HILBRICH, CUNNINGHAM & SCHWERD
Attorneys at Law
2637 - 45TH STREET
HIGHLAND, INDIANA 46322
TELEPHONE (219) 924-2427
FAX (219) 924-2481

JOHN FRANCIS HILBRICH
WILLIAM J. CUNNINGHAM
ROBERT M. SCHWERD
MICHAEL D. DOBOSZ
DANIEL B. VINOVICH
JONATHAN R. ANDERSON

PORTER COUNTY
6154 CENTRAL AVENUE
PORTAGE, INDIANA 46368
TELEPHONE (219) 762-2224

January 27, 1997

United States Environmental Protection Agency
Region 5
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

US EPA RECORDS CENTER REGION 5
464476

Attn: Attorney Michael McClary

Re: Ground Water Sampling Event
Griffith Landfill

Dear Mr. McClary:

On behalf of the Town of Griffith we wish to thank you and your staff for meeting with us on January 14, 1997 to discuss your proposed sampling of selected ground water monitoring wells at the Griffith Landfill. As we discussed during the meeting, the Town of Griffith requests that you provide information outlined below as part of an agreement to provide access to the selected existing monitoring wells at the landfill. This information is needed by our staff to develop a better understanding of the hydrogeological relationship between the landfill and the surrounding sites which you have studied extensively.

1. A copy of the sampling and analysis plan that will be used during the sampling event and a copy of the analytical laboratory QA/QC Plan.

2. A copy of the site plans showing the location of all existing monitoring wells that have been installed as part of the investigation of the area surrounding the Griffith Landfill including but not limited to the ACS Site.

3. A copy of the ground water flow maps prepared based on data obtained from the monitoring wells and piezometers installed for the ACS Site. At a minimum, it is requested that enough maps be provided to define seasonal fluctuations in the elevation and direction of flow of the ground water, including the most recent readings obtained in the Fall of 1996.

4. A copy of the most recent summary of historical analytical data obtained from all of the existing monitoring wells in the vicinity of this site.

5. A copy of the hydrogeologic report which describes the subsurface investigations that have been performed to date for the ACS Site as well as a description of the resulting interpretation of the hydrogeologic setting for this area.

6. A copy of the limits of contamination map that was presented to the Town Council during our meeting of January 14, 1997.

7. A copy of the design report that describe, in detail, the remediation program that will be utilized at the ACS Site as well as the timeline for the implementation of the remediation program.

8. A copy of all field data, laboratory results and correspondence related to the sampling, testing and evaluation of the ground water obtained from the Griffith Landfill provided as part of the normal distribution of data.

9. A copy of all future correspondence related to any actions regarding the ACS Site.

It is our understanding that you intend to instruct Montgomery Watson, the consultant retained by the ACS NPL Site Executive Committee, to sample and analyze ground water obtained from Monitoring Wells M-1S, M-2S, M-4S and M-4D in mid-February 1997. You have indicated that an EPA representative will be present throughout the sampling program at the Griffith Landfill and that split samples will be collected at each of these monitoring wells and sent to one of EPA's contract laboratories to be analyzed for the same list of parameters that will be performed by the laboratory used by Montgomery Watson. If we are mistaken regarding the understanding, please inform us of the procedures immediately.

In addition to the items outlined above, it will also be necessary to obtain a statement of indemnification from Montgomery Watson regarding potential damages at the Griffith Landfill that could occur during, or as a result of, the ground water sampling event.

Please forward the requested information to:

Robert M. Schwerd
2637 - 45th Street
Highland, Indiana 46322
(219) 924-2427

Upon receipt of this information, we will make final arrangements with Montgomery Watson for the referenced sampling event.

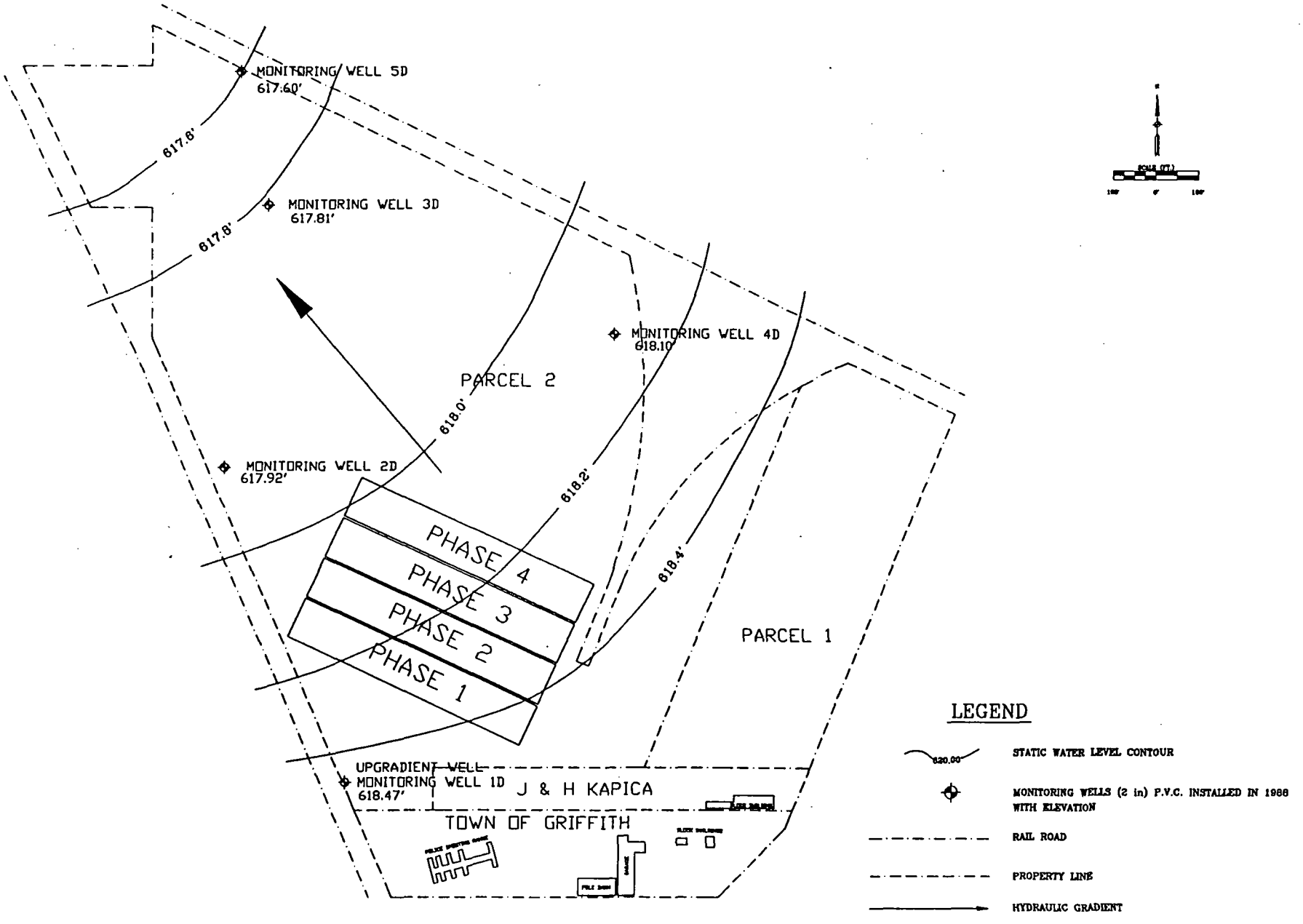
Sincerely,

Hilbrich, Cunningham & Schwerd

Robert M. Schwerd

RMS/clk

cc: Don Bryenton
Ron Cooper
Rick Konopasek
Stan Dobosz
Wayne Govert



LOWER AQUIFER 1-26-95
POTENTIOMETRIC MAP
GRIFFITH LANDFILL
GRIFFITH, INDIANA

JOB #: 1408
SCALE: 1" = 100'
SHEET: 2
OF: 2

R. E. BLATTERT & ASSOCIATES, INC.
CONSULTING ENGINEERS AND GEOLOGISTS
INDIANAPOLIS, INDIANA
AMES, IOWA

DRAWN BY: EAW
PROJECT MANAGER: EAW
CHECKED BY: WK
DATE: 3-29-95

REVISIONS

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

05939

K & S Testing and Engineering, Inc.
9715 Kennedy Ave.
Highland, IN. 46322

Report Date: 11/12/90
Sample Received: 10/27/90

Sample Description: Water - Griffith Landfill, Indiana

Date	Sample	Description	Chemical Oxygen Demand	Total Organic Carbon
10/25	8435	MW1S	60.	34
10/25	8436	MW1D	48.	25
10/25	8437	MW2S	56.	21
10/25	8438	MW2D	28.	32
10/25	8439	MW3S	92.	41
10/25	8440	MW3D	60.	20
10/25	8441	MW4S	360.	108
10/25	8442	MW4D	28.	13
10/25	8443	MW5S	250.	67
10/25	8444	MW5D	62.	34

All results expressed as ppm unless otherwise indicated.

Analyses performed using "Standard Methods for the Examination of Water and Wastewater", 17th Edition.

Karen Matchett

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

05940

K & S Testing and Engineering, Inc.
9715 Kennedy Ave.
Highland, IN. 46322

Report Date: 11/12/90
Sample Received: 10/27/90

Sample Description: Water - Griffith Landfill, Indiana

Date	Sample	Description	pH (units)	Total Dissolved Solids	Chloride	Magnesium/ Calcium	Hardness
10/25	8458	MW1S	7.16	990	55	42./210	700
10/25	8459	MW1D	7.57	650	22	55./140	580
10/25	8460	MW2S	7.51	730	49	36./160	550
10/25	8461	MW2D	7.59	650	6.1	53./130	540
10/25	8462	MW3S	7.23	730	54	49./340	1050
10/25	8463	MW3D	7.74	810	37	53./190	690
10/25	8464	MW4S	7.30	3400	10.30	63./670	1900
10/25	8465	MW4D	7.57	1100	153	36./100	400
10/25	8466	MW5S	7.05	1100	56	67./300	1020
10/25	8467	MW5D	7.63	980	3.7	53./180	670

All results expressed as ppm unless otherwise indicated.

Analyses performed using "Standard Methods for the Examination of Water and Wastewater", 17th Edition.

Karen Matchett

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

0593B

K & S Testing and Engineering, Inc.
9715 Kennedy Ave.
Highland, IN. 46322

Report Date: 11/12/90
Sample Received: 10/27/90

Sample Description: Water - Griffith Landfill, Indiana

Date	Sample	Description	Iron
10/25	8448	MW1S	18.
10/25	8449	MW1D	23.
10/25	8450	MW2S	20.
10/25	8451	MW2D	13.
10/25	8452	MW3S	76.
10/25	8453	MW3D	30.
10/25	8454	MW4S	64.
10/25	8455	MW4D	9.6
10/25	8456	MW5S	120
10/25	8457	MW5D	29.

All results expressed as ppm unless otherwise indicated.

Analyses performed using "Standard Methods for the Examination of Water and Wastewater", 17th Edition.

Karen Matchett

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

05949

K & S Testing and Engineering, Inc.
9715 Kennedy Ave.
Highland, IN. 46322

Report Date: 11/12/90
Sample Received: 10/27/90

Sample Description: Water - Griffith Landfill, Indiana MW1S
Sample No.: 8468

Volatile Organic Compounds:	Concentration Found In Sample
1. Acetone	18
2. Acrolein	<15.0
3. Acrylonitrile	<5.0
4. Benzene	<.1
5. Bromodichloromethane	<0.6
6. Bromoform	<4.0
7. Bromomethane	<0.7
8. 2-butanone (methyl ethyl ketone)	<10
9. Carbon disulfide	<1.0
10. Carbon tetrachloride	<0.6
11. Chlorobenzene	<0.6
12. Chlorodibromomethane	<1.0
13. Chloroethane	<0.7
14. 2-chloroethyl vinyl ether	<90.2
15. Chloroform	<0.5
16. Chloromethane	<1.0
17. Dibromomethane	<1.0
18. Dichlorodifluoromethane	<1.0
19. 1,1-dichloroethane	<0.5
20. 1,2-dichloroethene (total)	<1.0
21. cis-1,3-dichloropropene	<0.5
22. trans-1,3-dichloropropene	<0.9
23. Ethylbenzene	0.7

Leah E. Zeher

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

05949-A

K & S Testing and Engineering, Inc.
9715 Kennedy Ave.
Highland, IN. 46322

Report Date: 11/12/90
Sample Received: 10/27/90

Sample Description: Water - Griffith Landfill, Indiana MW1S
Sample No.: 8468

Volatile Organic Compounds:	Concentration Found In Sample
24. Ethyl methacrylate	<1.0
25. 2-hexanone	<5
26. Iodomethane	<1.0
27. Methylene chloride	<0.8
28. 4-methyl-2-pentanone	<5
29. Styrene	<1.0
30. 1,1,2,2-tetrachloroethane	<3.9
31. Toluene	4.4
32. 1,1,1-trichloroethane	<0.5
33. 1,1,2-trichloroethane	<2.5
34. Trichloroethene	<0.5
35. Trichlorofluoromethane	<0.5
36. 1,2,3-trichloropropane	<1.0
37. Vinyl acetate	<1.0
38. Vinyl chloride	<0.7
39. Xylenes (total)	3

All results expressed as ppb unless otherwise indicated.

Methods performed using EPA methods 8240 in accordance with SW-846, Third Edition.

Leah E. Zebre

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

05936

K & S Testing and Engineering, Inc.
9715 Kennedy Ave.
Highland, IN. 46322

Report Date: 11/12/90
Sample Received: 10/27/90

Sample Description: Water - Griffith Landfill, Indiana MW4S
Sample No.: 8470

Volatile Organic Compounds:	Concentration Found In Sample
1. Acetone	<1.0
2. Acrolein	<15.0
3. Acrylonitrile	<5.0
4. Benzene	<.1
5. Bromodichloromethane	<0.6
6. Bromoform	<4.0
7. Bromomethane	<0.7
8. 2-butanone (methyl ethyl ketone)	460
9. Carbon disulfide	<1.0
10. Carbon tetrachloride	<0.6
11. Chlorobenzene	<0.6
12. Chlorodibromomethane	<1.0
13. Chloroethane	160
14. 2-chloroethyl vinyl ether	<90.2
15. Chloroform	<0.5
16. Chloromethane	<1.0
17. Dibromomethane	<1.0
18. Dichlorodifluoromethane	<1.0
19. 1,1-dichloroethane	<0.5
20. 1,2-dichloroethene (total)	<1.0
21. cis-1,3-dichloropropene	<0.5
22. trans-1,3-dichloropropene	<0.9
23. Ethylbenzene	<0.6

Gail E. Fehr

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

05936-A

K & S Testing and Engineering, Inc.
9715 Kennedy Ave.
Highland, IN. 46322

Report Date: 11/12/90
Sample Received: 10/27/90

Sample Description: Water - Griffith Landfill, Indiana MW4S
Sample No.: 8470

Volatile Organic Compounds:	Concentration Found In Sample
24. Ethyl methacrylate	<1.0
25. 2-hexanone	<5
26. Iodomethane	<1.0
27. Methylene chloride	<0.8
28. 4-methyl-2-pentanone	<5
29. Styrene	<1.0
30. 1,1,2,2-tetrachloroethane	<3.9
31. Toluene	6.5
32. 1,1,1-trichloroethane	<0.5
33. 1,1,2-trichloroethane	<2.5
34. Trichloroethene	<0.5
35. Trichlorofluoromethane	<0.5
36. 1,2,3-trichloropropane	<1.0
37. Vinyl acetate	<1.0
38. Vinyl chloride	<0.7
39. Xylenes (total)	<0.9

All results expressed as ppb unless otherwise indicated.

Methods performed using EPA methods 8240 in accordance with SW-846, Third Edition.

Karl E. Rehn

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

05937

K & S Testing and Engineering, Inc.
9715 Kennedy Ave.
Highland, IN. 46322

Report Date: 11/12/90
Sample Received: 10/27/90

Sample Description: Water - Griffith Landfill, Indiana

Date	10/25	10/25
Sample	8445	8447
Description	Water MW1S	Water MW4S
Arsenic	<0.01	0.01
Barium	0.21	0.96
Cadmium	<0.01	<0.01
Chromium	0.02	0.01
Lead	0.05	0.04
Mercury	<0.01	<0.01
Selenium	<0.01	<0.01
Silver	<0.01	<0.01

All results expressed as ppm unless otherwise indicated.

Analyses performed using "Standard Methods for the Examination of Water and Wastewater", 17th Edition.

Karen Matchett

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

05941

K & S Testing and Engineering, Inc.
9715 Kennedy Ave.
Highland, IN. 46322

Report Date: 11/12/90
Sample Received: 10/27/90

Sample Description: Water - Griffith Landfill, Indiana

Date	Sample	Description	Nitrate	Fluoride
10/25	8458	MW1S	0.7	0.64
10/25	8459	MW1D	0.2	1.2
10/25	8460	MW2S	0.21	1.2
10/25	8461	MW2D	0.55	1.2
10/25	8462	MW3S	0.21	1.4
10/25	8463	MW3D	0.23	1.1
10/25	8464	MW4S	1.2	1.0
10/25	8465	MW4D	0.35	0.34
10/25	8466	MW5S	1.28	0.57
10/25	8467	MW5D	0.38	0.99

All results expressed as ppm unless otherwise indicated.

Analyses performed using "Standard Methods for the Examination of Water and Wastewater", 17th Edition.

Karen Matchett

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

05934

K & S Testing and Engineering, Inc.
9715 Kennedy Ave.
Highland, IN. 46322

Report Date: 11/12/90
Sample Received: 10/27/90

Sample Description: Water - Griffith Landfill, Indiana MW3S
Sample No.: 8469

Volatile Organic Compounds:	Concentration Found In Sample
1. Acetone	8.7
2. Acrolein	<15.0
3. Acrylonitrile	<5.0
4. Benzene	1.7
5. Bromodichloromethane	<0.6
6. Bromoform	<4.0
7. Bromomethane	<0.7
8. 2-butanone (methyl ethyl ketone)	<10
9. Carbon disulfide	<1.0
10. Carbon tetrachloride	<0.6
11. Chlorobenzene	<0.6
12. Chlorodibromomethane	<1.0
13. Chloroethane	<0.7
14. 2-chloroethyl vinyl ether	<90.2
15. Chloroform	<0.5
16. Chloromethane	<1.0
17. Dibromomethane	<1.0
18. Dichlorodifluoromethane	<1.0
19. 1,1-dichloroethane	<0.5
20. 1,2-dichloroethene (total)	<1.0
21. cis-1,3-dichloropropene	<0.5
22. trans-1,3-dichloropropene	<0.9
23. Ethylbenzene	<0.6

Leah E. Schue

LABORATORY

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

05934-A

K & S Testing and Engineering, Inc.
9715 Kennedy Ave.
Highland, IN. 46322

Report Date: 11/12/90
Sample Received: 10/27/90

Sample Description: Water - Griffith Landfill, Indiana MW3S
Sample No.: 8469

Volatile Organic Compounds:	Concentration Found In Sample
24. Ethyl methacrylate	<1.0
25. 2-hexanone	<5
26. Iodomethane	<1.0
27. Methylene chloride	<0.8
28. 4-methyl-2-pentanone	<5
29. Styrene	<1.0
30. 1,1,2,2-tetrachloroethane	<3.9
31. Toluene	2.5
32. 1,1,1-trichloroethane	<0.5
33. 1,1,2-trichloroethane	<2.5
34. Trichloroethene	<0.5
35. Trichlorofluoromethane	<0.5
36. 1,2,3-trichloropropane	<1.0
37. Vinyl acetate	<1.0
38. Vinyl chloride	<0.7
39. Xylenes (total)	3.5

All results expressed as ppb unless otherwise indicated.

Methods performed using EPA methods 8240 in accordance with SW-846, Third Edition.

Frank E. Zehnel

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

05937

K & S Testing and Engineering, Inc.
9715 Kennedy Ave.
Highland, IN. 46322

Report Date: 11/12/90
Sample Received: 10/27/90

Sample Description: Water - Griffith Landfill, Indiana

Date	10/25	10/25	10/25
Sample	8445	8446	8447
Description	Water MW1S	Water MW3S	Water MW4S
Arsenic	<0.01	0.05	0.01
Barium	0.21	0.23	0.96
Cadmium	<0.01	<0.01	<0.01
Chromium	0.02	<0.01	0.01
Lead	0.05	0.02	0.04
Mercury	<0.01	<0.01	<0.01
Selenium	<0.01	<0.01	<0.01
Silver	<0.01	<0.01	<0.01

All results expressed as ppm unless otherwise indicated.

Analyses performed using "Standard Methods for the Examination of Water and Wastewater", 17th Edition.

Karen Matchett

LABORATORY DIRECTOR

...g and Engineering Inc.
9715 Kennedy Ave. Highland, Indiana Phone: (219) 924-5231

CHAIN OF CUSTODY RECORD

PROJ. NO. 220 | PROJECT NAME: Griffith LF - Indiana

SAMPLERS: (Signature) Ja Troyer

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	As, Ba, Cd, Cr, Pb, Hg, Se, Ag, NO3	VOC - 8240 *	pH, TDS, Cl, Hardness (Mg)	(Cop), TOC	Fe	REMARKS
MW-1S	10/25/90	11:30A		✓	water	4	✓	✓	✓	✓	✓	- please return
MW-1D	10/25/90	11:40A		✓	water	3			✓	✓	✓	signed C-O-C Form
MW-2S	10/25/90	12:20P		✓	water	3			✓	✓	✓	
MW-2D	10/25/90	12:45P		✓	water	3			✓	✓	✓	
MW-3S	10/25/90	1:10P		✓	water	4	✓	✓	✓	✓	✓	- please test
MW-3D	10/25/90	1:20P		✓	water	3			✓	✓	✓	for organic constituent *
MW-4S	10/25/90	3:15P		✓	water	4	✓	✓	✓	✓	✓	in MW-1S, MW-3S
MW-4D	10/25/90	3:30P		✓	water	3			✓	✓	✓	& MW-5S per list
MW-5S	10/25/90	1:50P		✓	water	3			✓	✓	✓	in IAC-2-16-10
MW-5D	10/25/90	2:00P		✓	water	3			✓	✓	✓	
												- please follow
												USEPA - SW-846
												Test Methods

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Ja Troyer	10/26/90 12				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	
	10/26/90 5:20PM	Mike Hawer			

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

01470

K & S Testing and Engineering, Inc.
9715 Kennedy Ave.
Highland, IN. 46322

Report Date: 8/30/90
Sample Received: 7/31/90

Sample Description: ProjH 220 Griffith Landfill

Date	7/30	7/30	7/30	7/30	7/30	7/30	7/30
Sample	3941	3942	3943	3944	3945	3946	3947
Well Number	MW1D	MW1S	MW2S	MW2D	MW3S	MW3D	MW4S
Hardness	681	213	641	555	816	209	465
Total Dissolved Solids	450	480	580	510	710	230	530
Chloride	11	33	5	62	47	45	167
Chemical Oxygen Demand	132	116	92	102	122	96	36
Total Organic Carbon	16.3	38.7	19.1	26.8	40.1	63.5	23.8
Iron	14.	24.	22.	13.	27.	60.	6.1
pH (units)	6.6	6.4	6.4	6.3	6.4	6.3	6.7
Magnesium	75	48	83	46	68	47.	62
Calcium	149	6.3	120	146.	214.	6.4	84
Nitrate	0.60	<0.1	0.28	<0.1	0.23	0.14	0.20
Fluoride	0.90	6.38	1.10	0.67	0.63	1.30	0.58

All results expressed as ppm unless otherwise indicated.

Methods performed according to SW-846, "Test Methods for Evaluating Solid Waste".

Karen Matchett

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

01471

K & S Testing and Engineering, Inc.
9715 Kennedy Ave.
Highland, IN. 46322

Report Date: 8/30/90
Sample Received: 7/31/90

Sample Description: Proj# 220 Griffith Landfill

Date	7/30	7/30	7/30
Sample	3948	3949	3950
Well Number	MW4D	MW5S	MW5D
Hardness	288	692	888
Total Dissolved Solids	3620	520	820
Chloride	902	58	53
Chemical Oxygen Demand	512	138	108
Total Organic Carbon	130	28.3	56.0
Iron	62.	31.	42.
pH (units)	5.8	7.1	6.3
Magnesium	64.	77	59
Calcium	10.	150	258
Nitrate	0.35	0.30	<0.1
Fluoride	0.20	0.79	0.44

All results expressed as ppm unless otherwise indicated.

Methods performed according to SW-846, "Test Methods for Evaluating Solid Waste".

Karen Matchett

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

02320

K & S Testing and Engineering, Inc.
9715 Kennedy Ave.
Highland, IN. 46322

Report Date: 9/17/90
Sample Received: 7/13/90

Sample Description: Griffith Landfill MW-15
Sample No.: 3942

Volatile Organic Compounds:	Concentration Found In Sample
1. Acetone	10
2. Acrolein	<15.0
3. Acrylonitrile	<5.0
4. Benzene	3
5. Bromodichloromethane	<0.6
6. Bromoform	<4.0
7. Bromomethane	<0.7
8. 2-butanone (methyl ethyl ketone)	13
9. Carbon disulfide	<1.0
10. Carbon tetrachloride	<0.6
11. Chlorobenzene	<0.6
12. Chlorodibromomethane	<1.0
13. Chloroethane	<0.7
14. 2-chloroethyl vinyl ether	<90.2
15. Chloroform	4
16. Chloromethane	<1.0
17. Dibromomethane	<1.0
18. Dichlorodifluoromethane	<1.0
19. 1,1-dichloroethane	<0.5
20. 1,2-dichloroethene (total)	43
21. cis-1,3-dichloropropene	<0.5
22. trans-1,3-dichloropropene	<0.9
23. Ethylbenzene	<0.6

Leah E. Zehr

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

02320-A

K & S Testing and Engineering, Inc.
9715 Kennedy Ave.
Highland, IN. 46322

Report Date: 9/17/90
Sample Received: 7/13/90

Sample Description: Griffith Landfill MW-15
Sample No.: 3942

Volatile Organic Compounds:	Concentration Found In Sample
24. Ethyl methacrylate	<1.0
25. 2-hexanone	<5
26. Iodomethane	<1.0
27. Methylene chloride	<0.8
28. 4-methyl-2-pentanone	<5
29. Styrene	<1.0
30. 1,1,2,2-tetrachloroethane	<3.9
31. Toluene	5
32. 1,1,1-trichloroethane	2
33. 1,1,2-trichloroethane	<2.5
34. Trichloroethene	<0.5
35. Trichlorofluoromethane	<0.5
36. 1,2,3-trichloropropane	<1.0
37. Vinyl acetate	<1.0
38. Vinyl chloride	<0.7
39. Xylenes (total)	<0.9

All results expressed as ppb unless otherwise indicated.

Methods performed using EPA methods 8240 in accordance with SW-846, Third Edition.

Leah E. Zehner

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

02321

K & S Testing and Engineering, Inc.
9715 Kennedy Ave.
Highland, IN. 46322

Report Date: 9/17/90
Sample Received: 7/31/90

Sample Description: Griffith Landfill MW-45
Sample No.: 3948

Volatile Organic Compounds:	Concentration Found In Sample
1. Acetone	<1.0
2. Acrolein	<15.0
3. Acrylonitrile	<5.0
4. Benzene	12
5. Bromodichloromethane	<0.6
6. Bromoform	<4.0
7. Bromomethane	<0.7
8. 2-butanone (methyl ethyl ketone)	11
9. Carbon disulfide	<1.0
10. Carbon tetrachloride	<0.6
11. Chlorobenzene	<0.6
12. Chlorodibromomethane	<1.0
13. Chloroethane	<0.7
14. 2-chloroethyl vinyl ether	<90.2
15. Chloroform	5
16. Chloromethane	<1.0
17. Dibromomethane	<1.0
18. Dichlorodifluoromethane	<1.0
19. 1,1-dichloroethane	<0.5
20. 1,2-dichloroethene (total)	28
21. cis-1,3-dichloropropene	<0.5
22. trans-1,3-dichloropropene	<0.9
23. Ethylbenzene	<0.6

Frank E. Zehel

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

02321-A

K & S Testing and Engineering, Inc.
9715 Kennedy Ave.
Highland, IN. 46322

Report Date: 9/17/90
Sample Received: 7/31/90

Sample Description: Griffith Landfill MW-45
Sample No.: 3948

Volatile Organic Compounds:	Concentration Found In Sample
24. Ethyl methacrylate	<1.0
25. 2-hexanone	<5
26. Iodomethane	<1.0
27. Methylene chloride	<0.8
28. 4-methyl-2-pentanone	6
29. Styrene	<1.0
30. 1,1,2,2-tetrachloroethane	<3.9
31. Toluene	20
32. 1,1,1-trichloroethane	3
33. 1,1,2-trichloroethane	<2.5
34. Trichloroethene	<0.5
35. Trichlorofluoromethane	<0.5
36. 1,2,3-trichloropropane	<1.0
37. Vinyl acetate	<1.0
38. Vinyl chloride	<0.7
39. Xylenes (total)	<0.9

All results expressed as ppb unless otherwise indicated.

Methods performed using EPA methods 8240 in accordance with SW-846, Third Edition.

Leah E. Zeher

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT 01469

K & S Testing and Engineering, Inc.
9715 Kennedy Ave.
Highland, IN. 46322

Report Date: 8/30/90
Sample Received: 7/31/90

Sample Description: Proj #220 Griffith Landfill

Date	7/30	7/30
Sample	3942	3948
Well Number	MW1S	MW4D
Arsenic	0.08	<0.2
Barium	0.17	0.90
Cadmium	0.02	<0.01
Chromium	0.04	0.02
Lead	0.07	0.05
Mercury	<0.01	<0.01
Selenium	0.03	<0.2
Silver	<0.01	0.01

All results expressed as ppm unless otherwise indicated.

Methods performed according to SW-846, "Test Methods for Evaluating Solid Waste".

Karen Matchett

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

02319

K & S Testing and Engineering, Inc.
9715 Kennedy Ave.
Highland, IN. 46322

Report Date: 9/17/90
Sample Received: 7/13/90

Sample Description: Griffith Landfill MW-35
Sample No.: 3946

Volatile Organic Compounds:	Concentration Found In Sample
1. Acetone	5
2. Acrolein	<15.0
3. Acrylonitrile	<5.0
4. Benzene	5
5. Bromodichloromethane	1
6. Bromoform	<4.0
7. Bromomethane	<0.7
8. 2-butanone (methyl ethyl ketone)	12
9. Carbon disulfide	<1.0
10. Carbon tetrachloride	<0.6
11. Chlorobenzene	<0.6
12. Chlorodibromomethane	<1.0
13. Chloroethane	<0.7
14. 2-chloroethyl vinyl ether	<90.2
15. Chloroform	<0.5
16. Chloromethane	<1.0
17. Dibromomethane	<1.0
18. Dichlorodifluoromethane	<1.0
19. 1,1-dichloroethane	<0.5
20. 1,2-dichloroethene (total)	38
21. cis-1,3-dichloropropene	<0.5
22. trans-1,3-dichloropropene	<0.9
23. Ethylbenzene	<0.6

Leah E. Zehel

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

02319-A

K & S Testing and Engineering, Inc.
9715 Kennedy Ave.
Highland, IN. 46322

Report Date: 9/17/90
Sample Received: 7/13/90

Sample Description: Griffith Landfill MW-35
Sample No.: 3946

Volatile Organic Compounds:	Concentration Found In Sample
24. Ethyl methacrylate	<1.0
25. 2-hexanone	5
26. Iodomethane	<1.0
27. Methylene chloride	<0.8
28. 4-methyl-2-pentanone	7
29. Styrene	<1.0
30. 1,1,2,2-tetrachloroethane	<3.9
31. Toluene	11
32. 1,1,1-trichloroethane	3
33. 1,1,2-trichloroethane	<2.5
34. Trichloroethene	<0.5
35. Trichlorofluoromethane	<0.5
36. 1,2,3-trichloropropane	<1.0
37. Vinyl acetate	1
38. Vinyl chloride	<0.7
39. Xylenes (total)	<0.9

All results expressed as ppb unless otherwise indicated.

Methods performed using EPA methods 8240 in accordance with SW-846, Third Edition.

Leah E. Zehner

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

01943

K & S Testing and Engineering, Inc.
9715 Kennedy Ave.
Highland, IN. 46322

Report Date: 9/7/90
Sample Received: 7/31/90

Sample Description: Proj #220 Griffith Landfill

Date	7/30	7/30	7/30
Sample	3942	3945	3947
Well Number	MW1S	MW3S	MW4S
Arsenic	0.08	0.07	0.05
Barium	0.17	0.24	0.20
Cadmium	0.02	<0.01	<0.01
Chromium	0.04	0.03	0.01
Lead	0.07	0.05	0.06
Mercury	<0.01	<0.01	<0.01
Selenium	0.03	0.05	<0.01
Silver	<0.01	<0.01	0.01

All results expressed as ppm unless otherwise indicated.

Methods performed according to SW-846, "Test Methods for Evaluating Solid Waste".

Karen Matchett
LABORATORY DIRECTOR

K & S Testing and Engineering Inc.

9715 Kennedy Ave. Highland, Indiana Phone: (219) 924-5231

CHAIN OF CUSTODY RECORD

PROJ. NO.: 220

PROJECT NAME: Griffith LF

SAMPLERS: (Signature) J A Trezzo

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	As, Ba, Cd, Cr, Pb, Hg, Se, Ag, Ni, F	VOC - 8240	pH, TDS, Cl, Hardness, Cng, Fe	COD, TOC	Fe		REMARKS	
MW-1S	7/30/90	11:15A		✓	water	5	✓	✓	✓	✓	✓		- please return	3942
MW-1D	7/30/90	11:30A		✓	water	3			✓	✓	✓		signed COC form	3941
MW-2S	7/30/90	12:10P		✓	water	3			✓	✓	✓			3943
MW-2D	7/30/90	12:30P		✓	water	3			✓	✓	✓		- please test	3944
MW-3S	7/30/90	1:30P		✓	water	5	✓	✓	✓	✓	✓		constituents MW-1S	3945
MW-3D	7/30/90	1:45P		✓	water	3			✓	✓	✓		MW-3S & MW-4S	3946
MW-4S	7/30/90	2:50P		✓	water	5	✓	✓	✓	✓	✓		per list in IAC-2-16-10	3947
MW-4D	7/30/90	3:20P		✓	water	3			✓	✓	✓			3948
MW-5S	7/30/90	2:00P		✓	water	3			✓	✓	✓		- please follow	3949
MW-5D	7/30/90	2:20P		✓	water	3			✓	✓	✓		USEPA SW 846	3950
													Test Methods	~~[illegible]~~

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
J A Trezzo	7/31/90 10:55	Michael Mayon			
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	
Michael Mayon	7/31/90 ~~5:00~~ 5PM	[signature]			

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT 01469

K & S Testing and Engineering, Inc.
9715 Kennedy Ave.
Highland, IN. 46322

Report Date: 8/30/90
Sample Received: 7/31/90

Sample Description: Proj #220 Griffith Landfill

Date	7/30	7/30
Sample	3946	3948
Well Number	MW3D	MW4D
Arsenic	<0.2	<0.2
Barium	0.76	0.90
Cadmium	<0.01	<0.01
Chromium	0.05	0.02
Lead	0.08	0.05
Mercury	<0.01	<0.01
Selenium	<0.2	<0.2
Silver	<0.01	0.01

All results expressed as ppm unless otherwise indicated.

Methods performed according to SW-846, "Test Methods for Evaluating Solid Waste".

Karen Matchett

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

11645-D

K&S Testing
9715 Kennedy Avenue
Highland, IN. 46322

Report Date: 3/12/91
Sample Received: 2/01/91

Project Name: Griffith Landfill
Project No.: 220
Sample Description: Water

Date	Sample	Description	pH (Units)	Total Dissolved Solids	Chloride	Magnesium/ Calcium	Hardness
1/28	3278	MW-1D	7.5	308	38	46/96	430
1/28	3277	MW-1S	6.8	632	40	36/153	530
1/28	3280	MW-2D	7.2	498	6	44/90	410
1/28	3279	MW-2S	7.1	748	60	36/147	510
1/30	3282	MW-3D	7.2	520	40	48/131	530
1/30	3281	MW-3S	7.0	420	39	64/150	640
1/30	3284	MW-4D	7.2	556	147	42/83	380
1/30	3283	MW-4S	6.5	2,048	547	55/334	1100
1/30	3286	MW-5D	7.1	444	29	37/94	390
1/30	3285	MW-5S	6.6	584	58	34/170	560

All results expressed as ppm unless otherwise indicated.

Analyses performed using "Standard methods for the Examination of Water and Wastewater", 17th Edition.

Karen Matchett

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

11645-B

K&S Testing
9715 Kennedy Avenue
Highland, IN. 46322

Report Date: 3/12/91
Sample Received: 2/01/91

Project Name: Griffith Landfill
Project No.: 220
Sample Description: Water

Date	Sample	Description	Chemical Oxygen Demand	Total Organic Carbon
1/28	3278	MW-1D	24.0	13.9
1/28	3277	MW-1S	72.	25.7
1/28	3280	MW-2D	30.0	69.3
1/28	3279	MW-2S	68.0	25.3
1/30	3282	MW-3D	52.0	14.5
1/30	3281	MW-3S	160	33.6
1/30	3284	MW-4D	30.0	10.0
1/30	3283	MW-4S	264.	73.6
1/30	3286	MW-5D	50.0	19.9
1/30	3285	MW-5S	121.0	48.7

All results expressed as ppm unless otherwise indicated.

Analyses performed using "Standard methods for the Examination of Water and Wastewater", 17th Edition.

Karen Matchett

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

11645-A

K&S Testing
9715 Kennedy Avenue
Highland, IN. 46322

Report Date: 3/12/91
Sample Received: 2/01/91

Project Name: Griffith Landfill
Project No.: 220
Sample Description: Water

Date	Sample	Description	Iron
1/28	3278	MW-1D	7.9
1/28	3277	MW-1S	19.
1/28	3280	MW-2D	15.
1/28	3279	MW-2S	5.3
1/30	3282	MW-3D	38.
1/30	3281	MW-3S	9.3
1/30	3284	MW-4D	1.5
1/30	3283	MW-4S	7.8
1/30	3286	MW-5D	12.
1/30	3285	MW-5S	10.

All results expressed as ppm unless otherwise indicated.

Analyses performed using "Standard methods for the Examination of Water and Wastewater", 17th Edition.

Karen Matchett

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

95995

K & S Testing and Engineering, Inc.
9715 Kennedy Ave.
Highland, IN. 46322

Project Name: Griffith Landfill
Project Number: 220
Sample Description: Water MW1S
Sample No.:3277 A

Report Date: 2/20/91
Sample Received: 1/30/91

Volatile Organic Compounds:	Concentration Found In Sample	Concentration Found In Blank	MDL	Quantity Limit
1. Acetone	<1.0	<1.0	1.0	10
2. Acrolein	<15.0	<15.0	15.0	50
3. Acrylonitrile	<5.0	<5.0	5.0	50
4. Benzene	<0.1	0.1	0.1	5
5. Bromodichloromethane	<0.6	<0.6	0.6	5
6. Bromoform	<4.0	<0.4	0.4	5
7. Bromomethane	<0.7	<0.7	0.7	10
8. 2-butanone (methyl ethyl ketone)	<10.0	<10.0	10.0	20
9. Carbon disulfide	<1.0	<1.0	1.0	5
10. Carbon tetrachloride	<0.6	<0.6	0.6	5
11. Chlorobenzene	<0.6	<0.6	0.6	5
12. Chlorodibromomethane	<1.0	<1.0	1.0	5
13. Chloroethane	<0.7	<0.7	0.7	5
14. 2-chloroethyl vinyl ether	<90.2	<90.2	90.2	100
15. Chloroform	<0.5	<0.5	0.5	5
16. Chloromethane	<1.0	<1.0	1.0	5
17. Dibromomethane	<1.0	<1.0	1.0	5
18. Dichlorodifluoromethane	<1.0	<1.0	1.0	5
19. 1,1-dichloroethane	<0.5	<0.5	0.5	5
20. 1,1-dichloroethene (total	<1.0	<1.0	1.0	5
21. cis-1,3-dichloropropene	<0.5	<0.5	0.5	5
22. trans-1,3-dichloropropene	<0.9	<0.9	0.9	5
23. Ethylbenzene	<0.6	<0.6	0.6	5

Leah E. Zahn

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

95995-A

K & S Testing and Engineering, Inc.
9715 Kennedy Ave.
Highland, IN. 46322

Report Date: 2/20/91
Sample Received: 1/30/91

Project Name: Griffith Landfill
Project Number: 220
Sample Description: Water MW1S
Sample No.:3277 A

Volatile Organic Compounds	Concentration Found In Sample	Concentration Found In Blank	MDL	Quantity Limit
24. Ethyl methacrylate	<1.0	<1.0	1.0	5
25. 2-hexanone	<5.0	<5.0	5.0	20
26. Iodomethane	<1.0	<1.0	1.0	5
27. Methylene chloride	<0.8	<0.8	0.8	5
28. 4-methyl-2-pentanone	<5.0	<5.0	5.0	20
29. Styrene	<1.0	<1.0	1.0	5
30. 1,1,2,2-tetrachloroethane	<3.9	<3.9	3.9	5
31. Toluene	<0.5	<0.5	0.5	5
32. 1,1,1-trichloroethane	<0.5	<0.5	0.5	5
33. 1,1,2-trichloroethane	<2.5	<2.5	2.5	5
34. Trichloroethene	<0.5	<0.5	0.5	5
35. Trichlorofluoromethane	<0.5	<0.5	0.5	5
36. 1,2,3-trichloropropane	<1.0	<1.0	1.0	5
37. Vinyl acetate	<1.0	<1.0	1.0	5
38. Vinyl chloride	<0.7	<0.7	0.7	5
39. Xylenes (total)	<0.9	<0.9	0.9	5

All results expressed as ppb unless otherwise indicated.

Methods performed using EPA methods 8240 in accordance with SW-846, Third Edition.

Leah E. Zeller

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

95995

K & S Testing and Engineering, Inc.
9715 Kennedy Ave.
Highland, IN. 46322

Project Name: Griffith Landfill
Project Number: 220
Sample Description: Water MW4S
Sample No.:3283

Report Date: 2/20/91
Sample Received: 1/30/91

Volatile Organic Compounds:	Concentration Found In Sample	Concentration Found In Blank	MDL	Quantity Limit
1. Acetone	<1.0	<1.0	1.0	10
2. Acrolein	<15.0	<15.0	15.0	50
3. Acrylonitrile	<5.0	<5.0	5.0	50
4. Benzene	360	0.1	0.1	5
5. Bromodichloromethane	<0.6	<0.6	0.6	5
6. Bromoform	<4.0	<0.4	0.4	5
7. Bromomethane	<0.7	<0.7	0.7	10
8. 2-butanone (methyl ethyl ketone)	<10.0	<10.0	10.0	20
9. Carbon disulfide	<1.0	<1.0	1.0	5
10. Carbon tetrachloride	<0.6	<0.6	0.6	5
11. Chlorobenzene	<0.6	<0.6	0.6	5
12. Chlorodibromomethane	<1.0	<1.0	1.0	5
13. Chloroethane	<0.7	<0.7	0.7	5
14. 2-chloroethyl vinyl ether	<90.2	<90.2	90.2	100
15. Chloroform	<0.5	<0.5	0.5	5
16. Chloromethane	<1.0	<1.0	1.0	5
17. Dibromomethane	<1.0	<1.0	1.0	5
18. Dichlorodifluoromethane	<1.0	<1.0	1.0	5
19. 1,1-dichloroethane	<0.5	<0.5	0.5	5
20. 1,1-dichloroethene (total	24	<1.0	1.0	5
21. cis-1,3-dichloropropene	<0.5	<0.5	0.5	5
22. trans-1,3-dichloropropene	<0.9	<0.9	0.9	5
23. Ethylbenzene	<0.6	<0.6	0.6	5

Leah E. Zeher

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

95995-A

K & S Testing and Engineering, Inc.
9715 Kennedy Ave.
Highland, IN. 46322

Report Date: 2/20/91
Sample Received: 1/30/91

Project Name: Griffith Landfill
Project Number: 220
Sample Description: Water MW4S
Sample No.:3283

Volatile Organic Compounds	Concentration Found In Sample	Concentration Found In Blank	MDL	Quantity Limit
24. Ethyl methacrylate	<1.0	<1.0	1.0	5
25. 2-hexanone	<5.0	<5.0	5.0	20
26. Iodomethane	<1.0	<1.0	1.0	5
27. Methylene chloride	<0.8	<0.8	0.8	5
28. 4-methyl-2-pentanone	<5.0	<5.0	5.0	20
29. Styrene	<1.0	<1.0	1.0	5
30. 1,1,2,2-tetrachloroethane	<3.9	<3.9	3.9	5
31. Toluene	<0.5	<0.5	0.5	5
32. 1,1,1-trichloroethane	<0.5	<0.5	0.5	5
33. 1,1,2-trichloroethane	<2.5	<2.5	2.5	5
34. Trichloroethene	<0.5	<0.5	0.5	5
35. Trichlorofluoromethane	<0.5	<0.5	0.5	5
36. 1,2,3-trichloropropane	<1.0	<1.0	1.0	5
37. Vinyl acetate	<1.0	<1.0	1.0	5
38. Vinyl chloride	<0.7	<0.7	0.7	5
39. Xylenes (total)	<0.9	<0.9	0.9	5

All results expressed as ppb unless otherwise indicated.

Methods performed using EPA methods 8240 in accordance with SW-846, Third Edition.

Leah E. Zeher

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

11645

K&S Testing
9715 Kennedy Avenue
Highland, IN. 46322

Report Date: 3/12/91
Sample Received: 2/01/91

Project Name: Griffith Landfill
Project No.: 220
Sample Description: Water

Date	1/28	1/30
Sample	3277	3283
Description	MW-1S	MW-4S
Arsenic	<0.01	0.02
Barium	0.14	0.47
Cadmium	0.01	0.01
Chromium	0.03	0.02
Lead	0.06	0.07
Mercury	0.01	0.01
Selenium	<0.01	<0.01
Silver	<0.05	<0.05

All results expressed as ppm unless otherwise indicated.

Analyses performed using "Standard Methods for the Examination of Water and Wastewater", 17th Edition.

Karen Matchett

LABORATORY DIRECTOR

ENVIRONMENTAL
MONITORING AND
TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

11645-C

K&S Testing
9715 Kennedy Avenue
Highland, IN. 46322

Report Date: 3/12/91
Sample Received: 2/01/91

Project Name: Griffith Landfill
Project No.: 220
Sample Description: Water

Date	Sample	Description	Nitrate	Fluoride
1/28	3277	MW-1S	<0.1	0.76
1/30	3283	MW-4S	0.1	0.23

All results expressed as ppm unless otherwise indicated.

Analyses performed using "Standard methods for the Examination of Water and Wastewater", 17th Edition.

Karen Matchett

K & S Testing and Engineering Inc.

9715 Kennedy Ave. Highland, Indiana Phone: (219) 924-5231

CHAIN OF CUSTODY RECORD

PROJ. NO.: 220 | PROJECT NAME: Griffith Landfill

SAMPLERS: (Signature): Sudhir Mantri

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	As, Ba, Cd, Pb, Hg, Se, Mn, F	VOC - 8240	pH, TDS, Cl, Hardness (Hg/Ca)	COD, TOC	Fe		REMARKS
MW-1S	1/28/91	11:00A		✓	Water	7	✓	✓	✓	✓	✓		
MW-1D	1/28/91	11:20A		✓	Water	3			✓	✓	✓		- Please return signed
MW-2S	1/28/91	12:00N		✓	Water	3			✓	✓	✓		COC form.
MW-2D	1/28/91	12:20P		✓	Water	3			✓	✓	✓		
MW-3S	1/30/91	11:30A		✓	Water	7	✓	✓	✓	✓	✓		- Please test Constituents
MW-3D	1/30/91	12:00N		✓	Water	3			✓	✓	✓		MW-1S, MW-3S & MW-4S
MW-4S	1/30/91	2:00P		✓	Water	7	✓	✓	✓	✓	✓		Per list in IAC - 2-16-10
MW-4D	1/30/91	2:30 P		✓	Water	3			✓	✓	✓		
MW-5S	1/30/91	12:30P		✓	Water	3			✓	✓	✓		- Please follow
MW-5D	1/30/91	1:00P		✓	Water	3			✓	✓	✓		USEPA SW 846
													Test methods

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Sudhir Mantri	1/31/91 1:50	Anthony J Medina			
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	
Anthony J Medina	1/31/91 4:00				

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

K&S Testing and Engineering Inc.

9715 KENNEDY AVENUE • HIGHLAND, INDIANA 46322
(219) 924-5231 • (312) 734-5900 • FAX (219) 924-5271

March 20, 1991

File No. 220

Town of Griffith
111 North Broad Street
Griffith, IN 46319

Attn: Mr. John Bach - Director of Public Works

REF: Results of January 1991 Sampling of
Monitoring Well No. MW-3S
Supplemental Analytical Tests

Dear Mr. Bach:

During the Janaury 1991 groundwater sampling at Griffith Landfill, supplemental parameters were analyzed for Monitoring Well No. 3 in addition to the routine parameters. Monitoring Well Series No. 3 is located in the Western portion of the property adjacent to the former borrow pit. The supplemental analytical tests were performed for Phase II Monitoring Program constituents and are included as an attachment to this letter.

RESULTS OF THE SUPPLEMENTAL ANALYTICAL TESTS

Monitoring Well Series No. 3 consists of two (2) wells, MW-3S and MW-3D. Only MW-3S, a shallow monitoring well situated in the uppermost sand at approximately 11.0 feet in depth was analyzed.

During this sampling event, MW-3S did not indicate the presence of VOC's in the groundwater. The prior quarter, four VOC's were detected. Prior chemical analyses indicated BETX or petroleum hydrocarbon compounds and one VOC (acetone). Of the inorganic constituents, lead was present at an elevated level.

We appreciate the opportunity to be of service to you. If you have any questions regarding this letter, please call our office.

Very truly yours,
K & S Testing and Engineering, Inc.

Jerrold A. Trezzo
Senior Hydrogeologist

Dibakar Sundi, P.E.
Vice President

JAT:DS/vaj

File No. 220

ANALYTICAL RESULTS

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

95995

K & S Testing and Engineering, Inc.
9715 Kennedy Ave.
Highland, IN. 46322

Project Name: Griffith Landfill
Project Number: 220
Sample Description: Water MW3S
Sample No.:3281

Report Date: 2/20/91
Sample Received: 1/30/91

Volatile Organic Compounds:	Concentration Found In Sample	Concentration Found In Blank	MDL	Quantity Limit
1. Acetone	<1.0	<1.0	1.0	10
2. Acrolein	<15.0	<15.0	15.0	50
3. Acrylonitrile	<5.0	<5.0	5.0	50
4. Benzene	<0.1	0.1	0.1	5
5. Bromodichloromethane	<0.6	<0.6	0.6	5
6. Bromoform	<4.0	<0.4	0.4	5
7. Bromomethane	<0.7	<0.7	0.7	10
8. 2-butanone (methyl ethyl ketone)	<10.0	<10.0	10.0	20
9. Carbon disulfide	<1.0	<1.0	1.0	5
10. Carbon tetrachloride	<0.6	<0.6	0.6	5
11. Chlorobenzene	<0.6	<0.6	0.6	5
12. Chlorodibromomethane	<1.0	<1.0	1.0	5
13. Chloroethane	<0.7	<0.7	0.7	5
14. 2-chloroethyl vinyl ether	<90.2	<90.2	90.2	100
15. Chloroform	<0.5	<0.5	0.5	5
16. Chloromethane	<1.0	<1.0	1.0	5
17. Dibromomethane	<1.0	<1.0	1.0	5
18. Dichlorodifluoromethane	<1.0	<1.0	1.0	5
19. 1,1-dichloroethane	<0.5	<0.5	0.5	5
20. 1,1-dichloroethene (total	<1.0	<1.0	1.0	5
21. cis-1,3-dichloropropene	<0.5	<0.5	0.5	5
22. trans-1,3-dichloropropene	<0.9	<0.9	0.9	5
23. Ethylbenzene	<0.6	<0.6	0.6	5

Jack C. Zehner

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

95995-A

K & S Testing and Engineering, Inc.
9715 Kennedy Ave.
Highland, IN. 46322

Report Date: 2/20/91
Sample Received: 1/30/91

Project Name: Griffith Landfill
Project Number: 220
Sample Description: Water MW3S
Sample No.:3281

Volatile Organic Compounds	Concentration Found In Sample	Concentration Found In Blank	MDL	Quantity Limit
24. Ethyl methacrylate	<1.0	<1.0	1.0	5
25. 2-hexanone	<5.0	<5.0	5.0	20
26. Iodomethane	<1.0	<1.0	1.0	5
27. Methylene chloride	<0.8	<0.8	0.8	5
28. 4-methyl-2-pentanone	<5.0	<5.0	5.0	20
29. Styrene	<1.0	<1.0	1.0	5
30. 1,1,2,2-tetrachloroethane	<3.9	<3.9	3.9	5
31. Toluene	<0.5	<0.5	0.5	5
32. 1,1,1-trichloroethane	<0.5	<0.5	0.5	5
33. 1,1,2-trichloroethane	<2.5	<2.5	2.5	5
34. Trichloroethene	<0.5	<0.5	0.5	5
35. Trichlorofluoromethane	<0.5	<0.5	0.5	5
36. 1,2,3-trichloropropane	<1.0	<1.0	1.0	5
37. Vinyl acetate	<1.0	<1.0	1.0	5
38. Vinyl chloride	<0.7	<0.7	0.7	5
39. Xylenes (total)	<0.9	<0.9	0.9	5

All results expressed as ppb unless otherwise indicated.

Methods performed using EPA methods 8240 in accordance with SW-846, Third Edition.

Leah E. Zehner

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

11645

K&S Testing
9715 Kennedy Avenue
Highland, IN. 46322

Report Date: 3/12/91
Sample Received: 2/01/91

Project Name: Griffith Landfill
Project No.: 220
Sample Description: Water

Date	1/28	1/30	1/30
Sample	3277	3281	3283
Description	MW-1S	MW-3S	MW-4S
Arsenic	<0.01	0.04	0.02
Barium	0.14	0.15	0.47
Cadmium	0.01	0.01	0.01
Chromium	0.03	0.04	0.02
Lead	0.06	0.07	0.07
Mercury	0.01	0.01	0.01
Selenium	<0.01	<0.01	<0.01
Silver	<0.05	<0.05	<0.05

All results expressed as ppm unless otherwise indicated.

Analyses performed using "Standard Methods for the Examination of Water and Wastewater", 17th Edition.

Karen Matchett

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

11645-C

K&S Testing
9715 Kennedy Avenue
Highland, IN. 46322

Report Date: 3/12/91
Sample Received: 2/01/91

Project Name: Griffith Landfill
Project No.: 220
Sample Description: Water

Date	Sample	Description	Nitrate	Fluoride
1/28	3277	MW-1S	<0.1	0.76
1/30	3281	MW-3S	1.12	0.71
1/30	3283	MW-4S	0.1	0.23

All results expressed as ppm unless otherwise indicated.

Analyses performed using "Standard methods for the Examination of Water and Wastewater", 17th Edition.

Karen Matchett

LABORATORY DIRECTOR

K & S Testing and Engineering Inc.

9715 Kennedy Ave. Highland, Indiana Phone: (219) 924-5231

CHAIN OF CUSTODY RECORD

PROJ. NO.: 220 | PROJECT NAME: Griffith Landfill

SAMPLERS: (Signature) Sudhir Mantri

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	As, Ba, Cd, Pb, Hg, Se, Mn, F	VOC - 8240	pH, TDS, Cl, Hardness (Hg/Cr)	COD, TOC	Fe		REMARKS
MW-1S	1/28/91	11:00A		✓	Water	7	✓	✓	✓	✓	✓		
MW-1D	1/28/91	11:20A		✓	Water	3			✓	✓	✓		- Please return signed
MW-2S	1/28/91	12:00N		✓	Water	3			✓	✓	✓		COC form
MW-2D	1/28/91	12:20P		✓	Water	3			✓	✓	✓		
MW-3S	1/30/91	11:30A		✓	Water	7	✓	✓	✓	✓	✓		- Please test Constituents
MW-3D	1/30/91	12:00N		✓	Water	3			✓	✓	✓		MW-1S, MW-3S & MW-4S
MW-4S	1/30/91	2:00P		✓	Water	7	✓	✓	✓	✓	✓		Per list in IAC - 2-16-10
MW-4D	1/30/91	2:30 P		✓	Water	3			✓	✓	✓		
MW-5S	1/30/91	12:30P		✓	Water	3			✓	✓	✓		- Please follow
MW-5D	1/30/91	1:00P		✓	Water	3			✓	✓	✓		USEPA SW 846
													Test methods

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Sudhir Mantri	1/31/91 1:50	Anthony J Medina			
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	
Anthony J Medina	1/31/91 4:00				

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

15194

K & S Testing & Engineering, Inc.
9715 Kennedy Avenue
Highland, IN 46322

Project Name: Griffith Landfill
Project No.: 220

Report Date: 5/20/91
Sample Received: 5/1/91

Sample Description: Water

Sample No.:	7270	7271	
Description:	MW1-S 4/29/91 Water	MW1-D 4/29/91 Water	Date Analysed
Specific Conductance	950	840	5/15/91
Nitrate	<0.1	0.57	5/1/91
Total Phenolics	<0.5	<0.5	5/16/91
Chemical Oxygen Demand	20	20	5/8/91
Chloride	39	22	5/14/91
pH (units)	6.6	7.1	5/1/91
Total Dissolved Solids	620 mg/l	530 mg/l	5/6/91
Fluoride	0.3	0.7	5/15/91
Sulfate	90	120	5/14/91
Ammonia	8.0	9.5	5/6/91
Arsenic	<0.2	<0.2	5/6/91
Barium	0.15	0.24	5/6/91
Cadmium	<0.05	<0.05	5/6/91
Chromium	<0.05	<0.05	5/6/91
Lead	<0.05	<0.05	5/6/91
Mercury	<0.01	<0.01	5/8/91
Copper	<0.05	<0.05	5/6/91
Boron	<0.2	<0.2	5/6/91
Iron	14.	7.08	5/6/91
Manganese	0.54	0.12	5/6/91
Selenium	<0.2	<0.2	5/6/91
Silver	<0.05	<0.05	5/6/91
Sodium	22.	32.	5/6/91
Zinc	0.05	0.06	5/6/91

All results expressed as ppm unless otherwise indicated.

Analyses performed using "Standard Methods for the Examination of Water and Wastewater", 17th Edition.

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT 15193

K & S Testing & Engineering, Inc.
9715 Kennedy Avenue
Highland, IN 46322

Project Name: Griffith Landfill
Project No.: 220

Report Date: 5/20/91
Sample Received: 5/1/91

Sample Description: Water

Sample No.:	7272	7273	7274	7275	Date Analysed
Description:	MW2-S 4/30/91 Water	MW2-D 4/30/91 Water	MW3-S 4/29/91 Water	MW3-D 4/29/91 Water	
Specific Conductance	770	930	440	880	5/15/91
Ammonia	9.	10.	2.8	1.4	5/6/91
Chemical Oxygen Demand	<1.	4.0	9.6	20.	5/8/91
Chloride	2	53	31	39	5/14/91
pH (units)	7.2	6.7	6.4	6.9	5/1/91
Boron	<0.2	<0.2	<0.2	<0.2	5/7/91
Sodium	25.	27.	19.	20.	5/7/91
Total Phenolics	<0.5	<0.5	<0.5	<0.5	5/16/91

All results expressed as ppm unless otherwise indicated.

Analyses performed using "Standard Methods for the Examination of Water and Wastewater", 17th Edition.

Karen Matchett

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

15193-A

K & S Testing & Engineering, Inc.
9715 Kennedy Avenue
Highland, IN 46322

Project Name: Griffith Landfill
Project No.: 220

Report Date: 5/20/91
Sample Received: 5/1/91

Sample Description: Water

Sample No.:	7276	7277	7278	7279	Date Analysed
Description:	MW4-S 4/30/91 Water	MW4-D 4/30/91 Water	MW5-S 4/29/91 Water	MW5-D 4/29/91 Water	
Specific Conductance	3100	990	900	800	5/15/91
Ammonia	17.6	1.4	2.2	2.2	5/6/91
Chemical Oxygen Demand	160.	45.	95.	28.	5/8/91
Chloride	680	150	55	36	5/14/91
pH (units)	6.0	7.0	6.1	6.7	5/1/91
Boron	0.4	<0.2	<0.2	<0.2	5/7/91
Sodium	140.	71.	28.	18.	5/7/91
Total Phenolics	<0.5	<0.5	<0.5	<0.5	5/16/91

All results expressed as ppm unless otherwise indicated.

Analyses performed using "Standard Methods for the Examination of Water and Wastewater", 17th Edition.

Karen Matchett

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

16811

K & S Testing & Engineering, Inc.
9715 Kennedy Avenue
Highland, IN 46322

Project Name: Griffith Landfill

Report Date: 6/7/91
Sample Received: 5/1/91
Date Analysed: 5/13/91

Project No.: 220
Sample Description: MW-1S 4/29/91
Sample No.: 7270

Volatile Organic Compounds	Concentration Found in Sample	Concentration Found in Blank	Method Detection Limit	Quantitation Limit
1. Acetone	<1.0	<1.0	1.0	10
2. Acrolein	<15.0	<15.0	15.0	50
3. Acrylonitrile	<5.0	<5.0	5.0	50
4. Benzene	<0.1	<0.1	0.1	5
5. Bromodichloromethane	<0.6	<0.6	0.6	5
6. Bromoform	<4.0	<4.0	4.0	5
7. Bromomethane	<0.7	<0.7	0.7	10
8. 2-butanone (methyl ethyl ketone)	<10	<10	10	20
9. Carbon disulfide	<1.0	<1.0	1.0	5
10. Carbon tetrachloride	<0.6	<0.6	0.6	5
11. Chlorobenzene	<0.6	<0.6	0.6	5
12. Chlorodibromomethane	<1.0	<1.0	1.0	5
13. Chloroethane	<0.7	<0.7	0.7	5
14. 2-chloroethyl vinyl ether	<90.2	<90.2	90.2	100
15. Chloroform	<0.5	<0.5	0.5	5
16. Chloromethane	<1.0	<1.0	1.0	5
17. Dibromomethane	<1.0	<1.0	1.0	5
18. Dichlorodifluoromethane	<1.0	<1.0	1.0	5
19. 1,1-dichloroethane	<0.5	<0.5	0.5	5
20. 1,2-dichloroethane	<1.6	<1.6	1.6	5
21. 1,2-dichloroethene (total)	<1.0	<1.0	1.0	5
22. cis-1,3-dichloropropene	<0.5	<0.5	0.5	5
23. trans-1,3-dichloropropene	<0.9	<0.9	0.9	5
24. Ethylbenzene	<0.6	<0.6	0.6	5

Leah E. Zehner

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

16811

K & S Testing & Engineering, Inc.
9715 Kennedy Avenue
Highland, IN 46322

Project Name: Griffith Landfill

Report Date: 6/7/91
Sample Received: 5/1/91
Date Analysed: 5/13/91

Project No.: 220
Sample Description: MW-1S 4/29/91
Sample No.: 7270

Volatile Organic Compounds	Concentration Found in Sample	Concentration Found in Blank	Method Detection Limit	Quantitation Limit
25. Ethyl methacrylate	<1.0	<1.0	1.0	5
26. 2-hexanone	<5	<5	5	20
27. Iodomethane	<1.0	<1.0	1.0	5
28. Methylene chloride	<0.8	<0.8	0.8	5
29. 4-methyl-2-pentanone	<5	<5	5	20
30. Styrene	<1.0	<1.0	1.0	5
31. 1,1,2,2-tetrachloroethane	<3.9	<3.9	3.9	5
32. Toluene	4.1	<0.5	0.5	5
33. 1,1,1-trichloroethane	<0.5	<0.5	0.5	5
34. 1,1,2-trichloroethane	<2.5	<2.5	2.5	5
35. Trichloroethene	<0.5	<0.5	0.5	5
36. Trichlorofluoromethane	<0.5	<0.5	0.5	5
37. 1,2,3-trichloropropane	<1.0	<1.0	1.0	5
38. Vinyl acetate	<1.0	<1.0	1.0	5
39. Vinyl choride	<0.7	<0.7	0.7	5
40. Xylenes (total)	6.1	<0.9	0.9	5

All results expressed as ppb unless otherwise indicated.

Methods performed using EPA methods 8240 in accordance with SW-846, Third Edition.

Leah E. Zehner

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

16809

K & S Testing & Engineering, Inc.
9715 Kennedy Avenue
Highland, IN 46322

Project Name: Griffith Landfill

Report Date: 6/7/91
Sample Received: 5/1/91
Date Analysed: 5/13/91

Project No.: 220
Sample Description: MW-1D 4/29/91
Sample No.: 7271

Volatile Organic Compounds	Concentration Found in Sample	Concentration Found in Blank	Method Detection Limit	Quantitation Limit
1. Acetone	<1.0	<1.0	1.0	10
2. Acrolein	<15.0	<15.0	15.0	50
3. Acrylonitrile	<5.0	<5.0	5.0	50
4. Benzene	23	<0.1	0.1	5
5. Bromodichloromethane	<0.6	<0.6	0.6	5
6. Bromoform	<4.0	<4.0	4.0	5
7. Bromomethane	<0.7	<0.7	0.7	10
8. 2-butanone (methyl ethyl ketone)	<10	<10	10	20
9. Carbon disulfide	<1.0	<1.0	1.0	5
10. Carbon tetrachloride	<0.6	<0.6	0.6	5
11. Chlorobenzene	<0.6	<0.6	0.6	5
12. Chlorodibromomethane	<1.0	<1.0	1.0	5
13. Chloroethane	<0.7	<0.7	0.7	5
14. 2-chloroethyl vinyl ether	<90.2	<90.2	90.2	100
15. Chloroform	<0.5	<0.5	0.5	5
16. Chloromethane	<1.0	<1.0	1.0	5
17. Dibromomethane	<1.0	<1.0	1.0	5
18. Dichlorodifluoromethane	<1.0	<1.0	1.0	5
19. 1,1-dichloroethane	<0.5	<0.5	0.5	5
20. 1,2-dichloroethane	<1.6	<1.6	1.6	5
21. 1,2-dichloroethene (total)	<1.0	<1.0	1.0	5
22. cis-1,3-dichloropropene	<0.5	<0.5	0.5	5
23. trans-1,3-dichloropropene	<0.9	<0.9	0.9	5
24. Ethylbenzene	<0.6	<0.6	0.6	5

Leah E. Zehner

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

16809

K & S Testing & Engineering, Inc.
9715 Kennedy Avenue
Highland, IN 46322

Project Name: Griffith Landfill

Report Date: 6/7/91
Sample Received: 5/1/91
Date Analysed: 5/13/91

Project No.: 220
Sample Description: MW-1D 4/29/91
Sample No.: 7271

Volatile Organic Compounds	Concentration Found in Sample	Concentration Found in Blank	Method Detection Limit	Quantitation Limit
25. Ethyl methacrylate	<1.0	<1.0	1.0	5
26. 2-hexanone	<5	<5	5	20
27. Iodomethane	<1.0	<1.0	1.0	5
28. Methylene chloride	<0.8	<0.8	0.8	5
29. 4-methyl-2-pentanone	<5	<5	5	20
30. Styrene	<1.0	<1.0	1.0	5
31. 1,1,2,2-tetrachloroethane	<3.9	<3.9	3.9	5
32. Toluene	<0.5	<0.5	0.5	5
33. 1,1,1-trichloroethane	<0.5	<0.5	0.5	5
34. 1,1,2-trichloroethane	<2.5	<2.5	2.5	5
35. Trichloroethene	<0.5	<0.5	0.5	5
36. Trichlorofluoromethane	<0.5	<0.5	0.5	5
37. 1,2,3-trichloropropane	<1.0	<1.0	1.0	5
38. Vinyl acetate	<1.0	<1.0	1.0	5
39. Vinyl choride	<0.7	<0.7	0.7	5
40. Xylenes (total)	1.3	<0.9	0.9	5

All results expressed as ppb unless otherwise indicated.

Methods performed using EPA methods 8240 in accordance with SW-846, Third Edition.

Leah E. Zehner

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

16812

K & S Testing & Engineering, Inc.
9715 Kennedy Avenue
Highland, IN 46322

Project Name: Griffith Landfill

Report Date: 6/7/91
Sample Received: 5/1/91
Date Analysed: 5/13/91

Project No.: 220
Sample Description: MW-2S 4/30/91
Sample No.: 7272

Volatile Organic Compounds	Concentration Found in Sample	Concentration Found in Blank	Method Detection Limit	Quantitation Limit
1. Acetone	<1.0	<1.0	1.0	10
2. Acrolein	<15.0	<15.0	15.0	50
3. Acrylonitrile	<5.0	<5.0	5.0	50
4. Benzene	<0.1	<0.1	0.1	5
5. Bromodichloromethane	<0.6	<0.6	0.6	5
6. Bromoform	<4.0	<4.0	4.0	5
7. Bromomethane	<0.7	<0.7	0.7	10
8. 2-butanone (methyl ethyl ketone)	<10	<10	10	20
9. Carbon disulfide	<1.0	<1.0	1.0	5
10. Carbon tetrachloride	<0.6	<0.6	0.6	5
11. Chlorobenzene	<0.6	<0.6	0.6	5
12. Chlorodibromomethane	<1.0	<1.0	1.0	5
13. Chloroethane	<0.7	<0.7	0.7	5
14. 2-chloroethyl vinyl ether	<90.2	<90.2	90.2	100
15. Chloroform	<0.5	<0.5	0.5	5
16. Chloromethane	<1.0	<1.0	1.0	5
17. Dibromomethane	<1.0	<1.0	1.0	5
18. Dichlorodifluoromethane	<1.0	<1.0	1.0	5
19. 1,1-dichloroethane	<0.5	<0.5	0.5	5
20. 1,2-dichloroethane	<1.6	<1.6	1.6	5
21. 1,2-dichloroethene (total)	<1.0	<1.0	1.0	5
22. cis-1,3-dichloropropene	<0.5	<0.5	0.5	5
23. trans-1,3-dichloropropene	<0.9	<0.9	0.9	5
24. Ethylbenzene	<0.6	<0.6	0.6	5

Leah E. Zehner

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

16812

K & S Testing & Engineering, Inc.
9715 Kennedy Avenue
Highland, IN 46322

Project Name: Griffith Landfill

Report Date: 6/7/91
Sample Received: 5/1/91
Date Analysed: 5/13/91

Project No.: 220
Sample Description: MW-2S 4/30/91
Sample No.: 7272

Volatile Organic Compounds	Concentration Found in Sample	Concentration Found in Blank	Method Detection Limit	Quantitation Limit
25. Ethyl methacrylate	<1.0	<1.0	1.0	5
26. 2-hexanone	<5	<5	5	20
27. Iodomethane	<1.0	<1.0	1.0	5
28. Methylene chloride	<0.8	<0.8	0.8	5
29. 4-methyl-2-pentanone	<5	<5	5	20
30. Styrene	<1.0	<1.0	1.0	5
31. 1,1,2,2-tetrachloroethane	<3.9	<3.9	3.9	5
32. Toluene	<0.5	<0.5	0.5	5
33. 1,1,1-trichloroethane	<0.5	<0.5	0.5	5
34. 1,1,2-trichloroethane	<2.5	<2.5	2.5	5
35. Trichloroethene	<0.5	<0.5	0.5	5
36. Trichlorofluoromethane	<0.5	<0.5	0.5	5
37. 1,2,3-trichloropropane	<1.0	<1.0	1.0	5
38. Vinyl acetate	<1.0	<1.0	1.0	5
39. Vinyl choride	<0.7	<0.7	0.7	5
40. Xylenes (total)	2.3	<0.9	0.9	5

All results expressed as ppb unless otherwise indicated.

Methods performed using EPA methods 8240 in accordance with SW-846, Third Edition.

Leah E. Zehner

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

16810

K & S Testing & Engineering, Inc.
9715 Kennedy Avenue
Highland, IN 46322

Project Name: Griffith Landfill

Report Date: 6/7/91
Sample Received: 5/1/91
Date Analysed: 5/13/91

Project No.: 220
Sample Description: MW-2D 4/30/91
Sample No.: 7273

Volatile Organic Compounds	Concentration Found in Sample	Concentration Found in Blank	Method Detection Limit	Quantitation Limit
1. Acetone	<1.0	<1.0	1.0	10
2. Acrolein	<15.0	<15.0	15.0	50
3. Acrylonitrile	<5.0	<5.0	5.0	50
4. Benzene	<0.1	<0.1	0.1	5
5. Bromodichloromethane	<0.6	<0.6	0.6	5
6. Bromoform	<4.0	<4.0	4.0	5
7. Bromomethane	<0.7	<0.7	0.7	10
8. 2-butanone (methyl ethyl ketone)	<10	<10	10	20
9. Carbon disulfide	<1.0	<1.0	1.0	5
10. Carbon tetrachloride	<0.6	<0.6	0.6	5
11. Chlorobenzene	<0.6	<0.6	0.6	5
12. Chlorodibromomethane	<1.0	<1.0	1.0	5
13. Chloroethane	<0.7	<0.7	0.7	5
14. 2-chloroethyl vinyl ether	<90.2	<90.2	90.2	100
15. Chloroform	<0.5	<0.5	0.5	5
16. Chloromethane	<1.0	<1.0	1.0	5
17. Dibromomethane	<1.0	<1.0	1.0	5
18. Dichlorodifluoromethane	<1.0	<1.0	1.0	5
19. 1,1-dichloroethane	<0.5	<0.5	0.5	5
20. 1,2-dichloroethane	<1.6	<1.6	1.6	5
21. 1,2-dichloroethene (total)	<1.0	<1.0	1.0	5
22. cis-1,3-dichloropropene	<0.5	<0.5	0.5	5
23. trans-1,3-dichloropropene	<0.9	<0.9	0.9	5
24. Ethylbenzene	<0.6	<0.6	0.6	5

Leah E. Zehner

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

16810

K & S Testing & Engineering, Inc.
9715 Kennedy Avenue
Highland, IN 46322

Project Name: Griffith Landfill

Report Date: 6/7/91
Sample Received: 5/1/91
Date Analysed: 5/13/91

Project No.: 220
Sample Description: MW-2D 4/30/91
Sample No.: 7273

Volatile Organic Compounds	Concentration Found in Sample	Concentration Found in Blank	Method Detection Limit	Quantitation Limit
25. Ethyl methacrylate	<1.0	<1.0	1.0	5
26. 2-hexanone	<5	<5	5	20
27. Iodomethane	<1.0	<1.0	1.0	5
28. Methylene chloride	<0.8	<0.8	0.8	5
29. 4-methyl-2-pentanone	<5	<5	5	20
30. Styrene	<1.0	<1.0	1.0	5
31. 1,1,2,2-tetrachloroethane	<3.9	<3.9	3.9	5
32. Toluene	0.7	<0.5	0.5	5
33. 1,1,1-trichloroethane	<0.5	<0.5	0.5	5
34. 1,1,2-trichloroethane	<2.5	<2.5	2.5	5
35. Trichloroethene	<0.5	<0.5	0.5	5
36. Trichlorofluoromethane	<0.5	<0.5	0.5	5
37. 1,2,3-trichloropropane	<1.0	<1.0	1.0	5
38. Vinyl acetate	<1.0	<1.0	1.0	5
39. Vinyl choride	<0.7	<0.7	0.7	5
40. Xylenes (total)	1.1	<0.9	0.9	5

All results expressed as ppb unless otherwise indicated.

Methods performed using EPA methods 8240 in accordance with SW-846, Third Edition.

Leah E. Zehner

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

15826

K & S Testing & Engineering, Inc.
9715 Kennedy Avenue
Highland, IN 46322

Project Name: Griffith Landfill

Report Date: 6/7/91
Sample Received: 5/1/91
Date Analysed: 5/13/91

Project No.: 220
Sample Description: MW-3S 4/29/91
Sample No.: 7274

Volatile Organic Compounds	Concentration Found in Sample	Concentration Found in Blank	Method Detection Limit	Quantitation Limit
1. Acetone	<1.0	<1.0	1.0	10
2. Acrolein	<15.0	<15.0	15.0	50
3. Acrylonitrile	<5.0	<5.0	5.0	50
4. Benzene	<0.1	<0.1	0.1	5
5. Bromodichloromethane	<0.6	<0.6	0.6	5
6. Bromoform	<4.0	<4.0	4.0	5
7. Bromomethane	<0.7	<0.7	0.7	10
8. 2-butanone (methyl ethyl ketone)	<10	<10	10	20
9. Carbon disulfide	<1.0	<1.0	1.0	5
10. Carbon tetrachloride	<0.6	<0.6	0.6	5
11. Chlorobenzene	<0.6	<0.6	0.6	5
12. Chlorodibromomethane	<1.0	<1.0	1.0	5
13. Chloroethane	<0.7	<0.7	0.7	5
14. 2-chloroethyl vinyl ether	<90.2	<90.2	90.2	100
15. Chloroform	<0.5	<0.5	0.5	5
16. Chloromethane	<1.0	<1.0	1.0	5
17. Dibromomethane	<1.0	<1.0	1.0	5
18. Dichlorodifluoromethane	<1.0	<1.0	1.0	5
19. 1,1-dichloroethane	<0.5	<0.5	0.5	5
20. 1,2-dichloroethane	<1.6	<1.6	1.6	5
21. 1,2-dichloroethene (total)	<1.0	<1.0	1.0	5
22. cis-1,3-dichloropropene	<0.5	<0.5	0.5	5
23. trans-1,3-dichloropropene	<0.9	<0.9	0.9	5
24. Ethylbenzene	<0.6	<0.6	0.6	5

Leah E. Zehner

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

15826

K & S Testing & Engineering, Inc.
9715 Kennedy Avenue
Highland, IN 46322

Project Name: Griffith Landfill

Report Date: 6/7/91
Sample Received: 5/1/91
Date Analysed: 5/13/91

Project No.: 220
Sample Description: MW-3S 4/29/91
Sample No.: 7274

Volatile Organic Compounds	Concentration Found in Sample	Concentration Found in Blank	Method Detection Limit	Quantitation Limit
25. Ethyl methacrylate	<1.0	<1.0	1.0	5
26. 2-hexanone	<5	<5	5	20
27. Iodomethane	<1.0	<1.0	1.0	5
28. Methylene chloride	<0.8	<0.8	0.8	5
29. 4-methyl-2-pentanone	<5	<5	5	20
30. Styrene	<1.0	<1.0	1.0	5
31. 1,1,2,2-tetrachloroethane	<3.9	<3.9	3.9	5
32. Toluene	<0.5	<0.5	0.5	5
33. 1,1,1-trichloroethane	<0.5	<0.5	0.5	5
34. 1,1,2-trichloroethane	<2.5	<2.5	2.5	5
35. Trichloroethene	<0.5	<0.5	0.5	5
36. Trichlorofluoromethane	<0.5	<0.5	0.5	5
37. 1,2,3-trichloropropane	<1.0	<1.0	1.0	5
38. Vinyl acetate	<1.0	<1.0	1.0	5
39. Vinyl choride	<0.7	<0.7	0.7	5
40. Xylenes (total)	<0.9	<0.9	0.9	5

All results expressed as ppb unless otherwise indicated.

Methods performed using EPA methods 8240 in accordance with SW-846, Third Edition.

Leah E. Zeller

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

15827

K & S Testing & Engineering, Inc.
9715 Kennedy Avenue
Highland, IN 46322

Project Name: Griffith Landfill

Report Date: 6/7/91
Sample Received: 5/1/91
Date Analysed: 5/13/91

Project No.: 220
Sample Description: MW-3D 4/29/91
Sample No.: 7275

Volatile Organic Compounds	Concentration Found in Sample	Concentration Found in Blank	Method Detection Limit	Quantitation Limit
1. Acetone	<1.0	<1.0	1.0	10
2. Acrolein	<15.0	<15.0	15.0	50
3. Acrylonitrile	<5.0	<5.0	5.0	50
4. Benzene	<0.1	<0.1	0.1	5
5. Bromodichloromethane	<0.6	<0.6	0.6	5
6. Bromoform	<4.0	<4.0	4.0	5
7. Bromomethane	<0.7	<0.7	0.7	10
8. 2-butanone (methyl ethyl ketone)	<10	<10	10	20
9. Carbon disulfide	<1.0	<1.0	1.0	5
10. Carbon tetrachloride	<0.6	<0.6	0.6	5
11. Chlorobenzene	<0.6	<0.6	0.6	5
12. Chlorodibromomethane	<1.0	<1.0	1.0	5
13. Chloroethane	<0.7	<0.7	0.7	5
14. 2-chloroethyl vinyl ether	<90.2	<90.2	90.2	100
15. Chloroform	<0.5	<0.5	0.5	5
16. Chloromethane	<1.0	<1.0	1.0	5
17. Dibromomethane	<1.0	<1.0	1.0	5
18. Dichlorodifluoromethane	<1.0	<1.0	1.0	5
19. 1,1-dichloroethane	<0.5	<0.5	0.5	5
20. 1,2-dichloroethane	<1.6	<1.6	1.6	5
21. 1,2-dichloroethene (total)	<1.0	<1.0	1.0	5
22. cis-1,3-dichloropropene	<0.5	<0.5	0.5	5
23. trans-1,3-dichloropropene	<0.9	<0.9	0.9	5
24. Ethylbenzene	<0.6	<0.6	0.6	5

Leah E. Zehner

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

15827

K & S Testing & Engineering, Inc.
9715 Kennedy Avenue
Highland, IN 46322

Project Name: Griffith Landfill

Report Date: 6/7/91
Sample Received: 5/1/91
Date Analysed: 5/13/91

Project No.: 220
Sample Description: MW-3D 4/29/91
Sample No.: 7275

Volatile Organic Compounds	Concentration Found in Sample	Concentration Found in Blank	Method Detection Limit	Quantitation Limit
25. Ethyl methacrylate	<1.0	<1.0	1.0	5
26. 2-hexanone	<5	<5	5	20
27. Iodomethane	<1.0	<1.0	1.0	5
28. Methylene chloride	<0.8	<0.8	0.8	5
29. 4-methyl-2-pentanone	<5	<5	5	20
30. Styrene	<1.0	<1.0	1.0	5
31. 1,1,2,2-tetrachloroethane	<3.9	<3.9	3.9	5
32. Toluene	<0.5	<0.5	0.5	5
33. 1,1,1-trichloroethane	<0.5	<0.5	0.5	5
34. 1,1,2-trichloroethane	<2.5	<2.5	2.5	5
35. Trichloroethene	<0.5	<0.5	0.5	5
36. Trichlorofluoromethane	<0.5	<0.5	0.5	5
37. 1,2,3-trichloropropane	<1.0	<1.0	1.0	5
38. Vinyl acetate	<1.0	<1.0	1.0	5
39. Vinyl choride	<0.7	<0.7	0.7	5
40. Xylenes (total)	0.9	<0.9	0.9	5

All results expressed as ppb unless otherwise indicated.

Methods performed using EPA methods 8240 in accordance with SW-846, Third Edition.

Leah E. Zehner

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

15829

K & S Testing & Engineering, Inc.
9715 Kennedy Avenue
Highland, IN 46322

Project Name: Griffith Landfill

Report Date: 6/7/91
Sample Received: 5/1/91
Date Analysed: 5/13/91

Project No.: 220
Sample Description: MW-4S 4/30/91
Sample No.: 7276

Volatile Organic Compounds	Concentration Found in Sample	Concentration Found in Blank	Method Detection Limit	Quantitation Limit
1. Acetone	<1.0	<1.0	1.0	10
2. Acrolein	<15.0	<15.0	15.0	50
3. Acrylonitrile	<5.0	<5.0	5.0	50
4. Benzene	<0.1	<0.1	0.1	5
5. Bromodichloromethane	<0.6	<0.6	0.6	5
6. Bromoform	<4.0	<4.0	4.0	5
7. Bromomethane	<0.7	<0.7	0.7	10
8. 2-butanone (methyl ethyl ketone)	<10	<10	10	20
9. Carbon disulfide	<1.0	<1.0	1.0	5
10. Carbon tetrachloride	<0.6	<0.6	0.6	5
11. Chlorobenzene	<0.6	<0.6	0.6	5
12. Chlorodibromomethane	<1.0	<1.0	1.0	5
13. Chloroethane	<0.7	<0.7	0.7	5
14. 2-chloroethyl vinyl ether	<90.2	<90.2	90.2	100
15. Chloroform	<0.5	<0.5	0.5	5
16. Chloromethane	<1.0	<1.0	1.0	5
17. Dibromomethane	<1.0	<1.0	1.0	5
18. Dichlorodifluoromethane	<1.0	<1.0	1.0	5
19. 1,1-dichloroethane	<0.5	<0.5	0.5	5
20. 1,2-dichloroethane	<1.6	<1.6	1.6	5
21. 1,2-dichloroethene (total)	<1.0	<1.0	1.0	5
22. cis-1,3-dichloropropene	<0.5	<0.5	0.5	5
23. trans-1,3-dichloropropene	<0.9	<0.9	0.9	5
24. Ethylbenzene	<0.6	<0.6	0.6	5

Leah E. Zehner

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

15829

K & S Testing & Engineering, Inc.
9715 Kennedy Avenue
Highland, IN 46322

Project Name: Griffith Landfill

Report Date: 6/7/91
Sample Received: 5/1/91
Date Analysed: 5/13/91

Project No.: 220
Sample Description: MW-4S 4/30/91
Sample No.: 7276

Volatile Organic Compounds	Concentration Found in Sample	Concentration Found in Blank	Method Detection Limit	Quantitation Limit
25. Ethyl methacrylate	<1.0	<1.0	1.0	5
26. 2-hexanone	<5	<5	5	20
27. Iodomethane	<1.0	<1.0	1.0	5
28. Methylene chloride	<0.8	<0.8	0.8	5
29. 4-methyl-2-pentanone	<5	<5	5	20
30. Styrene	<1.0	<1.0	1.0	5
31. 1,1,2,2-tetrachloroethane	<3.9	<3.9	3.9	5
32. Toluene	<0.5	<0.5	0.5	5
33. 1,1,1-trichloroethane	<0.5	<0.5	0.5	5
34. 1,1,2-trichloroethane	<2.5	<2.5	2.5	5
35. Trichloroethene	<0.5	<0.5	0.5	5
36. Trichlorofluoromethane	<0.5	<0.5	0.5	5
37. 1,2,3-trichloropropane	<1.0	<1.0	1.0	5
38. Vinyl acetate	<1.0	<1.0	1.0	5
39. Vinyl choride	<0.7	<0.7	0.7	5
40. Xylenes (total)	1.5	<0.9	0.9	5

All results expressed as ppb unless otherwise indicated.

Methods performed using EPA methods 8240 in accordance with SW-846, Third Edition.

Leah E. Zahren

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

16813

K & S Testing & Engineering, Inc.
9715 Kennedy Avenue
Highland, IN 46322

Project Name: Griffith Landfill

Report Date: 6/7/91
Sample Received: 5/1/91
Date Analysed: 5/13/91

Project No.: 220
Sample Description: MW-4D 4/30/91
Sample No.: 7277

Volatile Organic Compounds	Concentration Found in Sample	Concentration Found in Blank	Method Detection Limit	Quantitation Limit
1. Acetone	<1.0	<1.0	1.0	10
2. Acrolein	<15.0	<15.0	15.0	50
3. Acrylonitrile	<5.0	<5.0	5.0	50
4. Benzene	<0.1	<0.1	0.1	5
5. Bromodichloromethane	<0.6	<0.6	0.6	5
6. Bromoform	<4.0	<4.0	4.0	5
7. Bromomethane	<0.7	<0.7	0.7	10
8. 2-butanone (methyl ethyl ketone)	<10	<10	10	20
9. Carbon disulfide	<1.0	<1.0	1.0	5
10. Carbon tetrachloride	<0.6	<0.6	0.6	5
11. Chlorobenzene	<0.6	<0.6	0.6	5
12. Chlorodibromomethane	<1.0	<1.0	1.0	5
13. Chloroethane	<0.7	<0.7	0.7	5
14. 2-chloroethyl vinyl ether	<90.2	<90.2	90.2	100
15. Chloroform	<0.5	<0.5	0.5	5
16. Chloromethane	<1.0	<1.0	1.0	5
17. Dibromomethane	<1.0	<1.0	1.0	5
18. Dichlorodifluoromethane	<1.0	<1.0	1.0	5
19. 1,1-dichloroethane	<0.5	<0.5	0.5	5
20. 1,2-dichloroethane	<1.6	<1.6	1.6	5
21. 1,2-dichloroethene (total)	<1.0	<1.0	1.0	5
22. cis-1,3-dichloropropene	<0.5	<0.5	0.5	5
23. trans-1,3-dichloropropene	<0.9	<0.9	0.9	5
24. Ethylbenzene	<0.6	<0.6	0.6	5

Leah E. Zehner

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

16813

K & S Testing & Engineering, Inc.
9715 Kennedy Avenue
Highland, IN 46322

Project Name: Griffith Landfill

Report Date: 6/7/91
Sample Received: 5/1/91
Date Analysed: 5/13/91

Project No.: 220
Sample Description: MW-4D 4/30/91
Sample No.: 7277

Volatile Organic Compounds	Concentration Found in Sample	Concentration Found in Blank	Method Detection Limit	Quantitation Limit
25. Ethyl methacrylate	<1.0	<1.0	1.0	5
26. 2-hexanone	<5	<5	5	20
27. Iodomethane	<1.0	<1.0	1.0	5
28. Methylene chloride	<0.8	<0.8	0.8	5
29. 4-methyl-2-pentanone	<5	<5	5	20
30. Styrene	<1.0	<1.0	1.0	5
31. 1,1,2,2-tetrachloroethane	<3.9	<3.9	3.9	5
32. Toluene	1.1	<0.5	0.5	5
33. 1,1,1-trichloroethane	<0.5	<0.5	0.5	5
34. 1,1,2-trichloroethane	<2.5	<2.5	2.5	5
35. Trichloroethene	<0.5	<0.5	0.5	5
36. Trichlorofluoromethane	<0.5	<0.5	0.5	5
37. 1,2,3-trichloropropane	<1.0	<1.0	1.0	5
38. Vinyl acetate	<1.0	<1.0	1.0	5
39. Vinyl choride	<0.7	<0.7	0.7	5
40. Xylenes (total)	2.2	<0.9	0.9	5

All results expressed as ppb unless otherwise indicated.

Methods performed using EPA methods 8240 in accordance with SW-846, Third Edition.

Leah E. Zehner

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

15825

K & S Testing & Engineering, Inc.
9715 Kennedy Avenue
Highland, IN 46322

Project Name: Griffith Landfill

Report Date: 6/7/91
Sample Received: 5/1/91
Date Analysed: 5/13/91

Project No.: 220
Sample Description: MW-5S 4/29/91
Sample No.: 7278

Volatile Organic Compounds	Concentration Found in Sample	Concentration Found in Blank	Method Detection Limit	Quantitation Limit
1. Acetone	<1.0	<1.0	1.0	10
2. Acrolein	<15.0	<15.0	15.0	50
3. Acrylonitrile	<5.0	<5.0	5.0	50
4. Benzene	<0.1	<0.1	0.1	5
5. Bromodichloromethane	<0.6	<0.6	0.6	5
6. Bromoform	<4.0	<4.0	4.0	5
7. Bromomethane	<0.7	<0.7	0.7	10
8. 2-butanone (methyl ethyl ketone)	<10	<10	10	20
9. Carbon disulfide	<1.0	<1.0	1.0	5
10. Carbon tetrachloride	<0.6	<0.6	0.6	5
11. Chlorobenzene	<0.6	<0.6	0.6	5
12. Chlorodibromomethane	<1.0	<1.0	1.0	5
13. Chloroethane	<0.7	<0.7	0.7	5
14. 2-chloroethyl vinyl ether	<90.2	<90.2	90.2	100
15. Chloroform	<0.5	<0.5	0.5	5
16. Chloromethane	<1.0	<1.0	1.0	5
17. Dibromomethane	<1.0	<1.0	1.0	5
18. Dichlorodifluoromethane	<1.0	<1.0	1.0	5
19. 1,1-dichloroethane	<0.5	<0.5	0.5	5
20. 1,2-dichloroethane	<1.6	<1.6	1.6	5
21. 1,2-dichloroethene (total)	<1.0	<1.0	1.0	5
22. cis-1,3-dichloropropene	<0.5	<0.5	0.5	5
23. trans-1,3-dichloropropene	<0.9	<0.9	0.9	5
24. Ethylbenzene	<0.6	<0.6	0.6	5

Leah E. Zehner

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

15825

K & S Testing & Engineering, Inc.
9715 Kennedy Avenue
Highland, IN 46322

Project Name: Griffith Landfill

Report Date: 6/7/91
Sample Received: 5/1/91
Date Analysed: 5/13/91

Project No.: 220
Sample Description: MW-5S 4/29/91
Sample No.: 7278

Volatile Organic Compounds	Concentration Found in Sample	Concentration Found in Blank	Method Detection Limit	Quantitation Limit
25. Ethyl methacrylate	<1.0	<1.0	1.0	5
26. 2-hexanone	<5	<5	5	20
27. Iodomethane	<1.0	<1.0	1.0	5
28. Methylene chloride	<0.8	<0.8	0.8	5
29. 4-methyl-2-pentanone	<5	<5	5	20
30. Styrene	<1.0	<1.0	1.0	5
31. 1,1,2,2-tetrachloroethane	<3.9	<3.9	3.9	5
32. Toluene	<0.5	<0.5	0.5	5
33. 1,1,1-trichloroethane	<0.5	<0.5	0.5	5
34. 1,1,2-trichloroethane	15	<2.5	2.5	5
35. Trichloroethene	<0.5	<0.5	0.5	5
36. Trichlorofluoromethane	<0.5	<0.5	0.5	5
37. 1,2,3-trichloropropane	<1.0	<1.0	1.0	5
38. Vinyl acetate	<1.0	<1.0	1.0	5
39. Vinyl choride	<0.7	<0.7	0.7	5
40. Xylenes (total)	2.1	<0.9	0.9	5

All results expressed as ppb unless otherwise indicated.

Methods performed using EPA methods 8240 in accordance with SW-846, Third Edition.

Leah E. Zeller

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

16843

K & S Testing & Engineering, Inc.
9715 Kennedy Avenue
Highland, IN 46322

Project Name: Griffith Landfill

Report Date: 6/7/91
Sample Received: 5/1/91
Date Analysed: 5/13/91

Project No.: 220
Sample Description: MW-5D 4/29/91
Sample No.: 7279

Volatile Organic Compounds	Concentration Found in Sample	Concentration Found in Blank	Method Detection Limit	Quantitation Limit
1. Acetone	<1.0	<1.0	1.0	10
2. Acrolein	<15.0	<15.0	15.0	50
3. Acrylonitrile	<5.0	<5.0	5.0	50
4. Benzene	<0.1	<0.1	0.1	5
5. Bromodichloromethane	<0.6	<0.6	0.6	5
6. Bromoform	<4.0	<4.0	4.0	5
7. Bromomethane	<0.7	<0.7	0.7	10
8. 2-butanone (methyl ethyl ketone)	<10	<10	10	20
9. Carbon disulfide	<1.0	<1.0	1.0	5
10. Carbon tetrachloride	<0.6	<0.6	0.6	5
11. Chlorobenzene	<0.6	<0.6	0.6	5
12. Chlorodibromomethane	<1.0	<1.0	1.0	5
13. Chloroethane	<0.7	<0.7	0.7	5
14. 2-chloroethyl vinyl ether	<90.2	<90.2	90.2	100
15. Chloroform	<0.5	<0.5	0.5	5
16. Chloromethane	<1.0	<1.0	1.0	5
17. Dibromomethane	<1.0	<1.0	1.0	5
18. Dichlorodifluoromethane	<1.0	<1.0	1.0	5
19. 1,1-dichloroethane	<0.5	<0.5	0.5	5
20. 1,2-dichloroethane	<1.6	<1.6	1.6	5
21. 1,2-dichloroethene (total)	<1.0	<1.0	1.0	5
22. cis-1,3-dichloropropene	<0.5	<0.5	0.5	5
23. trans-1,3-dichloropropene	<0.9	<0.9	0.9	5
24. Ethylbenzene	<0.6	<0.6	0.6	5

Leah E. Zehner

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

16843

K & S Testing & Engineering, Inc.
9715 Kennedy Avenue
Highland, IN 46322

Project Name: Griffith Landfill

Report Date: 5/28/91
Sample Received: 5/1/91
Date Analysed: 5/13/91

Project No.: 220
Sample Description: MW-5D 4/29/91
Sample No.: 7279

Volatile Organic Compounds	Concentration Found in Sample	Concentration Found in Blank	Method Detection Limit	Quantitation Limit
25. Ethyl methacrylate	<1.0	<1.0	1.0	5
26. 2-hexanone	<5	<5	5	20
27. Iodomethane	<1.0	<1.0	1.0	5
28. Methylene chloride	<0.8	<0.8	0.8	5
29. 4-methyl-2-pentanone	<5	<5	5	20
30. Styrene	<1.0	<1.0	1.0	5
31. 1,1,2,2-tetrachloroethane	<3.9	<3.9	3.9	5
32. Toluene	<0.5	<0.5	0.5	5
33. 1,1,1-trichloroethane	<0.5	<0.5	0.5	5
34. 1,1,2-trichloroethane	<2.5	<2.5	2.5	5
35. Trichloroethene	<0.5	<0.5	0.5	5
36. Trichlorofluoromethane	<0.5	<0.5	0.5	5
37. 1,2,3-trichloropropane	<1.0	<1.0	1.0	5
38. Vinyl acetate	<1.0	<1.0	1.0	5
39. Vinyl choride	<0.7	<0.7	0.7	5
40. Xylenes (total)	<0.9	<0.9	0.9	5

All results expressed as ppb unless otherwise indicated.

Methods performed using EPA methods 8240 in accordance with SW-846, Third Edition.

Leah E. Zehner

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

16214

K & S Testing & Engineering, Inc.
9715 Kennedy Avenue
Highland, IN 46322

Project Name: Griffith Landfill

Report Date: 6/7/91
Sample Received: 5/1/91
Date Analysed: 5/13/91

Project No.: 220
Sample Description: Blank-1 4/29/91 Water
Sample No.: 7280

Volatile Organic Compounds	Concentration Found in Sample	Concentration Found in Blank	Method Detection Limit	Quantitation Limit
1. Acetone	<1.0	<1.0	1.0	10
2. Acrolein	<15.0	<15.0	15.0	50
3. Acrylonitrile	<5.0	<5.0	5.0	50
4. Benzene	<0.1	<0.1	0.1	5
5. Bromodichloromethane	<0.6	<0.6	0.6	5
6. Bromoform	<4.0	<4.0	4.0	5
7. Bromomethane	<0.7	<0.7	0.7	10
8. 2-butanone (methyl ethyl ketone)	<10	<10	10	20
9. Carbon disulfide	<1.0	<1.0	1.0	5
10. Carbon tetrachloride	<0.6	<0.6	0.6	5
11. Chlorobenzene	<0.6	<0.6	0.6	5
12. Chlorodibromomethane	<1.0	<1.0	1.0	5
13. Chloroethane	<0.7	<0.7	0.7	5
14. 2-chloroethyl vinyl ether	<90.2	<90.2	90.2	100
15. Chloroform	<0.5	<0.5	0.5	5
16. Chloromethane	<1.0	<1.0	1.0	5
17. Dibromomethane	<1.0	<1.0	1.0	5
18. Dichlorodifluoromethane	<1.0	<1.0	1.0	5
19. 1,1-dichloroethane	<0.5	<0.5	0.5	5
20. 1,2-dichloroethane	<1.6	<1.6	1.6	5
21. 1,2-dichloroethene (total)	<1.0	<1.0	1.0	5
22. cis-1,3-dichloropropene	<0.5	<0.5	0.5	5
23. trans-1,3-dichloropropene	<0.9	<0.9	0.9	5
24. Ethylbenzene	<0.6	<0.6	0.6	5

Leah E. Zehner

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

16214

K & S Testing & Engineering, Inc.
9715 Kennedy Avenue
Highland, IN 46322

Project Name: Griffith Landfill

Report Date: 6/7/91
Sample Received: 5/1/91
Date Analysed: 5/13/91

Project No.: 220
Sample Description: Blank-1 4/29/91 Water
Sample No.: 7280

Volatile Organic Compounds	Concentration Found in Sample	Concentration Found in Blank	Method Detection Limit	Quantitation Limit
25. Ethyl methacrylate	<1.0	<1.0	1.0	5
26. 2-hexanone	<5	<5	5	20
27. Iodomethane	<1.0	<1.0	1.0	5
28. Methylene chloride	<0.8	<0.8	0.8	5
29. 4-methyl-2-pentanone	<5	<5	5	20
30. Styrene	<1.0	<1.0	1.0	5
31. 1,1,2,2-tetrachloroethane	<3.9	<3.9	3.9	5
32. Toluene	<0.5	<0.5	0.5	5
33. 1,1,1-trichloroethane	<0.5	<0.5	0.5	5
34. 1,1,2-trichloroethane	<2.5	<2.5	2.5	5
35. Trichloroethene	<0.5	<0.5	0.5	5
36. Trichlorofluoromethane	<0.5	<0.5	0.5	5
37. 1,2,3-trichloropropane	<1.0	<1.0	1.0	5
38. Vinyl acetate	<1.0	<1.0	1.0	5
39. Vinyl choride	<0.7	<0.7	0.7	5
40. Xylenes (total)	<0.9	<0.9	0.9	5

All results expressed as ppb unless otherwise indicated.

Methods performed using EPA methods 8240 in accordance with SW-846, Third Edition.

Leah E. Zehner

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

16215

K & S Testing & Engineering, Inc.
9715 Kennedy Avenue
Highland, IN 46322

Project Name: Griffith Landfill

Report Date: 6/7/91
Sample Received: 5/1/91
Date Analysed: 5/13/91

Project No.: 220
Sample Description: Blank-2 4/30/91 Water
Sample No.: 7281

Volatile Organic Compounds	Concentration Found in Sample	Concentration Found in Blank	Method Detection Limit	Quantitation Limit
1. Acetone	<1.0	<1.0	1.0	10
2. Acrolein	<15.0	<15.0	15.0	50
3. Acrylonitrile	<5.0	<5.0	5.0	50
4. Benzene	<0.1	<0.1	0.1	5
5. Bromodichloromethane	<0.6	<0.6	0.6	5
6. Bromoform	<4.0	<4.0	4.0	5
7. Bromomethane	<0.7	<0.7	0.7	10
8. 2-butanone (methyl ethyl ketone)	<10	<10	10	20
9. Carbon disulfide	<1.0	<1.0	1.0	5
10. Carbon tetrachloride	<0.6	<0.6	0.6	5
11. Chlorobenzene	<0.6	<0.6	0.6	5
12. Chlorodibromomethane	<1.0	<1.0	1.0	5
13. Chloroethane	<0.7	<0.7	0.7	5
14. 2-chloroethyl vinyl ether	<90.2	<90.2	90.2	100
15. Chloroform	<0.5	<0.5	0.5	5
16. Chloromethane	<1.0	<1.0	1.0	5
17. Dibromomethane	<1.0	<1.0	1.0	5
18. Dichlorodifluoromethane	<1.0	<1.0	1.0	5
19. 1,1-dichloroethane	<0.5	<0.5	0.5	5
20. 1,2-dichloroethane	<1.6	<1.6	1.6	5
21. 1,2-dichloroethene (total)	<1.0	<1.0	1.0	5
22. cis-1,3-dichloropropene	<0.5	<0.5	0.5	5
23. trans-1,3-dichloropropene	<0.9	<0.9	0.9	5
24. Ethylbenzene	<0.6	<0.6	0.6	5

Leah E. Zehner

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

16215

K & S Testing & Engineering, Inc.
9715 Kennedy Avenue
Highland, IN 46322

Project Name: Griffith Landfill

Report Date: 6/7/91
Sample Received: 5/1/91
Date Analysed: 5/13/91

Project No.: 220
Sample Description: Blank-2 4/30/91 Water
Sample No.: 7281

Volatile Organic Compounds	Concentration Found in Sample	Concentration Found in Blank	Method Detection Limit	Quantitation Limit
25. Ethyl methacrylate	<1.0	<1.0	1.0	5
26. 2-hexanone	<5	<5	5	20
27. Iodomethane	<1.0	<1.0	1.0	5
28. Methylene chloride	<0.8	<0.8	0.8	5
29. 4-methyl-2-pentanone	<5	<5	5	20
30. Styrene	<1.0	<1.0	1.0	5
31. 1,1,2,2-tetrachloroethane	<3.9	<3.9	3.9	5
32. Toluene	<0.5	<0.5	0.5	5
33. 1,1,1-trichloroethane	<0.5	<0.5	0.5	5
34. 1,1,2-trichloroethane	<2.5	<2.5	2.5	5
35. Trichloroethene	<0.5	<0.5	0.5	5
36. Trichlorofluoromethane	<0.5	<0.5	0.5	5
37. 1,2,3-trichloropropane	<1.0	<1.0	1.0	5
38. Vinyl acetate	<1.0	<1.0	1.0	5
39. Vinyl choride	<0.7	<0.7	0.7	5
40. Xylenes (total)	<0.9	<0.9	0.9	5

All results expressed as ppb unless otherwise indicated.

Methods performed using EPA methods 8240 in accordance with SW-846, Third Edition.

Leah E. Zehner

LABORATORY DIRECTOR

K & S Testing and Engineering Inc.

9715 Kennedy Ave. Highland, Indiana Phone: (219) 924-5231

CHAIN OF CUSTODY RECORD

PROJ. NO.: 220

PROJECT NAME: Griffith Landfill

SAMPLERS: (Signature) Sdhir Mantri

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	VOC-8240	Na, B	As, Ba, Cd, Cr, Pb, Hg, Cu, B, E, F, Se, Ag, K	COD, NH3	pH, TDS, Cl, specific conductance	pH, Cl, specific conductance, SO4, F	REMARKS	
MW1S	4/29/91	12:45PM		✓	Water	5	✓		✓	✓	✓			7270
MW1D	4/29/91	2:00PM		✓	Water	5	✓		✓	✓	✓			7271
MW2S	4/30/91	10:20AM		✓	Water	5	✓	✓		✓		✓	— Please return signed	7272
MW2D	4/30/91	9:35AM		✓	Water	5	✓	✓		✓		✓	COC form	7273
MW3S	4/29/91	5:00PM		✓	Water	5	✓	✓		✓		✓		7274
MW3D	4/29/91	5:30PM		✓	Water	5	✓	✓		✓		✓	— Please test well samples	7275
MW4S	4/30/91	11:30AM		✓	Water	5	✓	✓		✓		✓	as per list in 329IAC2-16	7276
MW4D	4/30/91	12:15PM		✓	Water	5	✓	✓		✓		✓		7277
MW5S	4/29/91	3:30PM		✓	Water	5	✓	✓		✓		✓	— Please follow	7278
MW5D	4/29/91	4:30PM		✓	Water	5	✓	✓		✓		✓	appropriate USEPA	7279
Blank-1	4/29/91	12:30PM		✓	Water	1	✓						test methods	7280
Blank-2	4/30/91	11:00AM		✓	Water	1	✓							7281

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Sdhir Mantri	5/1/91 11:40AM	V. Janowski	V. Janowski	5-1-91 2:25	M. Janus
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

K&S Testing and Engineering Inc.

9715 KENNEDY AVENUE • HIGHLAND, INDIANA 46322
(219) 924-5231 • (312) 734-5900 • FAX (219) 924-5271

PROJECT NAME: GRIFFITH LANDFILL
PROJECT NO.: 220

DATA SHEET FOR FIELD pH

WELL NO.	SAMPLING DATE	pH
1S	7-17-91	6.64
1D	7-17-91	7.60

pH measured using a HYDAC temperature, conductivity and pH measuring instrument. Calibration Date: 7-17-91.

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

19127

K & S Testing & Engineering, Inc.
9715 Kennedy Avenue
Highland, IN 46322

Project Name: Griffith Landfill
Griffith, IN
Project No.: 220
Sample Description: MW 1S 7/17/91
Sample No.: 1514

Report Date: 7/29/91
Sample Received: 7/18/91

	TOTAL	Date Analysed
Total Phenolics	<0.1	7/23/91
pH (units)	6.9	7/19/91
Sulfate	30	7/24/91
Fluoride	0.4	7/24/91
Specific Conductance	760	7/24/91
Arsenic	<0.1	7/24/91
Barium	0.23	7/24/91
Cadmium	<0.05	7/24/91
Chromium	<0.05	7/24/91
Copper	<0.05	7/24/91
Iron	13.	7/24/91
Lead	<0.05	7/24/91
Sodium	60.	7/24/91
Magnesium	54.	7/24/91
Mercury	<0.01	7/24/91
Selenium	<0.1	7/24/91
Silver	<0.05	7/24/91
Zinc	0.07	7/24/91
Ammonia	2.2	7/23/91
Total Dissolved Solids	520	7/23/91
COD	210	7/25/91

All results expressed as ppm unless otherwise indicated.

Analyses performed using "Standard Methods for the Examination of Water and Wastewater", 17th Edition.

Kate E. Chi

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

19128

K & S Testing & Engineering, Inc.
9715 Kennedy Avenue
Highland, IN 46322

Project Name: Griffith Landfill
Griffith, IN
Project No.: 220
Sample Description: MW 1D 7/17/91
Sample No.: 1515

Report Date: 7/29/91
Sample Received: 7/18/91

	TOTAL	Date Analysed
Total Phenolics	<0.1	7/23/91
pH (units)	6.5	7/19/91
Sulfate	100	7/24/91
Fluoride	0.86	7/24/91
Specific Conductance	1410	7/24/91
Arsenic	<0.1	7/24/91
Barium	0.27	7/24/91
Cadmium	<0.05	7/24/91
Chromium	<0.05	7/24/91
Copper	<0.05	7/24/91
Iron	25.	7/24/91
Lead	0.06	7/24/91
Sodium	30.	7/24/91
Magnesium	65.	7/24/91
Mercury	<0.01	7/24/91
Selenium	0.12	7/24/91
Silver	<0.05	7/24/91
Zinc	0.12	7/24/91
Ammonia	<2	7/23/91
Total Dissolved Solids	980	7/23/91
COD	83	7/25/91

All results expressed as ppm unless otherwise indicated.

Analyses performed using "Standard Methods for the Examination of Water and Wastewater", 17th Edition.

Kate E. Chi

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

18299

K & S Testing and Engineering, Inc.
9715 Kennedy Ave.
Highland, IN 46322

Report Date: 07/26/91
Sample Received: 07/18/91
Date Analysed: 07/19/91

Project Name: Griffith Landfill
Sample Description: MW-1S 7/17 Water
Sample No.: 1514

Volatile Organic Compounds	Concentration Found in Sample	Concentration Found in Blank	Method Detection Limit	Quantitation Limit
1. Acetone	<1.0	<1.0	1.0	10
2. Acrolein	<15.0	<15.0	15.0	50
3. Acrylonitrile	<5.0	<5.0	5.0	50
4. Benzene	<0.1	<0.1	0.1	5
5. Bromodichloromethane	<0.6	<0.6	0.6	5
6. Bromoform	<4.0	<4.0	4.0	5
7. Bromomethane	<0.7	<0.7	0.7	10
8. 2-butanone (methyl ethyl ketone)	<10	<10	10	20
9. Carbon disulfide	<1.0	<1.0	1.0	5
10. Carbon tetrachloride	<0.6	<0.6	0.6	5
11. Chlorobenzene	<0.6	<0.6	0.6	5
12. Chlorodibromomethane	<1.0	<1.0	1.0	5
13. Chloroethane	<0.7	<0.7	0.7	5
14. 2-chloroethyl vinyl ether	<90.2	<90.2	90.2	100
15. Chloroform	<0.5	<0.5	0.5	5
16. Chloromethane	<1.0	<1.0	1.0	5
17. Dibromomethane	<1.0	<1.0	1.0	5
18. Dichlorodifluoromethane	<1.0	<1.0	1.0	5
19. 1,1-dichloroethane	<0.5	<0.5	0.5	5
20. 1,2-dichloroethane	<1.6	<1.6	1.6	5
21. 1,2-dichloroethene (total)	<1.0	<1.0	1.0	5
22. cis-1,3-dichloropropene	<0.5	<0.5	0.5	5
23. trans-1,3-dichloropropene	<0.9	<0.9	0.9	5
24. Ethylbenzene	<0.6	<0.6	0.6	5

Leah E. Zeller

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

18299

K & S Testing and Engineering, Inc.
9715 Kennedy Ave.
Highland, IN 46322

Report Date: 07/26/91
Sample Received: 07/18/91
Analysis Date: 07/19/91

Project Name: Griffith Landfill
Sample Description: MW-1S 7/17 Water
Sample No.: 1514

Volatile Organic Compounds	Concentration Found in Sample	Concentration Found in Blank	Method Detection Limit	Quantitation Limit
25. Ethyl methacrylate	<1.0	<1.0	1.0	5
26. 2-hexanone	<5	<5	5	20
27. Iodomethane	<1.0	<1.0	1.0	5
28. Methylene chloride	<0.8	<0.8	0.8	5
29. 4-methyl-2-pentanone	<5	<5	5	20
30. Styrene	<1.0	<1.0	1.0	5
31. 1,1,2,2-tetrachloroethane	<3.9	<3.9	3.9	5
32. Toluene	1.0	<0.5	0.5	5
33. 1,1,1-trichloroethane	<0.5	<0.5	0.5	5
34. 1,1,2-trichloroethane	<2.5	<2.5	2.5	5
35. Trichloroethene	<0.5	<0.5	0.5	5
36. Trichlorofluoromethane	<0.5	<0.5	0.5	5
37. 1,2,3-trichloropropane	<1.0	<1.0	1.0	5
38. Vinyl acetate	<1.0	<1.0	1.0	5
39. Vinyl choride	<0.7	<0.7	0.7	5
40. Xylenes (total)	<0.9	<0.9	0.9	5

All results expressed as ppb unless otherwise indicated.

Methods performed using EPA methods 8240 in accordance with SW-846, Third Edition.

Leah E. Zehner

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

18298

K & S Testing and Engineering, Inc.
9715 Kennedy Ave.
Highland, IN 46322

Report Date: 07/26/91
Sample Received: 07/18/91
Date Analysed: 07/19/91

Project Name: Griffith Landfill
Sample Description: MW-1D 7/17 Water
Sample No.: 1515

Volatile Organic Compounds	Concentration Found in Sample	Concentration Found in Blank	Method Detection Limit	Quantitation Limit
1. Acetone	<1.0	<1.0	1.0	10
2. Acrolein	<15.0	<15.0	15.0	50
3. Acrylonitrile	<5.0	<5.0	5.0	50
4. Benzene	<0.1	<0.1	0.1	5
5. Bromodichloromethane	<0.6	<0.6	0.6	5
6. Bromoform	<4.0	<4.0	4.0	5
7. Bromomethane	<0.7	<0.7	0.7	10
8. 2-butanone (methyl ethyl ketone)	<10	<10	10	20
9. Carbon disulfide	<1.0	<1.0	1.0	5
10. Carbon tetrachloride	<0.6	<0.6	0.6	5
11. Chlorobenzene	<0.6	<0.6	0.6	5
12. Chlorodibromomethane	<1.0	<1.0	1.0	5
13. Chloroethane	<0.7	<0.7	0.7	5
14. 2-chloroethyl vinyl ether	<90.2	<90.2	90.2	100
15. Chloroform	<0.5	<0.5	0.5	5
16. Chloromethane	<1.0	<1.0	1.0	5
17. Dibromomethane	<1.0	<1.0	1.0	5
18. Dichlorodifluoromethane	<1.0	<1.0	1.0	5
19. 1,1-dichloroethane	<0.5	<0.5	0.5	5
20. 1,2-dichloroethane	<1.6	<1.6	1.6	5
21. 1,2-dichloroethene (total)	<1.0	<1.0	1.0	5
22. cis-1,3-dichloropropene	<0.5	<0.5	0.5	5
23. trans-1,3-dichloropropene	<0.9	<0.9	0.9	5
24. Ethylbenzene	<0.6	<0.6	0.6	5

Leah E. Zehner

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

18298

K & S Testing and Engineering, Inc.
9715 Kennedy Ave.
Highland, IN 46322

Report Date: 07/26/91
Sample Received: 07/18/91
Analysis Date: 07/19/91

Project Name: Griffith Landfill
Sample Description: MW-1D 7/17 Water
Sample No.: 1515

Volatile Organic Compounds	Concentration Found in Sample	Concentration Found in Blank	Method Detection Limit	Quantitation Limit
25. Ethyl methacrylate	<1.0	<1.0	1.0	5
26. 2-hexanone	<5	<5	5	20
27. Iodomethane	<1.0	<1.0	1.0	5
28. Methylene chloride	<0.8	<0.8	0.8	5
29. 4-methyl-2-pentanone	<5	<5	5	20
30. Styrene	<1.0	<1.0	1.0	5
31. 1,1,2,2-tetrachloroethane	<3.9	<3.9	3.9	5
32. Toluene	<0.5	<0.5	0.5	5
33. 1,1,1-trichloroethane	<0.5	<0.5	0.5	5
34. 1,1,2-trichloroethane	<2.5	<2.5	2.5	5
35. Trichloroethene	<0.5	<0.5	0.5	5
36. Trichlorofluoromethane	<0.5	<0.5	0.5	5
37. 1,2,3-trichloropropane	<1.0	<1.0	1.0	5
38. Vinyl acetate	<1.0	<1.0	1.0	5
39. Vinyl choride	<0.7	<0.7	0.7	5
40. Xylenes (total)	<0.9	<0.9	0.9	5

All results expressed as ppb unless otherwise indicated.

Methods performed using EPA methods 8240 in accordance with SW-846, Third Edition.

Leah E. Zehner

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

18297

K & S Testing and Engineering, Inc.
9715 Kennedy Ave.
Highland, IN 46322

Report Date: 07/26/91
Sample Received: 07/18/91
Date Analysed: 07/19/91

Project Name: Griffith Landfill
Sample Description: Blank-1 Water
Sample No.: 1516

Volatile Organic Compounds	Concentration Found in Sample	Concentration Found in Blank	Method Detection Limit	Quantitation Limit
1. Acetone	<1.0	<1.0	1.0	10
2. Acrolein	<15.0	<15.0	15.0	50
3. Acrylonitrile	<5.0	<5.0	5.0	50
4. Benzene	<0.1	<0.1	0.1	5
5. Bromodichloromethane	<0.6	<0.6	0.6	5
6. Bromoform	<4.0	<4.0	4.0	5
7. Bromomethane	<0.7	<0.7	0.7	10
8. 2-butanone (methyl ethyl ketone)	<10	<10	10	20
9. Carbon disulfide	<1.0	<1.0	1.0	5
10. Carbon tetrachloride	<0.6	<0.6	0.6	5
11. Chlorobenzene	<0.6	<0.6	0.6	5
12. Chlorodibromomethane	<1.0	<1.0	1.0	5
13. Chloroethane	<0.7	<0.7	0.7	5
14. 2-chloroethyl vinyl ether	<90.2	<90.2	90.2	100
15. Chloroform	<0.5	<0.5	0.5	5
16. Chloromethane	<1.0	<1.0	1.0	5
17. Dibromomethane	<1.0	<1.0	1.0	5
18. Dichlorodifluoromethane	<1.0	<1.0	1.0	5
19. 1,1-dichloroethane	<0.5	<0.5	0.5	5
20. 1,2-dichloroethane	<1.6	<1.6	1.6	5
21. 1,2-dichloroethene (total)	<1.0	<1.0	1.0	5
22. cis-1,3-dichloropropene	<0.5	<0.5	0.5	5
23. trans-1,3-dichloropropene	<0.9	<0.9	0.9	5
24. Ethylbenzene	<0.6	<0.6	0.6	5

Leah E. Zehner

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

18297

K & S Testing and Engineering, Inc.
9715 Kennedy Ave.
Highland, IN 46322

Report Date: 07/26/91
Sample Received: 07/18/91
Analysis Date: 07/19/91

Project Name: Griffith Landfill
Sample Description: Blank-1 Water
Sample No.: 1516

Volatile Organic Compounds	Concentration Found in Sample	Concentration Found in Blank	Method Detection Limit	Quantitation Limit
25. Ethyl methacrylate	<1.0	<1.0	1.0	5
26. 2-hexanone	<5	<5	5	20
27. Iodomethane	<1.0	<1.0	1.0	5
28. Methylene chloride	<0.8	<0.8	0.8	5
29. 4-methyl-2-pentanone	<5	<5	5	20
30. Styrene	<1.0	<1.0	1.0	5
31. 1,1,2,2-tetrachloroethane	<3.9	<3.9	3.9	5
32. Toluene	<0.5	<0.5	0.5	5
33. 1,1,1-trichloroethane	<0.5	<0.5	0.5	5
34. 1,1,2-trichloroethane	<2.5	<2.5	2.5	5
35. Trichloroethene	<0.5	<0.5	0.5	5
36. Trichlorofluoromethane	<0.5	<0.5	0.5	5
37. 1,2,3-trichloropropane	<1.0	<1.0	1.0	5
38. Vinyl acetate	<1.0	<1.0	1.0	5
39. Vinyl choride	<0.7	<0.7	0.7	5
40. Xylenes (total)	<0.9	<0.9	0.9	5

All results expressed as ppb unless otherwise indicated.

Methods performed using EPA methods 8240 in accordance with SW-846, Third Edition.

Leah E. Zahee

LABORATORY DIRECTOR

R G S Testing and Engineering Inc.

9715 Kennedy Ave. Highland, Indiana Phone: (219) 924-5231

CHAIN OF CUSTODY RECORD

PROJ. NO.: 220

PROJECT NAME: Griffith Landfill, Griffith

SAMPLERS: (Signature) Sdhir Mantri

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	VOC's 8240	Metals	Total Phenolics	Ammonia, COD, Sulphate, N	pH, TDS, Spec conductor, Cl	REMARKS	
MW1S	7/17/91	1:30 pm		✓	Water	7	✓	✓	✓	✓	✓		1514
MW1D	7/17/91	2:30 PM		✓	Water	7	✓	✓	✓	✓	✓		1515
Blank-1	7/17/91	Trip			Water	1	✓					— Please return signed	1516 1-S
												COC form.	1517 1-D
												— Please test well samples	
												as per list in 329 IAC 2-16	

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Sdhir Mantri	7/18/91 2:45	R. Nystrom	R. Nystrom	7-18-91	
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	
		Gregjones	1/18 4:30		

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

K&S Testing and Engineering Inc.

9715 KENNEDY AVENUE • HIGHLAND, INDIANA 46322
(219) 924-5231 • (312) 734-5900 • FAX (219) 924-5271

PROJECT NAME: GRIFFITH LANDFILL

PROJECT NO.: 220

DATA SHEET FOR FIELD pH

WELL NO.	SAMPLING DATE	pH
1S	1-29-92	7.51
1D	1-29-92	8.17

pH measured using a HYDAC temperature, conductivity and pH measuring instrument. Calibration Date: 1-29-92.

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

K & S Testing & Engineering, Inc. 31147
9715 Kennedy Avenue
Highland, IN 46322

Project Name: January Sampling/Griffith Landfill — Report Date: 2/7/92
Griffith, IN — Sample Received: 1/31/92
Project No.: 220
Sample Description: MW-1S 1/29/92 Up Gradient (water)
Sample No.: 13601

		Date of Analysis
COD	50	2/5/92
Chloride	46.0	2/4/92
Fluoride	<0.5	2/5/92
Ammonia as N	4.8	2/5/92
Nitrate as N	0.69	2/5/92
Sulfate	270	2/5/92
pH	7.55 (units)	1/30/92
Total Phenolics	<1	2/5/92
Specific Conductivity	1240.0 µmhos	2/5/92
TDS	820	2/4/92
Sodium	10.0	2/3/92
Arsenic	<0.2	2/3/92
Barium	0.23	2/3/92
Boron	0.19	2/3/92
Cadmium	<0.05	2/3/92
Chromium	<0.05	2/3/92
Copper	<0.05	2/3/92
Iron	28.0	2/3/92
Lead	<0.05	2/3/92
Manganese	0.78	2/3/92
Mercury	<0.5 ppb	2/3/92
Selenium	<0.2	2/3/92
Silver	<0.05	2/3/92
Zinc	<0.05	2/3/92

All results expressed as ppm unless otherwise indicated.

Analyses performed using "Standard Methods for the Examination of Water and Wastewater", 17th Edition.

Ivone Manawtus

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

K & S Testing & Engineering, Inc. 30766
9715 Kennedy Avenue
Highland, IN 46322

Project Name: Griffith Landfill/January Sampling
Griffith, IN
Project No.: 220
Sample Description: MW-1S 1/29/92 up Gradient (water)
Sample No.: 13601

Report Date: 2/3/92
Sample Received: 1/30/92
Analysis Date: 1/31/92

Volatile Organic Compounds	Concentration Found in Sample	Concentration Found in Blank	Method Detection Limit	Quantitation Limit
1. Acetone	<1.0	<1.0	1.0	10
2. Acrolein	<15.0	<15.0	15.0	50
3. Acrylonitrile	<5.0	<5.0	5.0	50
4. Benzene	<0.1	<0.1	0.1	5
5. Bromodichloromethane	<0.6	<0.6	0.6	5
6. Bromoform	<4.0	<4.0	4.0	5
7. Bromomethane	<0.7	<0.7	0.7	10
8. 2-butanone (methyl ethyl ketone)	<10	<10	10	20
9. Carbon disulfide	<1.0	<1.0	1.0	5
10. Carbon tetrachloride	<0.6	<0.6	0.6	5
11. Chlorobenzene	<0.6	<0.6	0.6	5
12. Chlorodibromomethane	<1.0	<1.0	1.0	5
13. Chloroethane	<0.7	<0.7	0.7	5
14. 2-chloroethyl vinyl ether	<90.2	<90.2	90.2	100
15. Chloroform	<0.5	<0.5	0.5	5
16. Chloromethane	<1.0	<1.0	1.0	5
17. Dibromomethane	<1.0	<1.0	1.0	5
18. Dichlorodifluoromethane	<1.0	<1.0	1.0	5
19. 1,1-dichloroethane	<0.5	<0.5	0.5	5
20. 1,2-dichloroethene (total)	<1.0	<1.0	1.0	5
21. cis-1,3-dichloropropene	<0.5	<0.5	0.5	5
22. trans-1,3-dichloropropene	<0.9	<0.9	0.9	5
23. Ethylbenzene	<0.6	<0.6	0.6	5

Leah E. Zbre
LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

K & S Testing & Engineering, Inc. 30766
9715 Kennedy Avenue
Highland, IN 46322

Project Name: Griffith Landfill/January Sampling
Griffith, IN
Project No.: 220
Sample Description: MW-1S 1/29/92 up Gradient (water)
Sample No.: 13601

Report Date: 2/3/92
Sample Received: 1/30/92
Analysis Date: 1/31/92

Volatile Organic Compounds	Concentration Found in Sample	Concentration Found in Blank	Method Detection Limit	Quantitation Limit
24. Ethyl methacrylate	<1.0	<1.0	1.0	5
25. 2-hexanone	<5	<5	5	20
26. Iodomethane	<1.0	<1.0	1.0	5
27. Methylene chloride	<0.8	<0.8	0.8	5
28. 4-methyl-2-pentanone	<5	<5	5	20
29. Styrene	<1.0	<1.0	1.0	5
30. 1,1,2,2-tetrachloroethane	<3.9	<3.9	3.9	5
31. Toluene	<0.5	<0.5	0.5	5
32. 1,1,1-trichloroethane	<0.5	<0.5	0.5	5
33. 1,1,2-trichloroethane	<2.5	<2.5	2.5	5
34. Trichloroethene	<0.5	<0.5	0.5	5
35. Trichlorofluoromethane	<0.5	<0.5	0.5	5
36. 1,2,3-trichloropropane	<1.0	<1.0	1.0	5
37. Vinyl acetate	<1.0	<1.0	1.0	5
38. Vinyl choride	<0.7	<0.7	0.7	5
39. Xylenes (total)	<0.9	<0.9	0.9	5
40. 1,2-dichloroethane	<1.6	<1.6	1.6	5

All results expressed as ppb unless otherwise indicated.

Methods performed using EPA methods 8240 in accordance with SW-846, Third Edition.

Leah E. Zbre

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

K & S Testing & Engineering, Inc. 31146
9715 Kennedy Avenue
Highland, IN 46322

Project Name: January Sampling/Griffith Landfill — Report Date: 2/7/92
Griffith, IN — Sample Received: 1/31/92
Project No.: 220
Sample Description: MW-1D 1/29/92 Up Gradient (water)
Sample No.: 13602

		Date of Analysis
COD	28	2/5/92
Chloride	39.0	2/4/92
Fluoride	<0.5	2/5/92
Ammonia as N	3.2	2/5/92
Nitrate as N	0.55	2/5/92
Sulfate	93	2/5/92
pH	7.50 (units)	1/30/92
Total Phenolics	0.3	2/5/92
Specific Conductivity	948.0 µmhos	2/5/92
TDS	590	2/4/92
Sodium	12.0	2/3/92
Arsenic	<0.2	2/3/92
Barium	0.28	2/3/92
Boron	0.25	2/3/92
Cadmium	<0.05	2/3/92
Chromium	<0.05	2/3/92
Copper	<0.05	2/3/92
Iron	9.4	2/3/92
Lead	<0.05	2/3/92
Manganese	0.15	2/3/92
Mercury	<0.5 ppb	2/3/92
Selenium	<0.2	2/3/92
Silver	<0.05	2/3/92
Zinc	<0.05	2/3/92

All results expressed as ppm unless otherwise indicated.

Analyses performed using "Standard Methods for the Examination of Water and Wastewater", 17th Edition.

Ivona Manawska

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

K & S Testing & Engineering, Inc. 30767
9715 Kennedy Avenue
Highland, IN 46322

Project Name: Griffith Landfill/January Sampling
Griffith, IN
Project No.: 220
Sample Description: MW-1D 1/29/92 up Gradient (water)
Sample No.: 13602

Report Date: 2/3/92
Sample Received: 1/30/92
Analysis Date: 1/31/92

Volatile Organic Compounds	Concentration Found in Sample	Concentration Found in Blank	Method Detection Limit	Quantitation Limit
1. Acetone	<1.0	<1.0	1.0	10
2. Acrolein	<15.0	<15.0	15.0	50
3. Acrylonitrile	<5.0	<5.0	5.0	50
4. Benzene	<0.1	<0.1	0.1	5
5. Bromodichloromethane	<0.6	<0.6	0.6	5
6. Bromoform	<4.0	<4.0	4.0	5
7. Bromomethane	<0.7	<0.7	0.7	10
8. 2-butanone (methyl ethyl ketone)	<10	<10	10	20
9. Carbon disulfide	<1.0	<1.0	1.0	5
10. Carbon tetrachloride	<0.6	<0.6	0.6	5
11. Chlorobenzene	<0.6	<0.6	0.6	5
12. Chlorodibromomethane	<1.0	<1.0	1.0	5
13. Chloroethane	<0.7	<0.7	0.7	5
14. 2-chloroethyl vinyl ether	<90.2	<90.2	90.2	100
15. Chloroform	<0.5	<0.5	0.5	5
16. Chloromethane	<1.0	<1.0	1.0	5
17. Dibromomethane	<1.0	<1.0	1.0	5
18. Dichlorodifluoromethane	<1.0	<1.0	1.0	5
19. 1,1-dichloroethane	<0.5	<0.5	0.5	5
20. 1,2-dichloroethene (total)	<1.0	<1.0	1.0	5
21. cis-1,3-dichloropropene	<0.5	<0.5	0.5	5
22. trans-1,3-dichloropropene	<0.9	<0.9	0.9	5
23. Ethylbenzene	<0.6	<0.6	0.6	5

Leah E. Zhre

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

K & S Testing & Engineering, Inc. 30767
9715 Kennedy Avenue
Highland, IN 46322

Project Name: Griffith Landfill/January Sampling
Griffith, IN
Project No.: 220
Sample Description: MW-1D 1/29/92 up Gradient (water)
Sample No.: 13602

Report Date: 2/3/92
Sample Received: 1/30/92
Analysis Date: 1/31/92

Volatile Organic Compounds	Concentration Found in Sample	Concentration Found in Blank	Method Detection Limit	Quantitation Limit
24. Ethyl methacrylate	<1.0	<1.0	1.0	5
25. 2-hexanone	<5	<5	5	20
26. Iodomethane	<1.0	<1.0	1.0	5
27. Methylene chloride	<0.8	<0.8	0.8	5
28. 4-methyl-2-pentanone	<5	<5	5	20
29. Styrene	<1.0	<1.0	1.0	5
30. 1,1,2,2-tetrachloroethane	<3.9	<3.9	3.9	5
31. Toluene	<0.5	<0.5	0.5	5
32. 1,1,1-trichloroethane	<0.5	<0.5	0.5	5
33. 1,1,2-trichloroethane	<2.5	<2.5	2.5	5
34. Trichloroethene	<0.5	<0.5	0.5	5
35. Trichlorofluoromethane	<0.5	<0.5	0.5	5
36. 1,2,3-trichloropropane	<1.0	<1.0	1.0	5
37. Vinyl acetate	<1.0	<1.0	1.0	5
38. Vinyl choride	<0.7	<0.7	0.7	5
39. Xylenes (total)	<0.9	<0.9	0.9	5
40. 1,2-dichloroethane	<1.6	<1.6	1.6	5

All results expressed as ppb unless otherwise indicated.

Methods performed using EPA methods 8240 in accordance with SW-846, Third Edition.

Leah E. Zhre

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

K & S Testing & Engineering, Inc.
9715 Kennedy Avenue
Highland, IN 46322

Project Name: Griffith Landfill/January Sampling
Griffith, IN — Report Date: 2/3/92
Project No.: 220 — Sample Received: 1/30/92
Sample Description: Blank-1 1/29/92 Field (water) — Analysis Date: 1/31/92
Sample No.: 13603

Volatile Organic Compounds	Concentration Found in Sample	Concentration Found in Blank	Method Detection Limit	Quantitation Limit
1. Acetone	<1.0	<1.0	1.0	10
2. Acrolein	<15.0	<15.0	15.0	50
3. Acrylonitrile	<5.0	<5.0	5.0	50
4. Benzene	<0.1	<0.1	0.1	5
5. Bromodichloromethane	<0.6	<0.6	0.6	5
6. Bromoform	<4.0	<4.0	4.0	5
7. Bromomethane	<0.7	<0.7	0.7	10
8. 2-butanone (methyl ethyl ketone)	<10	<10	10	20
9. Carbon disulfide	<1.0	<1.0	1.0	5
10. Carbon tetrachloride	<0.6	<0.6	0.6	5
11. Chlorobenzene	<0.6	<0.6	0.6	5
12. Chlorodibromomethane	<1.0	<1.0	1.0	5
13. Chloroethane	<0.7	<0.7	0.7	5
14. 2-chloroethyl vinyl ether	<90.2	<90.2	90.2	100
15. Chloroform	<0.5	<0.5	0.5	5
16. Chloromethane	<1.0	<1.0	1.0	5
17. Dibromomethane	<1.0	<1.0	1.0	5
18. Dichlorodifluoromethane	<1.0	<1.0	1.0	5
19. 1,1-dichloroethane	<0.5	<0.5	0.5	5
20. 1,2-dichloroethene (total)	<1.0	<1.0	1.0	5
21. cis-1,3-dichloropropene	<0.5	<0.5	0.5	5
22. trans-1,3-dichloropropene	<0.9	<0.9	0.9	5
23. Ethylbenzene	<0.6	<0.6	0.6	5

Leah E. Zhre

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

K & S Testing & Engineering, Inc. 30768
9715 Kennedy Avenue
Highland, IN 46322

Project Name: Griffith Landfill/January Sampling
Griffith, IN Report Date: 2/3/92
Project No.: 220 Sample Received: 1/30/92
Sample Description: Blank-1 1/29/92 Field (water) Analysis Date: 1/31/92
Sample No.: 13603

Volatile Organic Compounds	Concentration Found in Sample	Concentration Found in Blank	Method Detection Limit	Quantitation Limit
24. Ethyl methacrylate	<1.0	<1.0	1.0	5
25. 2-hexanone	<5	<5	5	20
26. Iodomethane	<1.0	<1.0	1.0	5
27. Methylene chloride	<0.8	<0.8	0.8	5
28. 4-methyl-2-pentanone	<5	<5	5	20
29. Styrene	<1.0	<1.0	1.0	5
30. 1,1,2,2-tetrachloroethane	<3.9	<3.9	3.9	5
31. Toluene	<0.5	<0.5	0.5	5
32. 1,1,1-trichloroethane	<0.5	<0.5	0.5	5
33. 1,1,2-trichloroethane	<2.5	<2.5	2.5	5
34. Trichloroethene	<0.5	<0.5	0.5	5
35. Trichlorofluoromethane	<0.5	<0.5	0.5	5
36. 1,2,3-trichloropropane	<1.0	<1.0	1.0	5
37. Vinyl acetate	<1.0	<1.0	1.0	5
38. Vinyl choride	<0.7	<0.7	0.7	5
39. Xylenes (total)	<0.9	<0.9	0.9	5
40. 1,2-dichloroethane	<1.6	<1.6	1.6	5

All results expressed as ppb unless otherwise indicated.

Methods performed using EPA methods 8240 in accordance with SW-846, Third Edition.

Leah E. Zhu

LABORATORY DIRECTOR

K&S Testing and Engineering Inc.
9715 KENNEDY AVENUE • HIGHLAND, INDIANA 46322
(219) 924-5231 • (312) 734-5900 • FAX (219) 924-5271

PROJECT NAME: GRIFFITH LANDFILL

PROJECT NO.: 220

DATA SHEET FOR FIELD pH

WELL NO.	SAMPLING DATE	pH
1S	1-20-93	6.75
1D	1-20-93	7.28
2S	1-20-93	7.20
2D	1-20-93	7.38
3S	1-21-93	6.82
3D	1-21-93	7.31
4S	1-21-93	6.47
4D	1-21-93	7.55
5S	1-21-93	6.71
5D	1-21-93	7.39

pH measured using a HYDAC temperature, conductivity and pH measuring instrument. Calibration Date: 11-20-93.

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

59893

K&S Testing And Engineering, Inc.
9715 Kennedy Avenue
Highland, IN. 46322

Report Date: 2/9/93
Project No.: 220 Sample Received: 1/22/93
Project Name: Griffith Landfill, Griffith, Indiana, January, 1993, Sampling
Sample Description: Water Samples

Sample No.	40149	40150	
Description	MW1S 1/20/93	MW1D 1/30/93	Date Analyzed
Sodium	34	40	1/27/93
Lead	0.17	0.07	1/27/93
Zinc	<0.05	0.05	1/27/93
Mercury	<0.0005	<0.0005	1/27/93
pH (units)	6.59	7.28	1/27/93
Ammonia	3.64	4.90	1/27/93
Chloride	65.	46.	1/27/93
COD	<1	6	1/27/93
Specific Conductance	1170	957	1/27/93
Fluoride	<0.1	0.4	1/26/93
Nitrate	<0.1	<0.1	1/26/93
Total Phenolics	<1.	<1.	1/27/93
Total Dissolved Solids	480	566	1/27/93
Sulfate	212.	96.	1/25/93
Arsenic	<0.2	<0.2	1/27/93
Selenium	<0.2	<0.2	1/27/93
Silver	<0.05	<0.05	1/27/93
Boron	0.18	0.35	1/27/93
Barium	0.14	0.35	1/27/93
Cadmium	<0.05	<0.05	1/27/93
Chormium	<0.05	<0.05	1/27/93
Copper	<0.05	<0.05	1/27/93
Iron	12.0	13.0	1/27/93
Manganese	0.39	0.21	1/26/93

All results expressed as ppm unless otherwise indicated.

Analyses performed using "Standard Methods for the Examination of Water and Wastewater", 17th Edition.

Kate E. Chi

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

59894

K&S Testing And Engineering, Inc.
9715 Kennedy Avenue
Highland, IN. 46322

Report Date: 2/9/93
Project No.: 220 Sample Received: 1/22/93
Project Name: Griffith Landfill, Griffith, Indiana, January, 1993, Sampling
Sample Description: Water Samples

Sample No.	40151	40152	40153	40154	40155	40156	40157	40158	
Description	MW2S 1/20/93	MW2D 1/20/93	MW3S 1/21/93	MW3D 1/21/93	MW4S 1/21/93	MW4D 1/21/93	MW5S 1/21/93	MW5D 1/21/93	Date Analyzed
Sodium	15	27	24	14	160	64	20	25	1/27/93
pH (units)	7.0	7.37	6.73	7.19	6.59	7.61	6.58	7.26	1/27/93
Ammonia	1.26	0.7	1.12	0.84	15.4	0.84	1.96	0.98	1/27/93
Chloride	18.	24.	43.	28.	1090.	171.	52.	88.	1/27/93
COD	16	2	54	6	195	2	5	21	1/27/93
Specific Conductance	813	844	646	788	5040	1130	1620	950	1/27/93
Total Phenolics	<1.	<1.	<1.	<1.	<1.	<1.	<1.	<1.	1/27/93
Boron	0.20	0.29	0.21	0.12	0.60	0.21	0.28	0.1	1/27/93

All results expressed as ppm unless otherwise indicated.

Analyses performed using "Standard Methods for the Examination of Water and Wastewater", 17th Edition.

Kate E. Cl

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

58548

K&S Testing And Engineering, Inc.
9715 Kennedy Avenue
Highland, IN. 46322

Report Date: 1/25/93
Sample Received: 1/22/93
Analysis Date: 1/23/93

Project No.: 220
Project Name: Griffith Landfill, Griffith, Indiana, January, 1993 Sampling
Sample Description: Water, MW1S
Sample No.: 40149

Volatile Organic Compounds	Concentration Found in Sample	Concentration Found in Blank	Method Detection Limit	Quantitation Limit
1. Acetone	<1.0	<1.0	10.0	10
2. Acrolein	<15.0	<15.0	15.0	50
3. Acrylonitrile	<5.0	<5.0	5.0	50
4. Benzene	<0.1	<0.1	0.1	5
5. Bromodichloromethane	<0.6	<0.6	0.6	5
6. Bromoform	<4.0	<4.0	4.0	5
7. Bromomethane	<0.7	<0.7	0.7	10
8. 2-butanone (methyl ethyl ketone)	<10	<10	10	20
9. Carbon disulfide	<1.0	<1.0	1.0	5
10. Carbon tetrachloride	<0.6	<0.6	0.6	5
11. Chlorobenzene	<0.6	<0.6	0.6	5
12. Chlorodibromomethane	<1.0	<1.0	1.0	5
13. Chloroethane	<0.7	<0.7	0.7	5
14. 2-chloroethyl vinyl ether	<90.2	<90.2	90.2	100
15. Chloroform	<0.5	<0.5	0.5	5
16. Chloromethane	<1.0	<1.0	1.0	5
17. Dibromomethane	<1.0	<1.0	1.0	5
18. Dichlorodifluoromethane	<1.0	<1.0	1.0	5
19. 1,1-dichloroethane	<0.5	<0.5	0.5	5
20. 1,2-dichloroethene (total)	<1.0	<1.0	1.0	5
21. cis-1,3-dichloropropene	<0.5	<0.5	0.5	5
22. trans-1,3-dichloropropene	<0.9	<0.9	0.9	5
23. Ethylbenzene	<0.6	<0.6	0.6	5

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

58548

K&S Testing And Engineering, Inc.
9715 Kennedy Avenue
Highland, IN. 46322

Report Date: 1/25/93
Sample Received: 1/22/93
Analysis Date: 1/23/93

Project No.: 220
Project Name: Griffith Landfill, Griffith, Indiana, January, 1993 Sampling
Sample Description: Water, MW1S
Sample No.: 40149

Volatile Organic Compounds	Concentration Found in Sample	Concentration Found in Blank	Method Detection Limit	Quantitation Limit
24. Ethyl methacrylate	<1.0	<1.0	1.0	5
25. 2-hexanone	<5	<5	5	20
26. Iodomethane	<1.0	<1.0	1.0	5
27. Methylene chloride	<0.8	<0.8	0.8	5
28. 4-methyl-2-pentanone	<5	<5	5	20
29. Styrene	<1.0	<1.0	1.0	5
30. 1,1,2,2-tetrachloroethane	<3.9	<3.9	3.9	5
31. Toluene	<0.5	<0.5	0.5	5
32. 1,1,1-trichloroethane	<0.5	<0.5	0.5	5
33. 1,1,2-trichloroethane	<2.5	<2.5	2.5	5
34. Trichloroethene	<0.5	<0.5	0.5	5
35. Trichlorofluoromethane	<0.5	<0.5	0.5	5
36. 1,2,3-trichloropropane	<1.0	<1.0	1.0	5
37. Vinyl acetate	<1.0	<1.0	1.0	5
38. Vinyl choride	<0.7	<0.7	0.7	5
39. Xylenes (total)	<0.9	<0.9	0.9	5
40. 1,2-dichloroethane	<1.6	<1.6	1.6	5

All results expressed as ppb unless otherwise indicated.

Methods performed using EPA methods 8240 in accordance with SW-846, Third Edition.

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

58549

K&S Testing And Engineering, Inc.
9715 Kennedy Avenue
Highland, IN. 46322

Report Date: 1/25/93
Sample Received: 1/22/93
Analysis Date: 1/23/93

Project No.: 220
Project Name: Griffith Landfill, Griffith, Indiana, January, 1993 Sampling
Sample Description: Water, MW1D
Sample No.: 40150

Volatile Organic Compounds	Concentration Found in Sample	Concentration Found in Blank	Method Detection Limit	Quantitation Limit
1. Acetone	<1.0	<1.0	10.0	10
2. Acrolein	<15.0	<15.0	15.0	50
3. Acrylonitrile	<5.0	<5.0	5.0	50
4. Benzene	<0.1	<0.1	0.1	5
5. Bromodichloromethane	<0.6	<0.6	0.6	5
6. Bromoform	<4.0	<4.0	4.0	5
7. Bromomethane	<0.7	<0.7	0.7	10
8. 2-butanone (methyl ethyl ketone)	<10	<10	10	20
9. Carbon disulfide	<1.0	<1.0	1.0	5
10. Carbon tetrachloride	<0.6	<0.6	0.6	5
11. Chlorobenzene	<0.6	<0.6	0.6	5
12. Chlorodibromomethane	<1.0	<1.0	1.0	5
13. Chloroethane	<0.7	<0.7	0.7	5
14. 2-chloroethyl vinyl ether	<90.2	<90.2	90.2	100
15. Chloroform	<0.5	<0.5	0.5	5
16. Chloromethane	<1.0	<1.0	1.0	5
17. Dibromomethane	<1.0	<1.0	1.0	5
18. Dichlorodifluoromethane	<1.0	<1.0	1.0	5
19. 1,1-dichloroethane	<0.5	<0.5	0.5	5
20. 1,2-dichloroethene (total)	<1.0	<1.0	1.0	5
21. cis-1,3-dichloropropene	<0.5	<0.5	0.5	5
22. trans-1,3-dichloropropene	<0.9	<0.9	0.9	5
23. Ethylbenzene	<0.6	<0.6	0.6	5

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

58549

K&S Testing And Engineering, Inc.
9715 Kennedy Avenue
Highland, IN. 46322

Report Date: 1/25/93
Sample Received: 1/22/93
Analysis Date: 1/23/93

Project No.: 220
Project Name: Griffith Landfill, Griffith, Indiana, January, 1993 Sampling
Sample Description: Water, MW1D
Sample No.: 40150

Volatile Organic Compounds	Concentration Found in Sample	Concentration Found in Blank	Method Detection Limit	Quantitation Limit
24. Ethyl methacrylate	<1.0	<1.0	1.0	5
25. 2-hexanone	<5	<5	5	20
26. Iodomethane	<1.0	<1.0	1.0	5
27. Methylene chloride	<0.8	<0.8	0.8	5
28. 4-methyl-2-pentanone	<5	<5	5	20
29. Styrene	<1.0	<1.0	1.0	5
30. 1,1,2,2-tetrachloroethane	<3.9	<3.9	3.9	5
31. Toluene	<0.5	<0.5	0.5	5
32. 1,1,1-trichloroethane	<0.5	<0.5	0.5	5
33. 1,1,2-trichloroethane	<2.5	<2.5	2.5	5
34. Trichloroethene	<0.5	<0.5	0.5	5
35. Trichlorofluoromethane	<0.5	<0.5	0.5	5
36. 1,2,3-trichloropropane	<1.0	<1.0	1.0	5
37. Vinyl acetate	<1.0	<1.0	1.0	5
38. Vinyl choride	<0.7	<0.7	0.7	5
39. Xylenes (total)	<0.9	<0.9	0.9	5
40. 1,2-dichloroethane	<1.6	<1.6	1.6	5

All results expressed as ppb unless otherwise indicated.

Methods performed using EPA methods 8240 in accordance with SW-846, Third Edition.

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

58550

K&S Testing And Engineering, Inc.
9715 Kennedy Avenue
Highland, IN. 46322

Report Date: 1/25/93
Sample Received: 1/22/93
Analysis Date: 1/23/93

Project No.: 220
Project Name: Griffith Landfill, Griffith, Indiana, January, 1993 Sampling
Sample Description: Water, MW2S
Sample No.: 40151

Volatile Organic Compounds	Concentration Found in Sample	Concentration Found in Blank	Method Detection Limit	Quantitation Limit
1. Acetone	<1.0	<1.0	10.0	10
2. Acrolein	<15.0	<15.0	15.0	50
3. Acrylonitrile	<5.0	<5.0	5.0	50
4. Benzene	<0.1	<0.1	0.1	5
5. Bromodichloromethane	<0.6	<0.6	0.6	5
6. Bromoform	<4.0	<4.0	4.0	5
7. Bromomethane	<0.7	<0.7	0.7	10
8. 2-butanone (methyl ethyl ketone)	<10	<10	10	20
9. Carbon disulfide	<1.0	<1.0	1.0	5
10. Carbon tetrachloride	<0.6	<0.6	0.6	5
11. Chlorobenzene	<0.6	<0.6	0.6	5
12. Chlorodibromomethane	<1.0	<1.0	1.0	5
13. Chloroethane	<0.7	<0.7	0.7	5
14. 2-chloroethyl vinyl ether	<90.2	<90.2	90.2	100
15. Chloroform	<0.5	<0.5	0.5	5
16. Chloromethane	<1.0	<1.0	1.0	5
17. Dibromomethane	<1.0	<1.0	1.0	5
18. Dichlorodifluoromethane	<1.0	<1.0	1.0	5
19. 1,1-dichloroethane	<0.5	<0.5	0.5	5
20. 1,2-dichloroethene (total)	<1.0	<1.0	1.0	5
21. cis-1,3-dichloropropene	<0.5	<0.5	0.5	5
22. trans-1,3-dichloropropene	<0.9	<0.9	0.9	5
23. Ethylbenzene	<0.6	<0.6	0.6	5

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

58550

K&S Testing And Engineering, Inc.
9715 Kennedy Avenue
Highland, IN. 46322

Report Date: 1/25/93
Sample Received: 1/22/93
Analysis Date: 1/23/93

Project No.: 220
Project Name: Griffith Landfill, Griffith, Indiana, January, 1993 Sampling
Sample Description: Water, MW2S
Sample No.: 40151

Volatile Organic Compounds	Concentration Found in Sample	Concentration Found in Blank	Method Detection Limit	Quantitation Limit
24. Ethyl methacrylate	<1.0	<1.0	1.0	5
25. 2-hexanone	<5	<5	5	20
26. Iodomethane	<1.0	<1.0	1.0	5
27. Methylene chloride	<0.8	<0.8	0.8	5
28. 4-methyl-2-pentanone	<5	<5	5	20
29. Styrene	<1.0	<1.0	1.0	5
30. 1,1,2,2-tetrachloroethane	<3.9	<3.9	3.9	5
31. Toluene	<0.5	<0.5	0.5	5
32. 1,1,1-trichloroethane	<0.5	<0.5	0.5	5
33. 1,1,2-trichloroethane	<2.5	<2.5	2.5	5
34. Trichloroethene	<0.5	<0.5	0.5	5
35. Trichlorofluoromethane	<0.5	<0.5	0.5	5
36. 1,2,3-trichloropropane	<1.0	<1.0	1.0	5
37. Vinyl acetate	<1.0	<1.0	1.0	5
38. Vinyl choride	<0.7	<0.7	0.7	5
39. Xylenes (total)	<0.9	<0.9	0.9	5
40. 1,2-dichloroethane	<1.6	<1.6	1.6	5

All results expressed as ppb unless otherwise indicated.

Methods performed using EPA methods 8240 in accordance with SW-846, Third Edition.

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

58551

K&S Testing And Engineering, Inc.
9715 Kennedy Avenue
Highland, IN. 46322

Report Date: 1/25/93
Sample Received: 1/22/93
Analysis Date: 1/23/93

Project No.: 220
Project Name: Griffith Landfill, Griffith, Indiana, January, 1993 Sampling
Sample Description: Water, MW2D
Sample No.: 40152

Volatile Organic Compounds	Concentration Found in Sample	Concentration Found in Blank	Method Detection Limit	Quantitation Limit
1. Acetone	<1.0	<1.0	10.0	10
2. Acrolein	<15.0	<15.0	15.0	50
3. Acrylonitrile	<5.0	<5.0	5.0	50
4. Benzene	<0.1	<0.1	0.1	5
5. Bromodichloromethane	<0.6	<0.6	0.6	5
6. Bromoform	<4.0	<4.0	4.0	5
7. Bromomethane	<0.7	<0.7	0.7	10
8. 2-butanone (methyl ethyl ketone)	<10	<10	10	20
9. Carbon disulfide	<1.0	<1.0	1.0	5
10. Carbon tetrachloride	<0.6	<0.6	0.6	5
11. Chlorobenzene	<0.6	<0.6	0.6	5
12. Chlorodibromomethane	<1.0	<1.0	1.0	5
13. Chloroethane	<0.7	<0.7	0.7	5
14. 2-chloroethyl vinyl ether	<90.2	<90.2	90.2	100
15. Chloroform	<0.5	<0.5	0.5	5
16. Chloromethane	<1.0	<1.0	1.0	5
17. Dibromomethane	<1.0	<1.0	1.0	5
18. Dichlorodifluoromethane	<1.0	<1.0	1.0	5
19. 1,1-dichloroethane	<0.5	<0.5	0.5	5
20. 1,2-dichloroethene (total)	<1.0	<1.0	1.0	5
21. cis-1,3-dichloropropene	<0.5	<0.5	0.5	5
22. trans-1,3-dichloropropene	<0.9	<0.9	0.9	5
23. Ethylbenzene	<0.6	<0.6	0.6	5

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

58551

K&S Testing And Engineering, Inc.
9715 Kennedy Avenue
Highland, IN. 46322

Report Date: 1/25/93
Sample Received: 1/22/93
Analysis Date: 1/23/93

Project No.: 220
Project Name: Griffith Landfill, Griffith, Indiana, January, 1993 Sampling
Sample Description: Water, MW2D
Sample No.: 40152

Volatile Organic Compounds	Concentration Found in Sample	Concentration Found in Blank	Method Detection Limit	Quantitation Limit
24. Ethyl methacrylate	<1.0	<1.0	1.0	5
25. 2-hexanone	<5	<5	5	20
26. Iodomethane	<1.0	<1.0	1.0	5
27. Methylene chloride	<0.8	<0.8	0.8	5
28. 4-methyl-2-pentanone	<5	<5	5	20
29. Styrene	<1.0	<1.0	1.0	5
30. 1,1,2,2-tetrachloroethane	<3.9	<3.9	3.9	5
31. Toluene	<0.5	<0.5	0.5	5
32. 1,1,1-trichloroethane	<0.5	<0.5	0.5	5
33. 1,1,2-trichloroethane	<2.5	<2.5	2.5	5
34. Trichloroethene	<0.5	<0.5	0.5	5
35. Trichlorofluoromethane	<0.5	<0.5	0.5	5
36. 1,2,3-trichloropropane	<1.0	<1.0	1.0	5
37. Vinyl acetate	<1.0	<1.0	1.0	5
38. Vinyl choride	<0.7	<0.7	0.7	5
39. Xylenes (total)	<0.9	<0.9	0.9	5
40. 1,2-dichloroethane	<1.6	<1.6	1.6	5

All results expressed as ppb unless otherwise indicated.

Methods performed using EPA methods 8240 in accordance with SW-846, Third Edition.

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

58552

K&S Testing And Engineering, Inc.
9715 Kennedy Avenue
Highland, IN. 46322

Report Date: 1/25/93
Sample Received: 1/22/93
Analysis Date: 1/23/93

Project No.: 220
Project Name: Griffith Landfill, Griffith, Indiana, January, 1993 Sampling
Sample Description: Water, MW3S
Sample No.: 40153

Volatile Organic Compounds	Concentration Found in Sample	Concentration Found in Blank	Method Detection Limit	Quantitation Limit
1. Acetone	<1.0	<1.0	10.0	10
2. Acrolein	<15.0	<15.0	15.0	50
3. Acrylonitrile	<5.0	<5.0	5.0	50
4. Benzene	<0.1	<0.1	0.1	5
5. Bromodichloromethane	<0.6	<0.6	0.6	5
6. Bromoform	<4.0	<4.0	4.0	5
7. Bromomethane	<0.7	<0.7	0.7	10
8. 2-butanone (methyl ethyl ketone)	<10	<10	10	20
9. Carbon disulfide	<1.0	<1.0	1.0	5
10. Carbon tetrachloride	<0.6	<0.6	0.6	5
11. Chlorobenzene	<0.6	<0.6	0.6	5
12. Chlorodibromomethane	<1.0	<1.0	1.0	5
13. Chloroethane	<0.7	<0.7	0.7	5
14. 2-chloroethyl vinyl ether	<90.2	<90.2	90.2	100
15. Chloroform	<0.5	<0.5	0.5	5
16. Chloromethane	<1.0	<1.0	1.0	5
17. Dibromomethane	<1.0	<1.0	1.0	5
18. Dichlorodifluoromethane	<1.0	<1.0	1.0	5
19. 1,1-dichloroethane	<0.5	<0.5	0.5	5
20. 1,2-dichloroethene (total)	<1.0	<1.0	1.0	5
21. cis-1,3-dichloropropene	<0.5	<0.5	0.5	5
22. trans-1,3-dichloropropene	<0.9	<0.9	0.9	5
23. Ethylbenzene	<0.6	<0.6	0.6	5

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

58552

K&S Testing And Engineering, Inc.
9715 Kennedy Avenue
Highland, IN. 46322

Report Date: 1/25/93
Sample Received: 1/22/93
Analysis Date: 1/23/93

Project No.: 220
Project Name: Griffith Landfill, Griffith, Indiana, January, 1993 Sampling
Sample Description: Water, MW3S
Sample No.: 40153

Volatile Organic Compounds	Concentration Found in Sample	Concentration Found in Blank	Method Detection Limit	Quantitation Limit
24. Ethyl methacrylate	<1.0	<1.0	1.0	5
25. 2-hexanone	<5	<5	5	20
26. Iodomethane	<1.0	<1.0	1.0	5
27. Methylene chloride	<0.8	<0.8	0.8	5
28. 4-methyl-2-pentanone	<5	<5	5	20
29. Styrene	<1.0	<1.0	1.0	5
30. 1,1,2,2-tetrachloroethane	<3.9	<3.9	3.9	5
31. Toluene	<0.5	<0.5	0.5	5
32. 1,1,1-trichloroethane	<0.5	<0.5	0.5	5
33. 1,1,2-trichloroethane	<2.5	<2.5	2.5	5
34. Trichloroethene	<0.5	<0.5	0.5	5
35. Trichlorofluoromethane	<0.5	<0.5	0.5	5
36. 1,2,3-trichloropropane	<1.0	<1.0	1.0	5
37. Vinyl acetate	<1.0	<1.0	1.0	5
38. Vinyl choride	<0.7	<0.7	0.7	5
39. Xylenes (total)	<0.9	<0.9	0.9	5
40. 1,2-dichloroethane	<1.6	<1.6	1.6	5

All results expressed as ppb unless otherwise indicated.

Methods performed using EPA methods 8240 in accordance with SW-846, Third Edition.

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

58552

K&S Testing And Engineering, Inc.
9715 Kennedy Avenue
Highland, IN. 46322

Report Date: 1/25/93
Sample Received: 1/22/93
Analysis Date: 1/23/93

Project No.: 220
Project Name: Griffith Landfill, Griffith, Indiana, January, 1993 Sampling
Sample Description: Water, MW3S
Sample No.: 40153

Volatile Organic Compounds	Concentration Found in Sample	Concentration Found in Blank	Method Detection Limit	Quantitation Limit
1. Acetone	<1.0	<1.0	10.0	10
2. Acrolein	<15.0	<15.0	15.0	50
3. Acrylonitrile	<5.0	<5.0	5.0	50
4. Benzene	<0.1	<0.1	0.1	5
5. Bromodichloromethane	<0.6	<0.6	0.6	5
6. Bromoform	<4.0	<4.0	4.0	5
7. Bromomethane	<0.7	<0.7	0.7	10
8. 2-butanone (methyl ethyl ketone)	<10	<10	10	20
9. Carbon disulfide	<1.0	<1.0	1.0	5
10. Carbon tetrachloride	<0.6	<0.6	0.6	5
11. Chlorobenzene	<0.6	<0.6	0.6	5
12. Chlorodibromomethane	<1.0	<1.0	1.0	5
13. Chloroethane	<0.7	<0.7	0.7	5
14. 2-chloroethyl vinyl ether	<90.2	<90.2	90.2	100
15. Chloroform	<0.5	<0.5	0.5	5
16. Chloromethane	<1.0	<1.0	1.0	5
17. Dibromomethane	<1.0	<1.0	1.0	5
18. Dichlorodifluoromethane	<1.0	<1.0	1.0	5
19. 1,1-dichloroethane	<0.5	<0.5	0.5	5
20. 1,2-dichloroethene (total)	<1.0	<1.0	1.0	5
21. cis-1,3-dichloropropene	<0.5	<0.5	0.5	5
22. trans-1,3-dichloropropene	<0.9	<0.9	0.9	5
23. Ethylbenzene	<0.6	<0.6	0.6	5

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

58552

K&S Testing And Engineering, Inc.
9715 Kennedy Avenue
Highland, IN. 46322

Report Date: 1/25/93
Sample Received: 1/22/93
Analysis Date: 1/23/93

Project No.: 220
Project Name: Griffith Landfill, Griffith, Indiana, January, 1993 Sampling
Sample Description: Water, MW3S
Sample No.: 40153

Volatile Organic Compounds	Concentration Found in Sample	Concentration Found in Blank	Method Detection Limit	Quantitation Limit
24. Ethyl methacrylate	<1.0	<1.0	1.0	5
25. 2-hexanone	<5	<5	5	20
26. Iodomethane	<1.0	<1.0	1.0	5
27. Methylene chloride	<0.8	<0.8	0.8	5
28. 4-methyl-2-pentanone	<5	<5	5	20
29. Styrene	<1.0	<1.0	1.0	5
30. 1,1,2,2-tetrachloroethane	<3.9	<3.9	3.9	5
31. Toluene	<0.5	<0.5	0.5	5
32. 1,1,1-trichloroethane	<0.5	<0.5	0.5	5
33. 1,1,2-trichloroethane	<2.5	<2.5	2.5	5
34. Trichloroethene	<0.5	<0.5	0.5	5
35. Trichlorofluoromethane	<0.5	<0.5	0.5	5
36. 1,2,3-trichloropropane	<1.0	<1.0	1.0	5
37. Vinyl acetate	<1.0	<1.0	1.0	5
38. Vinyl choride	<0.7	<0.7	0.7	5
39. Xylenes (total)	<0.9	<0.9	0.9	5
40. 1,2-dichloroethane	<1.6	<1.6	1.6	5

All results expressed as ppb unless otherwise indicated.

Methods performed using EPA methods 8240 in accordance with SW-846, Third Edition.

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

58553

K&S Testing And Engineering, Inc.
9715 Kennedy Avenue
Highland, IN. 46322

Report Date: 1/25/93
Sample Received: 1/22/93
Analysis Date: 1/23/93

Project No.: 220
Project Name: Griffith Landfill, Griffith, Indiana, January, 1993 Sampling
Sample Description: Water, MW3D
Sample No.: 40154

Volatile Organic Compounds	Concentration Found in Sample	Concentration Found in Blank	Method Detection Limit	Quantitation Limit
1. Acetone	<1.0	<1.0	10.0	10
2. Acrolein	<15.0	<15.0	15.0	50
3. Acrylonitrile	<5.0	<5.0	5.0	50
4. Benzene	<0.1	<0.1	0.1	5
5. Bromodichloromethane	<0.6	<0.6	0.6	5
6. Bromoform	<4.0	<4.0	4.0	5
7. Bromomethane	<0.7	<0.7	0.7	10
8. 2-butanone (methyl ethyl ketone)	<10	<10	10	20
9. Carbon disulfide	<1.0	<1.0	1.0	5
10. Carbon tetrachloride	<0.6	<0.6	0.6	5
11. Chlorobenzene	<0.6	<0.6	0.6	5
12. Chlorodibromomethane	<1.0	<1.0	1.0	5
13. Chloroethane	<0.7	<0.7	0.7	5
14. 2-chloroethyl vinyl ether	<90.2	<90.2	90.2	100
15. Chloroform	<0.5	<0.5	0.5	5
16. Chloromethane	<1.0	<1.0	1.0	5
17. Dibromomethane	<1.0	<1.0	1.0	5
18. Dichlorodifluoromethane	<1.0	<1.0	1.0	5
19. 1,1-dichloroethane	<0.5	<0.5	0.5	5
20. 1,2-dichloroethene (total)	<1.0	<1.0	1.0	5
21. cis-1,3-dichloropropene	<0.5	<0.5	0.5	5
22. trans-1,3-dichloropropene	<0.9	<0.9	0.9	5
23. Ethylbenzene	<0.6	<0.6	0.6	5

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

58553

K&S Testing And Engineering, Inc.
9715 Kennedy Avenue
Highland, IN. 46322

Report Date: 1/25/93
Sample Received: 1/22/93
Analysis Date: 1/23/93

Project No.: 220
Project Name: Griffith Landfill, Griffith, Indiana, January, 1993 Sampling
Sample Description: Water, MW3D
Sample No.: 40154

Volatile Organic Compounds	Concentration Found in Sample	Concentration Found in Blank	Method Detection Limit	Quantitation Limit
24. Ethyl methacrylate	<1.0	<1.0	1.0	5
25. 2-hexanone	<5	<5	5	20
26. Iodomethane	<1.0	<1.0	1.0	5
27. Methylene chloride	<0.8	<0.8	0.8	5
28. 4-methyl-2-pentanone	<5	<5	5	20
29. Styrene	<1.0	<1.0	1.0	5
30. 1,1,2,2-tetrachloroethane	<3.9	<3.9	3.9	5
31. Toluene	<0.5	<0.5	0.5	5
32. 1,1,1-trichloroethane	<0.5	<0.5	0.5	5
33. 1,1,2-trichloroethane	<2.5	<2.5	2.5	5
34. Trichloroethene	<0.5	<0.5	0.5	5
35. Trichlorofluoromethane	<0.5	<0.5	0.5	5
36. 1,2,3-trichloropropane	<1.0	<1.0	1.0	5
37. Vinyl acetate	<1.0	<1.0	1.0	5
38. Vinyl choride	<0.7	<0.7	0.7	5
39. Xylenes (total)	<0.9	<0.9	0.9	5
40. 1,2-dichloroethane	<1.6	<1.6	1.6	5

All results expressed as ppb unless otherwise indicated.

Methods performed using EPA methods 8240 in accordance with SW-846, Third Edition.

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

58544

K&S Testing And Engineering, Inc.
9715 Kennedy Avenue
Highland, IN. 46322

Report Date: 1/25/93
Sample Received: 1/22/93
Analysis Date: 1/23/93

Project No.: 220
Project Name: Griffith Landfill, Griffith, Indiana, January, 1993 Sampling
Sample Description: Water, MW4S
Sample No.: 40155

Volatile Organic Compounds	Concentration Found in Sample	Concentration Found in Blank	Method Detection Limit	Quantitation Limit
1. Acetone	<1.0	<1.0	10.0	10
2. Acrolein	<15.0	<15.0	15.0	50
3. Acrylonitrile	<5.0	<5.0	5.0	50
4. Benzene	622.	<0.1	0.1	5
5. Bromodichloromethane	<0.6	<0.6	0.6	5
6. Bromoform	<4.0	<4.0	4.0	5
7. Bromomethane	<0.7	<0.7	0.7	10
8. 2-butanone (methyl ethyl ketone)	<10	<10	10	20
9. Carbon disulfide	<1.0	<1.0	1.0	5
10. Carbon tetrachloride	<0.6	<0.6	0.6	5
11. Chlorobenzene	<0.6	<0.6	0.6	5
12. Chlorodibromomethane	<1.0	<1.0	1.0	5
13. Chloroethane	<0.7	<0.7	0.7	5
14. 2-chloroethyl vinyl ether	<90.2	<90.2	90.2	100
15. Chloroform	<0.5	<0.5	0.5	5
16. Chloromethane	<1.0	<1.0	1.0	5
17. Dibromomethane	<1.0	<1.0	1.0	5
18. Dichlorodifluoromethane	<1.0	<1.0	1.0	5
19. 1,1-dichloroethane	<0.5	<0.5	0.5	5
20. 1,2-dichloroethene (total)	52.9	<1.0	1.0	5
21. cis-1,3-dichloropropene	<0.5	<0.5	0.5	5
22. trans-1,3-dichloropropene	<0.9	<0.9	0.9	5
23. Ethylbenzene	<0.6	<0.6	0.6	5

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

58544

K&S Testing And Engineering, Inc.
9715 Kennedy Avenue
Highland, IN. 46322

Report Date: 1/25/93
Sample Received: 1/22/93
Analysis Date: 1/23/93

Project No.: 220
Project Name: Griffith Landfill, Griffith, Indiana, January, 1993 Sampling
Sample Description: Water, MW4S
Sample No.: 40155

Volatile Organic Compounds	Concentration Found in Sample	Concentration Found in Blank	Method Detection Limit	Quantitation Limit
24. Ethyl methacrylate	<1.0	<1.0	1.0	5
25. 2-hexanone	<5	<5	5	20
26. Iodomethane	<1.0	<1.0	1.0	5
27. Methylene chloride	<0.8	<0.8	0.8	5
28. 4-methyl-2-pentanone	<5	<5	5	20
29. Styrene	<1.0	<1.0	1.0	5
30. 1,1,2,2-tetrachloroethane	<3.9	<3.9	3.9	5
31. Toluene	<0.5	<0.5	0.5	5
32. 1,1,1-trichloroethane	<0.5	<0.5	0.5	5
33. 1,1,2-trichloroethane	<2.5	<2.5	2.5	5
34. Trichloroethene	<0.5	<0.5	0.5	5
35. Trichlorofluoromethane	<0.5	<0.5	0.5	5
36. 1,2,3-trichloropropane	<1.0	<1.0	1.0	5
37. Vinyl acetate	<1.0	<1.0	1.0	5
38. Vinyl choride	<0.7	<0.7	0.7	5
39. Xylenes (total)	<0.9	<0.9	0.9	5
40. 1,2-dichloroethane	<1.6	<1.6	1.6	5

All results expressed as ppb unless otherwise indicated.

Methods performed using EPA methods 8240 in accordance with SW-846, Third Edition.

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

58545

K&S Testing And Engineering, Inc.
9715 Kennedy Avenue
Highland, IN. 46322

Report Date: 1/25/93
Sample Received: 1/22/93
Analysis Date: 1/23/93

Project No.: 220
Project Name: Griffith Landfill, Griffith, Indiana, January, 1993 Sampling
Sample Description: Water, MW4D
Sample No.: 40156

Volatile Organic Compounds	Concentration Found in Sample	Concentration Found in Blank	Method Detection Limit	Quantitation Limit
1. Acetone	<1.0	<1.0	10.0	10
2. Acrolein	<15.0	<15.0	15.0	50
3. Acrylonitrile	<5.0	<5.0	5.0	50
4. Benzene	<0.1	<0.1	0.1	5
5. Bromodichloromethane	<0.6	<0.6	0.6	5
6. Bromoform	<4.0	<4.0	4.0	5
7. Bromomethane	<0.7	<0.7	0.7	10
8. 2-butanone (methyl ethyl ketone)	<10	<10	10	20
9. Carbon disulfide	<1.0	<1.0	1.0	5
10. Carbon tetrachloride	<0.6	<0.6	0.6	5
11. Chlorobenzene	<0.6	<0.6	0.6	5
12. Chlorodibromomethane	<1.0	<1.0	1.0	5
13. Chloroethane	<0.7	<0.7	0.7	5
14. 2-chloroethyl vinyl ether	<90.2	<90.2	90.2	100
15. Chloroform	<0.5	<0.5	0.5	5
16. Chloromethane	<1.0	<1.0	1.0	5
17. Dibromomethane	<1.0	<1.0	1.0	5
18. Dichlorodifluoromethane	<1.0	<1.0	1.0	5
19. 1,1-dichloroethane	<0.5	<0.5	0.5	5
20. 1,2-dichloroethene (total)	<1.0	<1.0	1.0	5
21. cis-1,3-dichloropropene	<0.5	<0.5	0.5	5
22. trans-1,3-dichloropropene	<0.9	<0.9	0.9	5
23. Ethylbenzene	<0.6	<0.6	0.6	5

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

58545

K&S Testing And Engineering, Inc.
9715 Kennedy Avenue
Highland, IN. 46322

Report Date: 1/25/93
Sample Received: 1/22/93
Analysis Date: 1/23/93

Project No.: 220
Project Name: Griffith Landfill, Griffith, Indiana, January, 1993 Sampling
Sample Description: Water, MW4D
Sample No.: 40156

Volatile Organic Compounds	Concentration Found in Sample	Concentration Found in Blank	Method Detection Limit	Quantitation Limit
24. Ethyl methacrylate	<1.0	<1.0	1.0	5
25. 2-hexanone	<5	<5	5	20
26. Iodomethane	<1.0	<1.0	1.0	5
27. Methylene chloride	<0.8	<0.8	0.8	5
28. 4-methyl-2-pentanone	<5	<5	5	20
29. Styrene	<1.0	<1.0	1.0	5
30. 1,1,2,2-tetrachloroethane	<3.9	<3.9	3.9	5
31. Toluene	<0.5	<0.5	0.5	5
32. 1,1,1-trichloroethane	<0.5	<0.5	0.5	5
33. 1,1,2-trichloroethane	<2.5	<2.5	2.5	5
34. Trichloroethene	<0.5	<0.5	0.5	5
35. Trichlorofluoromethane	<0.5	<0.5	0.5	5
36. 1,2,3-trichloropropane	<1.0	<1.0	1.0	5
37. Vinyl acetate	<1.0	<1.0	1.0	5
38. Vinyl choride	<0.7	<0.7	0.7	5
39. Xylenes (total)	<0.9	<0.9	0.9	5
40. 1,2-dichloroethane	<1.6	<1.6	1.6	5

All results expressed as ppb unless otherwise indicated.

Methods performed using EPA methods 8240 in accordance with SW-846, Third Edition.

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

59895

K&S Testing And Engineering, Inc.
9715 Kennedy Avenue
Highland, IN. 46322

Report Date: 2/9/93
Sample Received: 1/22/93
Analysis Date: 1/23/93

Project No.: 220
Project Name: Griffith Landfill, Griffith, Indiana, January, 1993 Sampling
Sample Description: Water, MW5S
Sample No.: 40157

Volatile Organic Compounds	Concentration Found in Sample	Concentration Found in Blank	Method Detection Limit	Quantitation Limit
1. Acetone	<1.0	<1.0	10.0	10
2. Acrolein	<15.0	<15.0	15.0	50
3. Acrylonitrile	<5.0	<5.0	5.0	50
4. Benzene	<0.1	<0.1	0.1	5
5. Bromodichloromethane	<0.6	<0.6	0.6	5
6. Bromoform	<4.0	<4.0	4.0	5
7. Bromomethane	<0.7	<0.7	0.7	10
8. 2-butanone (methyl ethyl ketone)	<10	<10	10	20
9. Carbon disulfide	<1.0	<1.0	1.0	5
10. Carbon tetrachloride	<0.6	<0.6	0.6	5
11. Chlorobenzene	<0.6	<0.6	0.6	5
12. Chlorodibromomethane	<1.0	<1.0	1.0	5
13. Chloroethane	<0.7	<0.7	0.7	5
14. 2-chloroethyl vinyl ether	<90.2	<90.2	90.2	100
15. Chloroform	<0.5	<0.5	0.5	5
16. Chloromethane	<1.0	<1.0	1.0	5
17. Dibromomethane	<1.0	<1.0	1.0	5
18. Dichlorodifluoromethane	<1.0	<1.0	1.0	5
19. 1,1-dichloroethane	<0.5	<0.5	0.5	5
20. 1,2-dichloroethene (total)	<1.0	<1.0	1.0	5
21. cis-1,3-dichloropropene	<0.5	<0.5	0.5	5
22. trans-1,3-dichloropropene	<0.9	<0.9	0.9	5
23. Ethylbenzene	<0.6	<0.6	0.6	5

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

59895

K&S Testing And Engineering, Inc.
9715 Kennedy Avenue
Highland, IN. 46322

Report Date: 2/9/93
Sample Received: 1/22/93
Analysis Date: 1/23/93

Project No.: 220
Project Name: Griffith Landfill, Griffith, Indiana, January, 1993 Sampling
Sample Description: Water, MW5S
Sample No.: 40157

Volatile Organic Compounds	Concentration Found in Sample	Concentration Found in Blank	Method Detection Limit	Quantitation Limit
24. Ethyl methacrylate	<1.0	<1.0	1.0	5
25. 2-hexanone	<5	<5	5	20
26. Iodomethane	<1.0	<1.0	1.0	5
27. Methylene chloride	<0.8	<0.8	0.8	5
28. 4-methyl-2-pentanone	<5	<5	5	20
29. Styrene	<1.0	<1.0	1.0	5
30. 1,1,2,2-tetrachloroethane	<3.9	<3.9	3.9	5
31. Toluene	<0.5	<0.5	0.5	5
32. 1,1,1-trichloroethane	<0.5	<0.5	0.5	5
33. 1,1,2-trichloroethane	<2.5	<2.5	2.5	5
34. Trichloroethene	<0.5	<0.5	0.5	5
35. Trichlorofluoromethane	<0.5	<0.5	0.5	5
36. 1,2,3-trichloropropane	<1.0	<1.0	1.0	5
37. Vinyl acetate	<1.0	<1.0	1.0	5
38. Vinyl choride	<0.7	<0.7	0.7	5
39. Xylenes (total)	<0.9	<0.9	0.9	5
40. 1,2-dichloroethane	<1.6	<1.6	1.6	5

All results expressed as ppb unless otherwise indicated.

Methods performed using EPA methods 8240 in accordance with SW-846, Third Edition.

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

59860

K&S Testing And Engineering, Inc.
9715 Kennedy Avenue
Highland, IN. 46322

Report Date: 2/9/93
Sample Received: 1/22/93
Analysis Date: 1/28/93

Project No.: 220
Project Name: Griffith Landfill, Griffith, Indiana, January, 1993 Sampling
Sample Description: Water, MW5D
Sample No.: 40158

Volatile Organic Compounds	Concentration Found in Sample	Concentration Found in Blank	Method Detection Limit	Quantitation Limit
1. Acetone	<1.0	<1.0	10.0	10
2. Acrolein	<15.0	<15.0	15.0	50
3. Acrylonitrile	<5.0	<5.0	5.0	50
4. Benzene	<0.1	<0.1	0.1	5
5. Bromodichloromethane	<0.6	<0.6	0.6	5
6. Bromoform	<4.0	<4.0	4.0	5
7. Bromomethane	<0.7	<0.7	0.7	10
8. 2-butanone (methyl ethyl ketone)	<10	<10	10	20
9. Carbon disulfide	<1.0	<1.0	1.0	5
10. Carbon tetrachloride	<0.6	<0.6	0.6	5
11. Chlorobenzene	<0.6	<0.6	0.6	5
12. Chlorodibromomethane	<1.0	<1.0	1.0	5
13. Chloroethane	<0.7	<0.7	0.7	5
14. 2-chloroethyl vinyl ether	<90.2	<90.2	90.2	100
15. Chloroform	<0.5	<0.5	0.5	5
16. Chloromethane	<1.0	<1.0	1.0	5
17. Dibromomethane	<1.0	<1.0	1.0	5
18. Dichlorodifluoromethane	<1.0	<1.0	1.0	5
19. 1,1-dichloroethane	<0.5	<0.5	0.5	5
20. 1,2-dichloroethene (total)	<1.0	<1.0	1.0	5
21. cis-1,3-dichloropropene	<0.5	<0.5	0.5	5
22. trans-1,3-dichloropropene	<0.9	<0.9	0.9	5
23. Ethylbenzene	<0.6	<0.6	0.6	5

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

59860

K&S Testing And Engineering, Inc.
9715 Kennedy Avenue
Highland, IN. 46322

Report Date: 2/9/93
Sample Received: 1/22/93
Analysis Date: 1/28/93

Project No.: 220
Project Name: Griffith Landfill, Griffith, Indiana, January, 1993 Sampling
Sample Description: Water, MW5D
Sample No.: 40158

Volatile Organic Compounds	Concentration Found in Sample	Concentration Found in Blank	Method Detection Limit	Quantitation Limit
24. Ethyl methacrylate	<1.0	<1.0	1.0	5
25. 2-hexanone	<5	<5	5	20
26. Iodomethane	<1.0	<1.0	1.0	5
27. Methylene chloride	<0.8	<0.8	0.8	5
28. 4-methyl-2-pentanone	<5	<5	5	20
29. Styrene	<1.0	<1.0	1.0	5
30. 1,1,2,2-tetrachloroethane	<3.9	<3.9	3.9	5
31. Toluene	<0.5	<0.5	0.5	5
32. 1,1,1-trichloroethane	<0.5	<0.5	0.5	5
33. 1,1,2-trichloroethane	<2.5	<2.5	2.5	5
34. Trichloroethene	<0.5	<0.5	0.5	5
35. Trichlorofluoromethane	<0.5	<0.5	0.5	5
36. 1,2,3-trichloropropane	<1.0	<1.0	1.0	5
37. Vinyl acetate	<1.0	<1.0	1.0	5
38. Vinyl choride	<0.7	<0.7	0.7	5
39. Xylenes (total)	<0.9	<0.9	0.9	5
40. 1,2-dichloroethane	<1.6	<1.6	1.6	5

All results expressed as ppb unless otherwise indicated.

Methods performed using EPA methods 8240 in accordance with SW-846, Third Edition.

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

58546

K&S Testing And Engineering, Inc.
9715 Kennedy Avenue
Highland, IN. 46322

Report Date: 1/25/93
Sample Received: 1/22/93
Analysis Date: 1/23/93

Project No.: 220
Project Name: Griffith Landfill, Griffith, Indiana, January, 1993 Sampling
Sample Description: Water, T.B.
Sample No.: 40147

Volatile Organic Compounds	Concentration Found in Sample	Concentration Found in Blank	Method Detection Limit	Quantitation Limit
1. Acetone	<1.0	<1.0	10.0	10
2. Acrolein	<15.0	<15.0	15.0	50
3. Acrylonitrile	<5.0	<5.0	5.0	50
4. Benzene	<0.1	<0.1	0.1	5
5. Bromodichloromethane	<0.6	<0.6	0.6	5
6. Bromoform	<4.0	<4.0	4.0	5
7. Bromomethane	<0.7	<0.7	0.7	10
8. 2-butanone (methyl ethyl ketone)	<10	<10	10	20
9. Carbon disulfide	<1.0	<1.0	1.0	5
10. Carbon tetrachloride	<0.6	<0.6	0.6	5
11. Chlorobenzene	<0.6	<0.6	0.6	5
12. Chlorodibromomethane	<1.0	<1.0	1.0	5
13. Chloroethane	<0.7	<0.7	0.7	5
14. 2-chloroethyl vinyl ether	<90.2	<90.2	90.2	100
15. Chloroform	<0.5	<0.5	0.5	5
16. Chloromethane	<1.0	<1.0	1.0	5
17. Dibromomethane	<1.0	<1.0	1.0	5
18. Dichlorodifluoromethane	<1.0	<1.0	1.0	5
19. 1,1-dichloroethane	<0.5	<0.5	0.5	5
20. 1,2-dichloroethene (total)	<1.0	<1.0	1.0	5
21. cis-1,3-dichloropropene	<0.5	<0.5	0.5	5
22. trans-1,3-dichloropropene	<0.9	<0.9	0.9	5
23. Ethylbenzene	<0.6	<0.6	0.6	5

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

58546

K&S Testing And Engineering, Inc.
9715 Kennedy Avenue
Highland, IN. 46322

Report Date: 1/25/93
Sample Received: 1/22/93
Analysis Date: 1/23/93

Project No.: 220
Project Name: Griffith Landfill, Griffith, Indiana, January, 1993 Sampling
Sample Description: Water, T.B.
Sample No.: 40147

Volatile Organic Compounds	Concentration Found in Sample	Concentration Found in Blank	Method Detection Limit	Quantitation Limit
24. Ethyl methacrylate	<1.0	<1.0	1.0	5
25. 2-hexanone	<5	<5	5	20
26. Iodomethane	<1.0	<1.0	1.0	5
27. Methylene chloride	<0.8	<0.8	0.8	5
28. 4-methyl-2-pentanone	<5	<5	5	20
29. Styrene	<1.0	<1.0	1.0	5
30. 1,1,2,2-tetrachloroethane	<3.9	<3.9	3.9	5
31. Toluene	<0.5	<0.5	0.5	5
32. 1,1,1-trichloroethane	<0.5	<0.5	0.5	5
33. 1,1,2-trichloroethane	<2.5	<2.5	2.5	5
34. Trichloroethene	<0.5	<0.5	0.5	5
35. Trichlorofluoromethane	<0.5	<0.5	0.5	5
36. 1,2,3-trichloropropane	<1.0	<1.0	1.0	5
37. Vinyl acetate	<1.0	<1.0	1.0	5
38. Vinyl choride	<0.7	<0.7	0.7	5
39. Xylenes (total)	<0.9	<0.9	0.9	5
40. 1,2-dichloroethane	<1.6	<1.6	1.6	5

All results expressed as ppb unless otherwise indicated.

Methods performed using EPA methods 8240 in accordance with SW-846, Third Edition.

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

58547

K&S Testing And Engineering, Inc.
9715 Kennedy Avenue
Highland, IN. 46322

Report Date: 1/25/93
Sample Received: 1/22/93
Analysis Date: 1/23/93

Project No.: 220
Project Name: Griffith Landfill, Griffith, Indiana, January, 1993 Sampling
Sample Description: Water, F.B.
Sample No.: 40148

Volatile Organic Compounds	Concentration Found in Sample	Concentration Found in Blank	Method Detection Limit	Quantitation Limit
1. Acetone	<1.0	<1.0	10.0	10
2. Acrolein	<15.0	<15.0	15.0	50
3. Acrylonitrile	<5.0	<5.0	5.0	50
4. Benzene	<0.1	<0.1	0.1	5
5. Bromodichloromethane	<0.6	<0.6	0.6	5
6. Bromoform	<4.0	<4.0	4.0	5
7. Bromomethane	<0.7	<0.7	0.7	10
8. 2-butanone (methyl ethyl ketone)	<10	<10	10	20
9. Carbon disulfide	<1.0	<1.0	1.0	5
10. Carbon tetrachloride	<0.6	<0.6	0.6	5
11. Chlorobenzene	<0.6	<0.6	0.6	5
12. Chlorodibromomethane	<1.0	<1.0	1.0	5
13. Chloroethane	<0.7	<0.7	0.7	5
14. 2-chloroethyl vinyl ether	<90.2	<90.2	90.2	100
15. Chloroform	<0.5	<0.5	0.5	5
16. Chloromethane	<1.0	<1.0	1.0	5
17. Dibromomethane	<1.0	<1.0	1.0	5
18. Dichlorodifluoromethane	<1.0	<1.0	1.0	5
19. 1,1-dichloroethane	<0.5	<0.5	0.5	5
20. 1,2-dichloroethene (total)	<1.0	<1.0	1.0	5
21. cis-1,3-dichloropropene	<0.5	<0.5	0.5	5
22. trans-1,3-dichloropropene	<0.9	<0.9	0.9	5
23. Ethylbenzene	<0.6	<0.6	0.6	5

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

58547

K&S Testing And Engineering, Inc.
9715 Kennedy Avenue
Highland, IN. 46322

Report Date: 1/25/93
Sample Received: 1/22/93
Analysis Date: 1/23/93

Project No.: 220
Project Name: Griffith Landfill, Griffith, Indiana, January, 1993 Sampling
Sample Description: Water, F.B.
Sample No.: 40148

Volatile Organic Compounds	Concentration Found in Sample	Concentration Found in Blank	Method Detection Limit	Quantitation Limit
24. Ethyl methacrylate	<1.0	<1.0	1.0	5
25. 2-hexanone	<5	<5	5	20
26. Iodomethane	<1.0	<1.0	1.0	5
27. Methylene chloride	<0.8	<0.8	0.8	5
28. 4-methyl-2-pentanone	<5	<5	5	20
29. Styrene	<1.0	<1.0	1.0	5
30. 1,1,2,2-tetrachloroethane	<3.9	<3.9	3.9	5
31. Toluene	<0.5	<0.5	0.5	5
32. 1,1,1-trichloroethane	<0.5	<0.5	0.5	5
33. 1,1,2-trichloroethane	<2.5	<2.5	2.5	5
34. Trichloroethene	<0.5	<0.5	0.5	5
35. Trichlorofluoromethane	<0.5	<0.5	0.5	5
36. 1,2,3-trichloropropane	<1.0	<1.0	1.0	5
37. Vinyl acetate	<1.0	<1.0	1.0	5
38. Vinyl choride	<0.7	<0.7	0.7	5
39. Xylenes (total)	<0.9	<0.9	0.9	5
40. 1,2-dichloroethane	<1.6	<1.6	1.6	5

All results expressed as ppb unless otherwise indicated.

Methods performed using EPA methods 8240 in accordance with SW-846, Third Edition.

LABORATORY DIRECTOR

K & S TESTING AND ENGINEERING, INC.

971b Kennedy Ave. Highland, IN (219)924-5231

CHAIN OF CUSTODY RECORD

PROJ. NO. 220 | PROJECT NAME GRIFFITH LANDFILL, GRIFFITH, INDIANA JANUARY, 1993, SAMPLING

SAMPLERS: (Signature)

Lab #P

	STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	VOC's - 8240	Metals	PHTDS, Cl, NO3, SO4, COD, NH3, etc				REMARKS
40149	MW1S	1/20/93	1:50 PM		✓	Water	5	✓	✓	✓	✓			- Please return Signed
40150	MW1D	1/20/93	2:45 PM		✓	Water	6	✓	✓	✓	✓			- Coc - form
40151	MW2S	1/20/93	3:20 PM		✓	Water	6	✓	✓	✓	✓			
40152	MW2D	1/20/93	4:00 PM		✓	Water	6	✓	✓	✓	✓			- Please test well samples
40153	MW3S	1/21/93	8:30 AM		✓	Water	6	✓	✓	✓	✓			as per list in 329 IAC 216
40154	MW3D	1/21/93	9:10 AM		✓	Water	6	✓	✓	✓	✓			
40155	MW4S	1/21/93	11:18 AM		✓	Water	6	✓	✓	✓	✓			- Please follow appropriate
40156	MW4D	1/21/93	10:56 AM		✓	Water	6	✓	✓	✓	✓			USEPA Test Methods
40157	MW5S	1/21/93	10:10 AM		✓	Water	6	✓	✓	✓	✓			- Test samples from 1S, 1D
40158	MW5D	1/21/93	9:45 AM		✓	Water	6	✓	✓	✓	✓			Per Item 11 and 25 thru
40147	T.B.	1/4/93			✓	Lab Water Trip Blank	2	✓						5D per Item 9.
40148	F.B	1/21/93	11:25 AM		✓	Field Water / Field Blank	2	✓						

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
	1/22/93				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature) Michael Calabrese	Date / Time 1/22/93	6:00	Remarks

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

1993
3Q

Mr. Rick Miller
R.E. BLATTERT
5214 S. East Street
Suite 1
Indianapolis, IN 46227

11/16/1993

NET Job Number: 93.02673

Enclosed are the Analytical Results for the following samples submitted to NET, Inc. Indianapolis Division for analysis:

Project Description: Semi-annual monitoring

Sample Number	Sample Description	Date Taken	Date Received
73677	MS-1S	08/26/1993	08/27/1993
73678	MS-1D	08/26/1993	08/27/1993
73679	MW-2D	08/26/1993	08/27/1993
73680	MW-3S	08/26/1993	08/27/1993
73681	MW-3D	08/26/1993	08/27/1993
73682	MW-4S	08/26/1993	08/27/1993
73683	MW-4D	08/26/1993	08/27/1993
73684	MW-5S	08/26/1993	08/27/1993
73685	MW-5D	08/26/1993	08/27/1993
73686	DUP.	08/26/1993	08/27/1993
73687	TRIP BLANK		08/27/1993

Sample analysis in support of the project referenced above has been completed and results are presented on the following pages. Please refer to the enclosed "Key to Abbreviations" for definition of terms. Should you have questions regarding procedures or results, please do not hesitate to call. NET has been pleased to provide these analytical services for you.

Approved By:

Joseph D. Shafer

REVISED REPORT

Joseph D. Shafer
Division Manager

OCEAN GROUP

NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Rick Miller
R.E. BLATTERT
5214 S. East Street
Suite 1
Indianapolis, IN 46227

11/16/1993

Sample No.: 73677
Job No.: 93.02673
P.O. NO.: 1479-1408

Sample Description: MS-1S
Job Description: Semi-annual monitoring

Date Taken: 08/26/1993 Date Received: 08/27/1993

Parameter	Result		Units	Analyst/ Date of Analysis	Method Number	Method PQL
Chloride	120.		mg/L	sld / 09/08/1993	S-9252	<2.
COD	86.		mg/L	lsb / 09/08/1993	E-410.4M	<10.
Conductivity	1718.		umhos/cm	sld / 09/08/1993	E-120.1	<5.
Fluoride	0.15		mg/L	grf / 09/09/1993	E-340.2	<0.05
Nitrogen, Ammonia	4.4		mg/L	lsb / 09/08/1993	E-350.3	<0.10
Nitrogen, Nitrate	0.14		mg/L	mag / 08/27/1993	E-353.3M	<0.10
pH	6.64		units	min / 08/27/1993	S-9040	NA
Phenol	<0.005		mg/L	grf / 09/07/1993	S-9065	<0.005
Solids, Dissolved	1200.		mg/L	sld / 09/02/1993	E-160.1	<10.
Sulfate	83.		mg/L	lsb / 09/13/1993	S-9038	<5.
Arsenic, diss. (GFAA)	<0.005		mg/L	grf / 09/11/1993	S-7060	<0.005
Barium, diss. (ICP)	0.11		mg/L	fjr / 11/09/1993	S-6010	<0.020
Boron, diss. (ICP)	0.85	b	mg/L	fjr / 11/09/1993	S-6010	<0.010
Cadmium, diss. (ICP)	<0.0050		mg/L	fjr / 11/09/1993	S-6010	<0.005
Chromium, diss. (ICP)	<0.010		mg/L	fjr / 11/09/1993	S-6010	<0.010
Copper, diss. (ICP)	0.02	b	mg/L	fjr / 11/09/1993	S-6010	<0.010
Iron, diss. (ICP)	0.07		mg/L	fjr / 11/09/1993	S-6010	<0.020
Lead, diss. (GFAA)	0.015		mg/L	bga / 11/12/1993	S-7421	<0.005
Manganese, diss. (ICP)	<0.010		mg/L	fjr / 11/09/1993	S-6010	<0.010
Mercury, diss. (CVAA)	0.003		mg/L	grf / 09/08/1993	S-7470	<0.0005
Selenium, diss. (GFAA)	<0.005		mg/L	bga / 09/10/1993	S-7740	<0.0050
Silver, diss. (ICP)	<0.010		mg/L	fjr / 11/09/1993	S-6010	<0.010
Sodium, diss. (ICP)	72.		mg/L	fjr / 11/09/1993	S-6010	<1.0
Zinc, diss. (ICP)	0.05		mg/L	fjr / 11/09/1993	S-6010	<0.020

Revised results for metals.

OCEAN GROUP

NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Rick Miller
R.E. BLATTERT
5214 S. East Street
Suite 1
Indianapolis, IN 46227

11/16/1993

Sample No.: 73677
Job No.: 93.02673
P.O. NO.: 1479-1408

Sample Description: MS-1S
Job Description: Semi-annual monitoring

Date Taken: 08/26/1993 Date Received: 08/27/1993

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Method PQL
VOLATILE ANALYSIS - AQUEOUS					
Dilution	1		rla / 09/07/1993	S - 8240	1
Acetone	<20.	ug/L	rla / 09/07/1993	S - 8240	<20.
Acrolein	<50.	ug/L	rla / 09/07/1993	S - 8240	<50.
Acrylonitrile	<50.	ug/L	rla / 09/07/1993	S - 8240	<50.
Benzene	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
Bromodichloromethane	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
Bromoform	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
Bromomethane	<5.0	ug/L	rla / 09/07/1993	S - 8240	<5.0
2-Butanone (MEK)	<10.	ug/L	rla / 09/07/1993	S - 8240	<10.
Carbon disulfide	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
Carbon tetrachloride	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
Chlorobenzene	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
Chloroethane	<10.	ug/L	rla / 09/07/1993	S - 8240	<10.
2-Chloroethyl vinyl ether	ND	ug/L	rla / 09/07/1993	S - 8240	ND
Chloroform	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
Chloromethane	<10.	ug/L	rla / 09/07/1993	S - 8240	<10.
Dibromomethane	<10.	ug/L	rla / 09/07/1993	S - 8240	<10.
Dibromochloromethane	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
Dichlorodifluoromethane	<10.	ug/L	rla / 09/07/1993	S - 8240	<10.
1,1-Dichloroethane	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
1,2-Dichloroethane	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
1,1-Dichloroethene	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
trans-1,2-Dichloroethene	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
cis-1,2-Dichloroethene	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
cis-1,3-Dichloropropene	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
trans-1,3-Dichloropropene	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
Ethylbenzene	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
Ethyl methacrylate	<10.	ug/L	rla / 09/07/1993	S - 8240	<10.
2-Hexanone	<10.	ug/L	rla / 09/07/1993	S - 8240	<10.
Iodomethane	<10.	ug/L	rla / 09/07/1993	S - 8240	<10.
Methylene chloride	<10.	ug/L	rla / 09/07/1993	S - 8240	<10.
4-Methyl-2-pentanone (MIBK)	<10.	ug/L	rla / 09/07/1993	S - 8240	<10.
Styrene	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
1,1,2,2-Tetrachloroethane	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0

OCEAN GROUP

NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Rick Miller
R.E. BLATTERT
5214 S. East Street
Suite 1
Indianapolis, IN 46227

11/16/1993

Sample No.: 73677
Job No.: 93.02673
P.O. NO.: 1479-1408

Sample Description: MS-1S
Job Description: Semi-annual monitoring

Date Taken: 08/26/1993 Date Received: 08/27/1993

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Method PQL
VOLATILE ANALYSIS - AQUEOUS					
Toluene	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
1,2,3-Trichloropropane	<10.	ug/L	rla / 09/07/1993	S - 8240	<10.
1,1,1-Trichloroethane	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
1,1,2-Trichloroethane	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
Trichloroethene	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
Trichlorofluoromethane	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
Vinyl acetate	<10.	ug/L	rla / 09/07/1993	S - 8240	<10.
Vinyl chloride	<5.	ug/L	rla / 09/07/1993	S - 8240	<5.
Xylenes	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
SURROGATE COMPOUNDS	% RECOVERY	LIMITS	rla / 09/07/1993	S - 8240	% RECOVERY
1,2-Dichloroethane-d4	100	76-114	rla / 09/07/1993	S - 8240	1
Toluene-d8	98	88-110	rla / 09/07/1993	S - 8240	1
4-Bromofluorobenzene	99	86-115	rla / 09/07/1993	S - 8240	1

NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Rick Miller
R.E. BLATTERT
5214 S. East Street
Suite 1
Indianapolis, IN 46227

11/16/1993

Sample No.: 73678
Job No.: 93.02673
P.O. NO.: 1479-1408

Sample Description: MS-1D
Job Description: Semi-annual monitoring

Date Taken: 08/26/1993 Date Received: 08/27/1993

Parameter	Result		Units	Analyst/ Date of Analysis	Method Number	Method PQL
Chloride	58.		mg/L	sld / 09/08/1993	S-9252	<2.
COD	19.		mg/L	lsb / 09/08/1993	E-410.4M	<10.
Conductivity	776.		umhos/cm	sld / 09/08/1993	E-120.1	<5.
Fluoride	0.28		mg/L	grf / 09/09/1993	E-340.2	<0.05
Nitrogen, Ammonia	0.76		mg/L	lsb / 09/08/1993	E-350.3	<0.10
Nitrogen, Nitrate	2.1		mg/L	mag / 08/27/1993	E-353.3M	<0.10
pH	7.43		units	min / 08/27/1993	S-9040	NA
Phenol	<0.005		mg/L	grf / 09/07/1993	S-9065	<0.005
Solids, Dissolved	560.		mg/L	sld / 09/02/1993	E-160.1	<10.
Sulfate	95.		mg/L	lsb / 09/13/1993	S-9038	<5.
Arsenic, diss. (GFAA)	<0.005		mg/L	grf / 09/11/1993	S-7060	<0.005
Barium, diss. (ICP)	0.23		mg/L	fjr / 11/09/1993	S-6010	<0.020
Boron, diss. (ICP)	0.59	b	mg/L	fjr / 11/09/1993	S-6010	<0.010
Cadmium, diss. (ICP)	<0.0050		mg/L	fjr / 11/09/1993	S-6010	<0.005
Chromium, diss. (ICP)	<0.010		mg/L	fjr / 11/09/1993	S-6010	<0.010
Copper, diss. (ICP)	0.03	b	mg/L	fjr / 11/09/1993	S-6010	<0.010
Iron, diss. (ICP)	0.07		mg/L	fjr / 11/09/1993	S-6010	<0.020
Lead, diss. (GFAA)	<0.005		mg/L	bga / 11/12/1993	S-7421	<0.005
Manganese, diss. (ICP)	<0.010		mg/L	fjr / 11/09/1993	S-6010	<0.010
Mercury, diss. (CVAA)	<0.0005		mg/L	grf / 09/08/1993	S-7470	<0.0005
Selenium, diss. (GFAA)	<0.005		mg/L	bga / 09/10/1993	S-7740	<0.0050
Silver, diss. (ICP)	<0.010		mg/L	fjr / 11/09/1993	S-6010	<0.010
Sodium, diss. (ICP)	37.		mg/L	fjr / 11/09/1993	S-6010	<1.0
Zinc, diss. (ICP)	0.06		mg/L	fjr / 11/09/1993	S-6010	<0.020

Revised results for metals.

OCEAN GROUP

NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Rick Miller
R.E. BLATTERT
5214 S. East Street
Suite 1
Indianapolis, IN 46227

11/16/1993

Sample No.: 73678
Job No.: 93.02673
P.O. NO.: 1479-1408

Sample Description: MS-1D
Job Description: Semi-annual monitoring

Date Taken: 08/26/1993 Date Received: 08/27/1993

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Method PQL
VOLATILE ANALYSIS - AQUEOUS					
Dilution	1		rla / 09/07/1993	S - 8240	1
Acetone	<20.	ug/L	rla / 09/07/1993	S - 8240	<20.
Acrolein	<50.	ug/L	rla / 09/07/1993	S - 8240	<50.
Acrylonitrile	<50.	ug/L	rla / 09/07/1993	S - 8240	<50.
Benzene	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
Bromodichloromethane	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
Bromoform	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
Bromomethane	<5.0	ug/L	rla / 09/07/1993	S - 8240	<5.0
2-Butanone (MEK)	<10.	ug/L	rla / 09/07/1993	S - 8240	<10.
Carbon disulfide	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
Carbon tetrachloride	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
Chlorobenzene	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
Chloroethane	<10.	ug/L	rla / 09/07/1993	S - 8240	<10.
2-Chloroethyl vinyl ether	ND	ug/L	rla / 09/07/1993	S - 8240	ND
Chloroform	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
Chloromethane	<10.	ug/L	rla / 09/07/1993	S - 8240	<10.
Dibromomethane	<10.	ug/L	rla / 09/07/1993	S - 8240	<10.
Dibromochloromethane	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
Dichlorodifluoromethane	<10.	ug/L	rla / 09/07/1993	S - 8240	<10.
1,1-Dichloroethane	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
1,2-Dichloroethane	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
1,1-Dichloroethene	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
trans-1,2-Dichloroethene	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
cis-1,2-Dichloroethene	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
cis-1,3-Dichloropropene	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
trans-1,3-Dichloropropene	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
Ethylbenzene	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
Ethyl methacrylate	<10.	ug/L	rla / 09/07/1993	S - 8240	<10.
2-Hexanone	<10.	ug/L	rla / 09/07/1993	S - 8240	<10.
Iodomethane	<10.	ug/L	rla / 09/07/1993	S - 8240	<10.
Methylene chloride	<10.	ug/L	rla / 09/07/1993	S - 8240	<10.
4-Methyl-2-pentanone (MIBK)	<10.	ug/L	rla / 09/07/1993	S - 8240	<10.
Styrene	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
1,1,2,2-Tetrachloroethane	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0

NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Rick Miller
R.E. BLATTERT
5214 S. East Street
Suite 1
Indianapolis, IN 46227

11/16/1993

Sample No.: 73678
Job No.: 93.02673
P.O. NO.: 1479-1408

Sample Description: MS-1D
Job Description: Semi-annual monitoring

Date Taken: 08/26/1993 Date Received: 08/27/1993

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Method PQL
VOLATILE ANALYSIS - AQUEOUS					
Toluene	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
1,2,3-Trichloropropane	<10.	ug/L	rla / 09/07/1993	S - 8240	<10.
1,1,1-Trichloroethane	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
1,1,2-Trichloroethane	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
Trichloroethene	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
Trichlorofluoromethane	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
Vinyl acetate	<10.	ug/L	rla / 09/07/1993	S - 8240	<10.
Vinyl chloride	<5.	ug/L	rla / 09/07/1993	S - 8240	<5.
Xylenes	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
SURROGATE COMPOUNDS	% RECOVERY	LIMITS	rla / 09/07/1993	S - 8240	% RECOVERY
1,2-Dichloroethane-d4	97	76-114	rla / 09/07/1993	S - 8240	1
Toluene-d8	97	88-110	rla / 09/07/1993	S - 8240	1
4-Bromofluorobenzene	97	86-115	rla / 09/07/1993	S - 8240	1

OCEAN GROUP

NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Rick Miller
R.E. BLATTERT
5214 S. East Street
Suite 1
Indianapolis, IN 46227

11/16/1993

Sample No.: 73679
Job No.: 93.02673
P.O. NO.: 1479-1408

Sample Description: MW-2D
Job Description: Semi-annual monitoring

Date Taken: 08/26/1993 Date Received: 08/27/1993

Parameter	Result		Units	Analyst/ Date of Analysis	Method Number	Method PQL
Chloride	25.		mg/L	sld / 09/08/1993	S-9252	<2.
COD	16.		mg/L	lsb / 09/08/1993	E-410.4M	<10.
Conductivity	804.		umhos/cm	sld / 09/08/1993	E-120.1	<5.
Nitrogen, Ammonia	0.17		mg/L	lsb / 09/08/1993	E-350.3	<0.10
pH	7.42		units	min / 08/27/1993	S-9040	NA
Phenol	<0.005		mg/L	grf / 09/07/1993	S-9065	<0.005
Boron, diss. (ICP)	0.71	b	mg/L	fjr / 11/09/1993	S-6010	<0.010
Sodium, diss. (ICP)	27.		mg/L	fjr / 11/09/1993	S-6010	<1.0

Revised results for metals.

NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Rick Miller
R.E. BLATTERT
5214 S. East Street
Suite 1
Indianapolis, IN 46227

11/16/1993

Sample No.: 73679
Job No.: 93.02673
P.O. NO.: 1479-1408

Sample Description: MW-2D
Job Description: Semi-annual monitoring

Date Taken: 08/26/1993 Date Received: 08/27/1993

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Method PQL
VOLATILE ANALYSIS - AQUEOUS					
Dilution	1		rla / 09/07/1993	S - 8240	1
Benzene	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
2-Butanone (MEK)	<10.	ug/L	rla / 09/07/1993	S - 8240	<10.
1,1-Dichloroethane	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
1,1-Dichloroethene	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
Ethylbenzene	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
Methylene chloride	<10.	ug/L	rla / 09/07/1993	S - 8240	<10.
Toluene	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
SURROGATE COMPOUNDS	% RECOVERY	LIMITS	rla / 09/07/1993	S - 8240	% RECOVERY
1,2-Dichloroethane-d4	103	76-114	rla / 09/07/1993	S - 8240	1
Toluene-d8	100	88-110	rla / 09/07/1993	S - 8240	1
4-Bromofluorobenzene	98	86-115	rla / 09/07/1993	S - 8240	1

OCEAN GROUP

NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Rick Miller
R.E. BLATTERT
5214 S. East Street
Suite 1
Indianapolis, IN 46227

11/16/1993

Sample No.: 73680
Job No.: 93.02673
P.O. NO.: 1479-1408

Sample Description: MW-3S
Job Description: Semi-annual monitoring

Date Taken: 08/26/1993 Date Received: 08/27/1993

Parameter	Result		Units	Analyst/ Date of Analysis	Method Number	Method PQL
Chloride	23.		mg/L	sld / 09/08/1993	S-9252	<2.
COD	66.		mg/L	lsb / 09/08/1993	E-410.4M	<10.
Conductivity	535.		umhos/cm	sld / 09/08/1993	E-120.1	<5.
Nitrogen, Ammonia	0.39		mg/L	lsb / 09/08/1993	E-350.3	<0.10
pH	6.76		units	min / 08/27/1993	S-9040	NA
Phenol	<0.005		mg/L	grf / 09/07/1993	S-9065	<0.005
Boron, diss. (ICP)	0.38	b	mg/L	fjr / 11/09/1993	S-6010	<0.010
Sodium, diss. (ICP)	22.		mg/L	fjr / 11/09/1993	S-6010	<1.0

Revised results for metals.

OCEAN GROUP

NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Rick Miller
R.E. BLATTERT
5214 S. East Street
Suite 1
Indianapolis, IN 46227

11/16/1993

Sample No.: 73680
Job No.: 93.02673
P.O. NO.: 1479-1408

Sample Description: MW-3S
Job Description: Semi-annual monitoring

Date Taken: 08/26/1993 Date Received: 08/27/1993

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Method PQL
VOLATILE ANALYSIS - AQUEOUS					
Dilution	1		rla / 09/07/1993	S - 8240	1
Benzene	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
2-Butanone (MEK)	<10.	ug/L	rla / 09/07/1993	S - 8240	<10.
1,1-Dichloroethane	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
1,1-Dichloroethene	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
Ethylbenzene	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
Methylene chloride	<10.	ug/L	rla / 09/07/1993	S - 8240	<10.
Toluene	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
SURROGATE COMPOUNDS	% RECOVERY	LIMITS	rla / 09/07/1993	S - 8240	% RECOVERY
1,2-Dichloroethane-d4	96	76-114	rla / 09/07/1993	S - 8240	1
Toluene-d8	98	88-110	rla / 09/07/1993	S - 8240	1
4-Bromofluorobenzene	100	86-115	rla / 09/07/1993	S - 8240	1

OCEAN GROUP

NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Rick Miller
R.E. BLATTERT
5214 S. East Street
Suite 1
Indianapolis, IN 46227

11/16/1993

Sample No.: 73681
Job No.: 93.02673
P.O. NO.: 1479-1408

Sample Description: MW-3D
Job Description: Semi-annual monitoring

Date Taken: 08/26/1993 Date Received: 08/27/1993

Parameter	Result		Units	Analyst/ Date of Analysis	Method Number	Method PQL
Chloride	34.		mg/L	sld / 09/08/1993	S-9252	<2.
COD	49.		mg/L	lsb / 09/08/1993	E-410.4M	<10.
Conductivity	722.		umhos/cm	sld / 09/08/1993	E-120.1	<5.
Nitrogen, Ammonia	0.26		mg/L	lsb / 09/08/1993	E-350.3	<0.10
pH	7.04		units	min / 08/27/1993	S-9040	NA
Phenol	0.009		mg/L	grf / 09/07/1993	S-9065	<0.005
Boron, diss. (ICP)	0.72	b	mg/L	fjr / 11/09/1993	S-6010	<0.010
Sodium, diss. (ICP)	21.		mg/L	fjr / 11/09/1993	S-6010	<1.0

Revised results for metals.

OCEAN GROUP

NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Rick Miller
R.E. BLATTERT
5214 S. East Street
Suite 1
Indianapolis, IN 46227

11/16/1993

Sample No.: 73681
Job No.: 93.02673
P.O. NO.: 1479-1408

Sample Description: MW-30
Job Description: Semi-annual monitoring

Date Taken: 08/26/1993 Date Received: 08/27/1993

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Method PQL
VOLATILE ANALYSIS - AQUEOUS					
Dilution	1		rla / 09/07/1993	S - 8240	1
Benzene	1.8	ug/L	rla / 09/07/1993	S - 8240	<1.0
2-Butanone (MEK)	<10.	ug/L	rla / 09/07/1993	S - 8240	<10.
1,1-Dichloroethane	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
1,1-Dichloroethene	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
Ethylbenzene	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
Methylene chloride	<10.	ug/L	rla / 09/07/1993	S - 8240	<10.
Toluene	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
SURROGATE COMPOUNDS	% RECOVERY	LIMITS	rla / 09/07/1993	S - 8240	% RECOVERY
1,2-Dichloroethane-d4	99	76-114	rla / 09/07/1993	S - 8240	1
Toluene-d8	102	88-110	rla / 09/07/1993	S - 8240	1
4-Bromofluorobenzene	103	86-115	rla / 09/07/1993	S - 8240	1

OCEAN GROUP

NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Rick Miller
R.E. BLATTERT
5214 S. East Street
Suite 1
Indianapolis, IN 46227

11/16/1993

Sample No.: 73682
Job No.: 93.02673
P.O. NO.: 1479-1408

Sample Description: MW-4S
Job Description: Semi-annual monitoring

Date Taken: 08/26/1993 Date Received: 08/27/1993

Parameter	Result		Units	Analyst/ Date of Analysis	Method Number	Method PQL
Chloride	930.		mg/L	sld / 09/08/1993	S-9252	<2.
COD	340.		mg/L	lsb / 09/08/1993	E-410.4M	<10.
Conductivity	3930.		umhos/cm	sld / 09/08/1993	E-120.1	<5.
Nitrogen, Ammonia	14.		mg/L	grf / 09/10/1993	E-350.3	<0.10
pH	6.37		units	min / 08/27/1993	S-9040	NA
Phenol	0.013		mg/L	grf / 09/07/1993	S-9065	<0.005
Boron, diss. (ICP)	0.81	b	mg/L	fjr / 11/09/1993	S-6010	<0.010
Sodium, diss. (ICP)	150.		mg/L	fjr / 11/09/1993	S-6010	<1.0

Revised results for metals.

OCEAN GROUP

NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Rick Miller
R.E. BLATTERT
5214 S. East Street
Suite 1
Indianapolis, IN 46227

11/16/1993

Sample No.: 73682
Job No.: 93.02673
P.O. NO.: 1479-1408

Sample Description: MW-4S
Job Description: Semi-annual monitoring

Date Taken: 08/26/1993 Date Received: 08/27/1993

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Method PQL
VOLATILE ANALYSIS - AQUEOUS					
Dilution	1		rla / 09/08/1993	S - 8240	1
Benzene	490.	ug/L	rla / 09/08/1993	S - 8240	<1.0
2-Butanone (MEK)	<10.	ug/L	rla / 09/08/1993	S - 8240	<10.
1,1-Dichloroethane	<1.0	ug/L	rla / 09/08/1993	S - 8240	<1.0
1,1-Dichloroethene	<1.0	ug/L	rla / 09/08/1993	S - 8240	<1.0
Ethylbenzene	<1.0	ug/L	rla / 09/08/1993	S - 8240	<1.0
Methylene chloride	11.	ug/L	rla / 09/08/1993	S - 8240	<10.
Toluene	1.8	ug/L	rla / 09/08/1993	S - 8240	<1.0
SURROGATE COMPOUNDS	% RECOVERY	LIMITS	rla / 09/08/1993	S - 8240	% RECOVERY
1,2-Dichloroethane-d4	97.	76-114	rla / 09/08/1993	S - 8240	1
Toluene-d8	99.	88-110	rla / 09/08/1993	S - 8240	1
4-Bromofluorobenzene	105.	86-115	rla / 09/08/1993	S - 8240	1

NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Rick Miller
R.E. BLATTERT
5214 S. East Street
Suite 1
Indianapolis, IN 46227

11/16/1993

Sample No.: 73683
Job No.: 93.02673
P.O. NO.: 1479-1408

Sample Description: MW-4D
Job Description: Semi-annual monitoring

Date Taken: 08/26/1993 Date Received: 08/27/1993

Parameter	Result		Units	Analyst/ Date of Analysis	Method Number	Method PQL
Chloride	150.		mg/L	sld / 09/08/1993	S-9252	<2.
COD	28.		mg/L	lsb / 09/08/1993	E-410.4M	<10.
Conductivity	957.		umhos/cm	sld / 09/08/1993	E-120.1	<5.
Nitrogen, Ammonia	0.40		mg/L	grf / 09/10/1993	E-350.3	<0.10
pH	7.47		units	min / 08/27/1993	S-9040	NA
Phenol	<0.005		mg/L	grf / 09/07/1993	S-9065	<0.005
Boron, diss. (ICP)	0.78	b	mg/L	fjr / 11/09/1993	S-6010	<0.010
Sodium, diss. (ICP)	57.		mg/L	fjr / 11/09/1993	S-6010	<1.0

Revised results for metals.

OCEAN GROUP

NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Rick Miller
R.E. BLATTERT
5214 S. East Street
Suite 1
Indianapolis, IN 46227

11/16/1993

Sample No.: 73683
Job No.: 93.02673
P.O. NO.: 1479-1408

Sample Description: MW-4D
Job Description: Semi-annual monitoring

Date Taken: 08/26/1993 Date Received: 08/27/1993

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Method PQL
VOLATILE ANALYSIS - AQUEOUS					
Dilution	1		rla / 09/08/1993	S - 8240	1
Benzene	<1.0	ug/L	rla / 09/08/1993	S - 8240	<1.0
2-Butanone (MEK)	<10.	ug/L	rla / 09/08/1993	S - 8240	<10.
1,1-Dichloroethane	<1.0	ug/L	rla / 09/08/1993	S - 8240	<1.0
1,1-Dichloroethene	<1.0	ug/L	rla / 09/08/1993	S - 8240	<1.0
Ethylbenzene	<1.0	ug/L	rla / 09/08/1993	S - 8240	<1.0
Methylene chloride	<10.	ug/L	rla / 09/08/1993	S - 8240	<10.
Toluene	<1.0	ug/L	rla / 09/08/1993	S - 8240	<1.0
SURROGATE COMPOUNDS	% RECOVERY	LIMITS	rla / 09/08/1993	S - 8240	% RECOVERY
1,2-Dichloroethane-d4	103.	76-114	rla / 09/08/1993	S - 8240	1
Toluene-d8	101.	88-110	rla / 09/08/1993	S - 8240	1
4-Bromofluorobenzene	98.	86-115	rla / 09/08/1993	S - 8240	1

NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Rick Miller
R.E. BLATTERT
5214 S. East Street
Suite 1
Indianapolis, IN 46227

11/16/1993

Sample No.: 73684
Job No.: 93.02673
P.O. NO.: 1479-1408

Sample Description: MW-5S
Job Description: Semi-annual monitoring

Date Taken: 08/26/1993 Date Received: 08/27/1993

Parameter	Result		Units	Analyst/ Date of Analysis	Method Number	Method PQL
Chloride	40.		mg/L	sld / 09/08/1993	S-9252	<2.
COD	66.		mg/L	lsb / 09/08/1993	E-410.4M	<10.
Conductivity	890.		umhos/cm	sld / 09/08/1993	E-120.1	<5.
Nitrogen, Ammonia	1.9		mg/L	grf / 09/10/1993	E-350.3	<0.10
pH	6.51		units	min / 08/27/1993	S-9040	NA
Phenol	<0.005		mg/L	grf / 09/07/1993	S-9065	<0.005
Boron, diss. (ICP)	0.81	b	mg/L	fjr / 11/09/1993	S-6010	<0.010
Sodium, diss. (ICP)	28.		mg/L	fjr / 11/09/1993	S-6010	<1.0

Revised results for metals.

OCEAN GROUP

NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Rick Miller
R.E. BLATTERT
5214 S. East Street
Suite 1
Indianapolis, IN 46227

11/16/1993

Sample No.: 73684
Job No.: 93.02673
P.O. NO.: 1479-1408

Sample Description: MW-5S
Job Description: Semi-annual monitoring

Date Taken: 08/26/1993 Date Received: 08/27/1993

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Method PQL
VOLATILE ANALYSIS - AQUEOUS					
Dilution	1		rla / 09/07/1993	S - 8240	1
Benzene	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
2-Butanone (MEK)	<10.	ug/L	rla / 09/07/1993	S - 8240	<10.
1,1-Dichloroethane	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
1,1-Dichloroethene	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
Ethylbenzene	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
Methylene chloride	<10.	ug/L	rla / 09/07/1993	S - 8240	<10.
Toluene	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
SURROGATE COMPOUNDS	% RECOVERY	LIMITS	rla / 09/07/1993	S - 8240	% RECOVERY
1,2-Dichloroethane-d4	99	76-114	rla / 09/07/1993	S - 8240	1
Toluene-d8	101	88-110	rla / 09/07/1993	S - 8240	1
4-Bromofluorobenzene	102	86-115	rla / 09/07/1993	S - 8240	1

OCEAN GROUP

NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Rick Miller
R.E. BLATTERT
5214 S. East Street
Suite 1
Indianapolis, IN 46227

11/16/1993

Sample No.: 73685
Job No.: 93.02673
P.O. NO.: 1479-1408

Sample Description: MW-5D
Job Description: Semi-annual monitoring

Date Taken: 08/26/1993 Date Received: 08/27/1993

Parameter	Result		Units	Analyst/ Date of Analysis	Method Number	Method PQL
Chloride	46.		mg/L	sld / 09/08/1993	S-9252	<2.
COD	35.		mg/L	lsb / 09/08/1993	E-410.4M	<10.
Conductivity	777.		umhos/cm	sld / 09/08/1993	E-120.1	<5.
Nitrogen, Ammonia	0.46		mg/L	grf / 09/10/1993	E-350.3	<0.10
pH	7.20		units	min / 08/27/1993	S-9040	NA
Phenol	<0.0050		mg/L	lsb / 09/13/1993	S-9065	<0.005
Boron, diss. (ICP)	0.59	b	mg/L	fjr / 11/09/1993	S-6010	<0.010
Sodium, diss. (ICP)	27.		mg/L	fjr / 11/09/1993	S-6010	<1.0

Revised results for metals.

NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Rick Miller
R.E. BLATTERT
5214 S. East Street
Suite 1
Indianapolis, IN 46227

11/16/1993

Sample No.: 73685
Job No.: 93.02673
P.O. NO.: 1479-1408

Sample Description: MW-5D
Job Description: Semi-annual monitoring

Date Taken: 08/26/1993 Date Received: 08/27/1993

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Method PQL
VOLATILE ANALYSIS - AQUEOUS					
Dilution	1		rla / 09/07/1993	S - 8240	1
Benzene	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
2-Butanone (MEK)	<10.	ug/L	rla / 09/07/1993	S - 8240	<10.
1,1-Dichloroethane	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
1,1-Dichloroethene	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
Ethylbenzene	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
Methylene chloride	<10.	ug/L	rla / 09/07/1993	S - 8240	<10.
Toluene	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
SURROGATE COMPOUNDS	% RECOVERY	LIMITS	rla / 09/07/1993	S - 8240	% RECOVERY
1,2-Dichloroethane-d4	100	76-114	rla / 09/07/1993	S - 8240	1
Toluene-d8	98	88-110	rla / 09/07/1993	S - 8240	1
4-Bromofluorobenzene	99	86-115	rla / 09/07/1993	S - 8240	1

OCEAN GROUP

NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Rick Miller
R.E. BLATTERT
5214 S. East Street
Suite 1
Indianapolis, IN 46227

11/16/1993

Sample No.: 73686
Job No.: 93.02673
P.O. NO.: 1479-1408

Sample Description: DUP.
Job Description: Semi-annual monitoring

Date Taken: 08/26/1993 Date Received: 08/27/1993

Parameter	Result		Units	Analyst/ Date of Analysis	Method Number	Method PQL
Chloride	930.		mg/L	sld / 09/08/1993	S-9252	<2.
COD	360.		mg/L	lsb / 09/08/1993	E-410.4M	<10.
Conductivity	3950.		umhos/cm	sld / 09/08/1993	E-120.1	<5.
Fluoride	0.07		mg/L	grf / 09/09/1993	E-340.2	<0.05
Nitrogen, Ammonia	15.		mg/L	grf / 09/10/1993	E-350.3	<0.10
Nitrogen, Nitrate	0.58		mg/L	mag / 08/27/1993	E-353.3M	<0.10
pH	6.34		units	min / 08/27/1993	S-9040	NA
Phenol	0.016		mg/L	lsb / 09/15/1993	S-9065	<0.005
Solids, Dissolved	3400.		mg/L	sld / 09/02/1993	E-160.1	<10.
Sulfate	<5.0		mg/L	lsb / 09/13/1993	S-9038	<5.
Arsenic, diss. (GFAA)	0.007		mg/L	grf / 09/11/1993	S-7060	<0.005
Barium, diss. (ICP)	0.73		mg/L	fjr / 11/09/1993	S-6010	<0.020
Boron, diss. (ICP)	0.76	b	mg/L	fjr / 11/09/1993	S-6010	<0.010
Cadmium, diss. (ICP)	<0.0050		mg/L	fjr / 11/09/1993	S-6010	<0.005
Chromium, diss. (ICP)	<0.010		mg/L	fjr / 11/09/1993	S-6010	<0.010
Copper, diss. (ICP)	0.04	b	mg/L	fjr / 11/09/1993	S-6010	<0.010
Iron, diss. (ICP)	0.09		mg/L	fjr / 11/09/1993	S-6010	<0.020
Lead, diss. (GFAA)	<0.005		mg/L	bga / 11/12/1993	S-7421	<0.005
Manganese, diss. (ICP)	0.03		mg/L	fjr / 11/09/1993	S-6010	<0.010
Mercury, diss. (CVAA)	<0.0005		mg/L	grf / 09/08/1993	S-7470	<0.0005
Selenium, diss. (GFAA)	<0.005		mg/L	bga / 09/10/1993	S-7740	<0.0050
Silver, diss. (ICP)	<0.010		mg/L	fjr / 11/09/1993	S-6010	<0.010
Sodium, diss. (ICP)	150.		mg/L	fjr / 11/09/1993	S-6010	<1.0
Zinc, diss. (ICP)	0.07		mg/L	fjr / 11/09/1993	S-6010	<0.020

Revised results for metals.

OCEAN GROUP

NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Rick Miller
R.E. BLATTERT
5214 S. East Street
Suite 1
Indianapolis, IN 46227

11/16/1993

Sample No.: 73686
Job No.: 93.02673
P.O. NO.: 1479-1408

Sample Description: DUP.
Job Description: Semi-annual monitoring

Date Taken: 08/26/1993 Date Received: 08/27/1993

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Method PQL
VOLATILE ANALYSIS - AQUEOUS					
Dilution	1		rla / 09/08/1993	S - 8240	1
Acetone	<20.	ug/L	rla / 09/08/1993	S - 8240	<20.
Acrolein	<50.	ug/L	rla / 09/08/1993	S - 8240	<50.
Acrylonitrile	<50.	ug/L	rla / 09/08/1993	S - 8240	<50.
Benzene	490	ug/L	rla / 09/08/1993	S - 8240	<1.0
Bromodichloromethane	<1.0	ug/L	rla / 09/08/1993	S - 8240	<1.0
Bromoform	<1.0	ug/L	rla / 09/08/1993	S - 8240	<1.0
Bromomethane	<5.0	ug/L	rla / 09/08/1993	S - 8240	<5.0
2-Butanone (MEK)	<10.	ug/L	rla / 09/08/1993	S - 8240	<10.
Carbon disulfide	<1.0	ug/L	rla / 09/08/1993	S - 8240	<1.0
Carbon tetrachloride	<1.0	ug/L	rla / 09/08/1993	S - 8240	<1.0
Chlorobenzene	<1.0	ug/L	rla / 09/08/1993	S - 8240	<1.0
Chloroethane	560	ug/L	rla / 09/08/1993	S - 8240	<10.
2-Chloroethyl vinyl ether	ND	ug/L	rla / 09/08/1993	S - 8240	ND
Chloroform	<1.0	ug/L	rla / 09/08/1993	S - 8240	<1.0
Chloromethane	<10.	ug/L	rla / 09/08/1993	S - 8240	<10.
Dibromomethane	<10.	ug/L	rla / 09/08/1993	S - 8240	<10.
Dibromochloromethane	<1.0	ug/L	rla / 09/08/1993	S - 8240	<1.0
1,2-Dibromo-3-chloropropane	<10.	ug/L	rla / 09/08/1993	S - 8240	<10.
1,2-Dibromoethane (EDB)	<1.0	ug/L	rla / 09/08/1993	S - 8240	<1.0
1,2-Dichlorobenzene	<1.0	ug/L	rla / 09/08/1993	S - 8240	<1.0
1,3-Dichlorobenzene	<1.0	ug/L	rla / 09/08/1993	S - 8240	<1.0
1,4-Dichlorobenzene	<1.0	ug/L	rla / 09/08/1993	S - 8240	<1.0
Dichlorodifluoromethane	<10.	ug/L	rla / 09/08/1993	S - 8240	<10.
1,1-Dichloroethane	<1.0	ug/L	rla / 09/08/1993	S - 8240	<1.0
1,2-Dichloroethane	<1.0	ug/L	rla / 09/08/1993	S - 8240	<1.0
1,1-Dichloroethene	<1.0	ug/L	rla / 09/08/1993	S - 8240	<1.0
trans-1,2-Dichloroethene	55.	ug/L	rla / 09/08/1993	S - 8240	<1.0
cis-1,2-Dichloroethene	<1.0	ug/L	rla / 09/08/1993	S - 8240	<1.0
1,2-Dichloropropane	<1.0	ug/L	rla / 09/08/1993	S - 8240	<1.0
cis-1,3-Dichloropropene	<1.0	ug/L	rla / 09/08/1993	S - 8240	<1.0
trans-1,3-Dichloropropene	<1.0	ug/L	rla / 09/08/1993	S - 8240	<1.0
Ethyl Acetate	<10.	ug/L	rla / 09/08/1993	S - 8240	<10.
Ethylbenzene	<1.0	ug/L	rla / 09/08/1993	S - 8240	<1.0

NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Rick Miller
R.E. BLATTERT
5214 S. East Street
Suite 1
Indianapolis, IN 46227

11/16/1993

Sample No.: 73686
Job No.: 93.02673
P.O. NO.: 1479-1408

Sample Description: DUP.
Job Description: Semi-annual monitoring

Date Taken: 08/26/1993 Date Received: 08/27/1993

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Method PQL
VOLATILE ANALYSIS - AQUEOUS					
Ethyl methacrylate	<10.	ug/L	rla / 09/08/1993	S - 8240	<10.
2-Hexanone	24.	ug/L	rla / 09/08/1993	S - 8240	<10.
Methyl-tert-butyl-ether (MTBE	<10.	ug/L	rla / 09/08/1993	S - 8240	<10.
Iodomethane	<10.	ug/L	rla / 09/08/1993	S - 8240	<10.
Methylene chloride	10.	ug/L	rla / 09/08/1993	S - 8240	<10.
Paraldehyde	<10.	ug/L	rla / 09/08/1993	S - 8240	<10.
4-Methyl-2-pentanone (MIBK)	<10.	ug/L	rla / 09/08/1993	S - 8240	<10.
Styrene	<1.0	ug/L	rla / 09/08/1993	S - 8240	<1.0
1,1,2,2-Tetrachloroethane	<1.0	ug/L	rla / 09/08/1993	S - 8240	<1.0
Tetrachloroethene	<1.0	ug/L	rla / 09/08/1993	S - 8240	<1.0
Tetrahydrofuran	6500	ug/L	rla / 09/08/1993	S - 8240	<10.
Toluene	1.8	ug/L	rla / 09/08/1993	S - 8240	<1.0
Trichlorotrifluoroethane	<10.	ug/L	rla / 09/08/1993	S - 8240	<10.
1,2,3-Trichloropropane	<10.	ug/L	rla / 09/08/1993	S - 8240	<10.
1,1,1-Trichloroethane	<1.0	ug/L	rla / 09/08/1993	S - 8240	<1.0
1,1,2-Trichloroethane	<1.0	ug/L	rla / 09/08/1993	S - 8240	<1.0
Trichloroethene	<1.0	ug/L	rla / 09/08/1993	S - 8240	<1.0
Trichlorofluoromethane	<1.0	ug/L	rla / 09/08/1993	S - 8240	<1.0
Vinyl acetate	<10.	ug/L	rla / 09/08/1993	S - 8240	<10.
Vinyl chloride	<5.	ug/L	rla / 09/08/1993	S - 8240	<5.
Xylenes	<1.0	ug/L	rla / 09/08/1993	S - 8240	<1.0
SURROGATE COMPOUNDS	% RECOVERY	LIMITS	rla / 09/08/1993	S - 8240	% RECOVERY
1,2-Dichloroethane-d4	99	76-114	rla / 09/08/1993	S - 8240	1
Toluene-d8	99	88-110	rla / 09/08/1993	S - 8240	1
4-Bromofluorobenzene	100	86-115	rla / 09/08/1993	S - 8240	1

NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Rick Miller
R.E. BLATTERT
5214 S. East Street
Suite 1
Indianapolis, IN 46227

11/16/1993

Sample No.: 73687
Job No.: 93.02673
P.O. NO.: 1479-1408

Sample Description: TRIP BLANK
Job Description: Semi-annual monitoring

Date Taken: Date Received: 08/27/1993

Parameter	Result		Units	Analyst/ Date of Analysis	Method Number	Method PQL
Chloride	<2.0		mg/L	sld / 09/08/1993	S-9252	<2.
COD	<10.		mg/L	lsb / 09/08/1993	E-410.4M	<10.
Conductivity	8.60		umhos/cm	sld / 09/08/1993	E-120.1	<5.
Fluoride	<0.05		mg/L	grf / 09/09/1993	E-340.2	<0.05
Nitrogen, Ammonia	<0.10		mg/L	grf / 09/10/1993	E-350.3	<0.10
Nitrogen, Nitrate	<0.1		mg/L	mag / 08/27/1993	E-353.3M	<0.10
pH	5.77		units	min / 08/27/1993	S-9040	NA
Phenol	<0.0050		mg/L	lsb / 09/13/1993	S-9065	<0.005
Solids, Dissolved	20.		mg/L	sld / 09/02/1993	E-160.1	<10.
Sulfate	<5.0		mg/L	lsb / 09/13/1993	S-9038	<5.
Arsenic, diss. (GFAA)	<0.005		mg/L	grf / 09/11/1993	S-7060	<0.005
Barium, diss. (ICP)	<0.020		mg/L	fjr / 11/09/1993	S-6010	<0.020
Boron, diss. (ICP)	0.09	b	mg/L	fjr / 11/09/1993	S-6010	<0.010
Cadmium, diss. (ICP)	<0.0050		mg/L	fjr / 11/09/1993	S-6010	<0.005
Chromium, diss. (ICP)	<0.010		mg/L	fjr / 11/09/1993	S-6010	<0.010
Copper, diss. (ICP)	<0.010		mg/L	fjr / 11/09/1993	S-6010	<0.010
Iron, diss. (ICP)	0.03		mg/L	fjr / 11/09/1993	S-6010	<0.020
Lead, diss. (GFAA)	<0.005		mg/L	bga / 11/12/1993	S-7421	<0.005
Manganese, diss. (ICP)	<0.010		mg/L	fjr / 11/09/1993	S-6010	<0.010
Mercury, diss. (CVAA)	<0.0005		mg/L	grf / 09/08/1993	S-7470	<0.0005
Selenium, diss. (GFAA)	<0.005		mg/L	bga / 09/10/1993	S-7740	<0.0050
Silver, diss. (ICP)	<0.010		mg/L	fjr / 11/09/1993	S-6010	<0.010
Sodium, diss. (ICP)	<1.0		mg/L	fjr / 11/09/1993	S-6010	<1.0
Zinc, diss. (ICP)	<0.020		mg/L	fjr / 11/09/1993	S-6010	<0.020

Revised results for metals.

OCEAN GROUP

NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Rick Miller
R.E. BLATTERT
5214 S. East Street
Suite 1
Indianapolis, IN 46227

11/16/1993

Sample No.: 73687
Job No.: 93.02673
P.O. NO.: 1479-1408

Sample Description: TRIP BLANK
Job Description: Semi-annual monitoring

Date Taken: Date Received: 08/27/1993

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Method PQL
VOLATILE ANALYSIS - AQUEOUS					
Dilution	1		rla / 09/07/1993	S - 8240	1
Acetone	<20.	ug/L	rla / 09/07/1993	S - 8240	<20.
Acrolein	<50.	ug/L	rla / 09/07/1993	S - 8240	<50.
Acrylonitrile	<50.	ug/L	rla / 09/07/1993	S - 8240	<50.
Benzene	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
Bromodichloromethane	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
Bromoform	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
Bromomethane	<5.0	ug/L	rla / 09/07/1993	S - 8240	<5.0
2-Butanone (MEK)	<10.	ug/L	rla / 09/07/1993	S - 8240	<10.
Carbon disulfide	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
Carbon tetrachloride	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
Chlorobenzene	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
Chloroethane	<10.	ug/L	rla / 09/07/1993	S - 8240	<10.
2-Chloroethyl vinyl ether	ND	ug/L	rla / 09/07/1993	S - 8240	ND
Chloroform	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
Chloromethane	<10.	ug/L	rla / 09/07/1993	S - 8240	<10.
Dibromomethane	<10.	ug/L	rla / 09/07/1993	S - 8240	<10.
Dibromochloromethane	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
Dichlorodifluoromethane	<10.	ug/L	rla / 09/07/1993	S - 8240	<10.
1,1-Dichloroethane	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
1,2-Dichloroethane	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
1,1-Dichloroethene	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
trans-1,2-Dichloroethene	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
cis-1,2-Dichloroethene	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
cis-1,3-Dichloropropene	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
trans-1,3-Dichloropropene	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
Ethylbenzene	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
Ethyl methacrylate	<10.	ug/L	rla / 09/07/1993	S - 8240	<10.
2-Hexanone	<10.	ug/L	rla / 09/07/1993	S - 8240	<10.
Iodomethane	<10.	ug/L	rla / 09/07/1993	S - 8240	<10.
Methylene chloride	<10.	ug/L	rla / 09/07/1993	S - 8240	<10.
4-Methyl-2-pentanone (MIBK)	<10.	ug/L	rla / 09/07/1993	S - 8240	<10.
Styrene	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
1,1,2,2-Tetrachloroethane	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0

NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Rick Miller
R.E. BLATTERT
5214 S. East Street
Suite 1
Indianapolis, IN 46227

11/16/1993

Sample No.: 73687
Job No.: 93.02673
P.O. NO.: 1479-1408

Sample Description: TRIP BLANK
Job Description: Semi-annual monitoring

Date Taken: Date Received: 08/27/1993

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Method PQL
VOLATILE ANALYSIS - AQUEOUS					
Toluene	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
1,2,3-Trichloropropane	<10.	ug/L	rla / 09/07/1993	S - 8240	<10.
1,1,1-Trichloroethane	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
1,1,2-Trichloroethane	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
Trichloroethene	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
Trichlorofluoromethane	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
Vinyl acetate	<10.	ug/L	rla / 09/07/1993	S - 8240	<10.
Vinyl chloride	<5.	ug/L	rla / 09/07/1993	S - 8240	<5.
Xylenes	<1.0	ug/L	rla / 09/07/1993	S - 8240	<1.0
SURROGATE COMPOUNDS	% RECOVERY	LIMITS	rla / 09/07/1993	S - 8240	% RECOVERY
1,2-Dichloroethane-d4	103	76-114	rla / 09/07/1993	S - 8240	1
Toluene-d8	101	88-110	rla / 09/07/1993	S - 8240	1
4-Bromofluorobenzene	97	86-115	rla / 09/07/1993	S - 8240	1

NATIONAL
ENVIRONMENTAL
TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

PROJECT NARRATIVE

JOB NUMBER: 93.02673

All samples in this job were reanalyzed for metals content due to the possibility of contamination in the original analysis. The attached report dated 11/16/1993 is revised to reflect the reanalysis of samples for metals. The Method Blank prepared with the samples on 11/05/1993 for ICP analysis was found to contain 0.02 mg/L Boron and 0.02 mg/L Copper. The analytical results have been flagged appropriately. Subsequently we have implemented a more thorough procedure for cleaning glassware to be used for metals analysis and some older glassware has been replaced.bd11/16/1993

NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

KEY TO ABBREVIATIONS

<	Less than; when appearing in the results column indicates the analyte was not detected at or above the reported value.
mg/L	Concentration in units of milligrams of analyte per Liter of sample. Measurement used for aqueous samples. Can also be expressed as parts per million (ppm).
ug/L	Concentration in units of micrograms of analyte per Liter of sample. Measurement used for aqueous samples. Can also be expressed as parts per billion (ppb).
mg/kg	Concentration in units of milligrams of analyte per kilogram of sample. Measurement used for non-aqueous samples. Can also be expressed as parts per million (ppm).
ug/kg	Concentration in units of micrograms of analyte per kilogram of sample. Measurement used for non-aqueous samples. Can also be expressed as parts per billion (ppb).
PQL	Practical Quantitation Limit; the lowest level that can be reliably achieved within specified limits of precision and accuracy under routine conditions.
a	Indicates the sample concentration was quantitated using a diesel fuel standard.
b	Indicates the analyte of interest was also found in the method blank.
d1	Indicates the sample was diluted due to high analyte concentration.
d2	Indicates the sample was diluted due to matrix interference and that the PQL may be elevated.
e	Indicates the reported concentration is estimated.
f	Indicates the sample concentration was quantitated using a fuel oil standard.
g	Indicates the sample concentration was quantitated using a gasoline standard.
h	Indicates the sample was analyzed past holding time.
j	Indicates the reported concentration is below the PQL.
k	Indicates the sample concentration was quantitated using a kerosene standard.
m	Indicates the sample concentration was quantitated using a mineral spirits standard.
o	Indicates the sample concentration was quantitated using a motor oil standard.
q	Indicates the sample concentration was quantitated using a standard provided by the client.
r	Indicates the sample was received past holding time.
s	Indicates the sample concentration was quantitated using a stoddard solvent standard.
u	Indicates the sample was received improperly preserved and/or contained.
TCLP	Indicates the Toxicity Characteristic Leaching Procedure was performed for this analysis.
ICP	Indicates the analysis was performed using Inductively Coupled Plasma Spectroscopy.
GFAA	Indicates the analysis was performed using Graphite Furnace Atomic Absorption Spectroscopy.
%	Percent; To convert ppm to %, divide the result by 10,000. To convert % to ppm, multiply the result by 10,000.
Dry Weight	When indicated, the results are reported on a dry weight basis. The contribution of the moisture content in the sample is subtracted when calculating the concentration of the analyte.

OCEAN GROUP

NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

RECEIVED FEB 17 1994

ANALYTICAL REPORT

Mr. Rick Miller
R.E. BLATTERT
5214 S. East Street
Suite 1
Indianapolis, IN 46227

02/16/1994

NET Job Number: 94.00237

Enclosed are the Analytical Results for the following samples submitted to NET, Inc. Indianapolis Division for analysis:

Project Description: Griffith Landfill

Sample Number	Sample Description	Date Taken	Date Received
80421	MW-1 DEEP	01/31/1994	02/01/1994
80422	MW-1 SHALLOW	01/31/1994	02/01/1994
80423	MW-2 DEEP	01/31/1994	02/01/1994
80424	MW-2 SHALLOW	01/31/1994	02/01/1994
80425	MW-3 DEEP	01/31/1994	02/01/1994
80426	MW-3 SHALLOW	01/31/1994	02/01/1994
80427	MW-4 DEEP	01/31/1994	02/01/1994
80428	MW-4 SHALLOW	01/31/1994	02/01/1994
80429	MW-5 DEEP	01/31/1994	02/01/1994
80430	MW-5 SHALLOW	01/31/1994	02/01/1994
80431	DUPLICATE	01/31/1994	02/01/1994
80432	TRIP BLANK		02/01/1994

Sample analysis in support of the project referenced above has been completed and results are presented on the following pages. Please refer to the enclosed "Key to Abbreviations" for definition of terms. Should you have questions regarding procedures or results, please do not hesitate to call. NET has been pleased to provide these analytical services for you.

Approved By:

Joseph D. Shafer
Division Manager

OCEAN GROUP

NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

KEY TO ABBREVIATIONS

<	Less than; when appearing in the results column indicates the analyte was not detected at or above the reported value.
mg/L	Concentration in units of milligrams of analyte per Liter of sample. Measurement used for aqueous samples. Can also be expressed as parts per million (ppm).
ug/L	Concentration in units of micrograms of analyte per Liter of sample. Measurement used for aqueous samples. Can also be expressed as parts per billion (ppb).
mg/kg	Concentration in units of milligrams of analyte per kilogram of sample. Measurement used for non-aqueous samples. Can also be expressed as parts per million (ppm).
ug/kg	Concentration in units of micrograms of analyte per kilogram of sample. Measurement used for non-aqueous samples. Can also be expressed as parts per billion (ppb).
PQL	Practical Quantitation Limit; the lowest level that can be reliably achieved within specified limits of precision and accuracy under routine conditions.
a	Indicates the sample concentration was quantitated using a diesel fuel standard.
b	Indicates the analyte of interest was also found in the method blank.
d1	Indicates the sample was diluted due to high analyte concentration.
d2	Indicates the sample was diluted due to matrix interference and that the PQL may be elevated.
e	Indicates the reported concentration is estimated.
f	Indicates the sample concentration was quantitated using a fuel oil standard.
g	Indicates the sample concentration was quantitated using a gasoline standard.
h	Indicates the sample was analyzed past holding time.
j	Indicates the reported concentration is below the PQL.
k	Indicates the sample concentration was quantitated using a kerosene standard.
m	Indicates the sample concentration was quantitated using a mineral spirits standard.
o	Indicates the sample concentration was quantitated using a motor oil standard.
q	Indicates the sample concentration was quantitated using a standard provided by the client.
r	Indicates the sample was received past holding time.
s	Indicates the sample concentration was quantitated using a stoddard solvent standard.
u	Indicates the sample was received improperly preserved and/or contained.
TCLP	Indicates the Toxicity Characteristic Leaching Procedure was performed for this analysis.
ICP	Indicates the analysis was performed using Inductively Coupled Plasma Spectroscopy.
GFAA	Indicates the analysis was performed using Graphite Furnace Atomic Absorption Spectroscopy.
%	Percent; To convert ppm to %, divide the result by 10,000. To convert % to ppm, multiply the result by 10,000.
Dry Weight	When indicated, the results are reported on a dry weight basis. The contribution of the moisture content in the sample is subtracted when calculating the concentration of the analyte.

OCEAN GROUP

NATIONAL
ENVIRONMENTAL
TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

PROJECT NARRATIVE

JOB NUMBER:94.00237

GFAA Se MS/MSD, for this digestion batch, produced low % recoveries possibly due to matrix interference. Spl #80421 was diluted to 10x to produce acceptable recoveries.

The method blank associated with these samples was found to contain Boron, and Iron. Boron = 0.078 mg/L, Iron = 0.034 mg/L.

OCEAN GROUP

NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Rick Miller
R.E. BLATTERT
5214 S. East Street
Suite 1
Indianapolis, IN 46227

02/16/1994

Sample No.: 80421
Job No.: 94.00237
P.O. NO.: 1408

Sample Description: MW-1 DEEP
Job Description: Griffith Landfill

Date Taken: 01/31/1994 Date Received: 02/01/1994

Parameter	Result		Units	Analyst/ Date of Analysis	Method Number	Method PQL
Chloride	56.		mg/L	ddm / 02/07/1994	S-9252	<2.
COD	<10.		mg/L	ddm / 02/09/1994	E-410.4M	<10.
Conductivity	905		umhos/cm	sld / 02/14/1994	E-120.1	<5.
Fluoride	0.34		mg/L	ddm / 02/02/1994	E-340.2	<0.05
Nitrogen, Ammonia	3.8		mg/L	ddm / 02/04/1994	E-350.3	<0.10
Nitrogen, Nitrate	0.13		mg/L	ddm / 02/02/1994	E-353.3M	<0.10
pH	7.45		units	sld / 02/01/1994	S-9040	NA
Phenol	<0.005		mg/L	ddm / 02/07/1994	S-9065	<0.005
Solids, Dissolved	530		mg/L	sld / 02/07/1994	E-160.1	<10.
Sulfate	96.		mg/L	ddm / 02/03/1994	S-9038	<5.
Arsenic, diss. (GFAA)	<0.005		mg/L	grf / 02/14/1994	S-7060	<0.005
Barium, diss. (ICP)	0.25		mg/L	bga / 02/10/1994	S-6010	<0.020
Boron, diss. (ICP)	0.49	b	mg/L	bga / 02/10/1994	S-6010	<0.010
Cadmium, diss. (ICP)	<0.005		mg/L	bga / 02/10/1994	S-6010	<0.005
Chromium, diss. (ICP)	<0.010		mg/L	bga / 02/10/1994	S-6010	<0.010
Copper, diss. (ICP)	0.02		mg/L	bga /	S-6010	<0.010
Iron, diss. (ICP)	0.11	b	mg/L	bga / 02/10/1994	S-6010	<0.020
Lead, diss. (ICP)	0.08		mg/L	bga / 02/10/1994	S-6010	<0.080
Manganese, diss. (ICP)	0.01		mg/L	bga / 02/10/1994	S-6010	<0.010
Mercury, diss. (CVAA)	<0.0005		mg/L	grf / 02/15/1994	S-7470	<0.0005
Selenium, diss. (GFAA)	<0.050	d2	mg/L	grf / 02/15/1994	S-7740	<0.0050
Silver, diss. (ICP)	<0.010		mg/L	bga / 02/10/1994	S-6010	<0.010
Sodium, diss. (ICP)	29.		mg/L	bga / 02/10/1994	S-6010	<1.0
Zinc, diss. (ICP)	0.03		mg/L	bga / 02/10/1994	S-6010	<0.020

OCEAN GROUP

NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Rick Miller
R.E. BLATTERT
5214 S. East Street
Suite 1
Indianapolis, IN 46227

02/16/1994

Sample No.: 80421
Job No.: 94.00237
P.O. NO.: 1408

Sample Description: MW-1 DEEP
Job Description: Griffith Landfill

Date Taken: 01/31/1994 Date Received: 02/01/1994

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Method PQL
VOLATILE ANALYSIS - AQUEOUS					
Dilution	1		rla / 02/16/1994	S - 8240	1
Acetone	<20.	ug/L	rla / 02/16/1994	S - 8240	<20.
Acrolein	<50.	ug/L	rla / 02/16/1994	S - 8240	<50.
Acrylonitrile	<50.	ug/L	rla / 02/16/1994	S - 8240	<50.
Benzene	<1.0	ug/L	rla / 02/16/1994	S - 8240	<1.0
Bromodichloromethane	<1.0	ug/L	rla / 02/16/1994	S - 8240	<1.0
Bromoform	<1.0	ug/L	rla / 02/16/1994	S - 8240	<1.0
Bromomethane	<5.0	ug/L	rla / 02/16/1994	S - 8240	<5.0
2-Butanone (MEK)	<10.	ug/L	rla / 02/16/1994	S - 8240	<10.
Carbon disulfide	<1.0	ug/L	rla / 02/16/1994	S - 8240	<1.0
Carbon tetrachloride	<1.0	ug/L	rla / 02/16/1994	S - 8240	<1.0
Chlorobenzene	<1.0	ug/L	rla / 02/16/1994	S - 8240	<1.0
Chloroethane	<10.	ug/L	rla / 02/16/1994	S - 8240	<10.
2-Chloroethyl vinyl ether	ND	ug/L	rla / 02/16/1994	S - 8240	ND
Chloroform	<1.0	ug/L	rla / 02/16/1994	S - 8240	<1.0
Chloromethane	<10.	ug/L	rla / 02/16/1994	S - 8240	<10.
Dibromomethane	<10.	ug/L	rla / 02/16/1994	S - 8240	<10.
Dibromochloromethane	<1.0	ug/L	rla / 02/16/1994	S - 8240	<1.0
Dichlorodifluoromethane	<10.	ug/L	rla / 02/16/1994	S - 8240	<10.
1,1-Dichloroethane	<1.0	ug/L	rla / 02/16/1994	S - 8240	<1.0
1,2-Dichloroethane	<1.0	ug/L	rla / 02/16/1994	S - 8240	<1.0
1,1-Dichloroethene	<1.0	ug/L	rla / 02/16/1994	S - 8240	<1.0
trans-1,2-Dichloroethene	<1.0	ug/L	rla / 02/16/1994	S - 8240	<1.0
cis-1,2-Dichloroethene	<1.0	ug/L	rla / 02/16/1994	S - 8240	<1.0
cis-1,3-Dichloropropene	<1.0	ug/L	rla / 02/16/1994	S - 8240	<1.0
trans-1,3-Dichloropropene	<1.0	ug/L	rla / 02/16/1994	S - 8240	<1.0
Ethylbenzene	<1.0	ug/L	rla / 02/16/1994	S - 8240	<1.0
Ethyl methacrylate	<10.	ug/L	rla / 02/16/1994	S - 8240	<10.
2-Hexanone	<10.	ug/L	rla / 02/16/1994	S - 8240	<10.
Iodomethane	<10.	ug/L	rla / 02/16/1994	S - 8240	<10.
Methylene chloride	<10.	ug/L	rla / 02/16/1994	S - 8240	<10.
4-Methyl-2-pentanone (MIBK)	<10.	ug/L	rla / 02/16/1994	S - 8240	<10.
Styrene	<1.0	ug/L	rla / 02/16/1994	S - 8240	<1.0
1,1,2,2-Tetrachloroethane	<1.0	ug/L	rla / 02/16/1994	S - 8240	<1.0

NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Rick Miller
R.E. BLATTERT
5214 S. East Street
Suite 1
Indianapolis, IN 46227

02/16/1994

Sample No.: 80421
Job No.: 94.00237
P.O. NO.: 1408

Sample Description: MW-1 DEEP
Job Description: Griffith Landfill

Date Taken: 01/31/1994 Date Received: 02/01/1994

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Method PQL
VOLATILE ANALYSIS - AQUEOUS					
Toluene	<1.0	ug/L	rla / 02/16/1994	S - 8240	<1.0
1,2,3-Trichloropropane	<10.	ug/L	rla / 02/16/1994	S - 8240	<10.
1,1,1-Trichloroethane	<1.0	ug/L	rla / 02/16/1994	S - 8240	<1.0
1,1,2-Trichloroethane	<1.0	ug/L	rla / 02/16/1994	S - 8240	<1.0
Trichloroethene	<1.0	ug/L	rla / 02/16/1994	S - 8240	<1.0
Trichlorofluoromethane	<1.0	ug/L	rla / 02/16/1994	S - 8240	<1.0
Vinyl acetate	<10.	ug/L	rla / 02/16/1994	S - 8240	<10.
Vinyl chloride	<5.	ug/L	rla / 02/16/1994	S - 8240	<5.
Xylenes	<1.0	ug/L	rla / 02/16/1994	S - 8240	<1.0
SURROGATE COMPOUNDS	% RECOVERY	LIMITS	rla / 02/16/1994	S - 8240	% RECOVERY
1,2-Dichloroethane-d4	91	76-114	rla / 02/16/1994	S - 8240	1
Toluene-d8	103	88-110	rla / 02/16/1994	S - 8240	1
4-Bromofluorobenzene	87	86-115	rla / 02/16/1994	S - 8240	1

NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Rick Miller
R.E. BLATTERT
5214 S. East Street
Suite 1
Indianapolis, IN 46227

02/16/1994

Sample No.: 80422
Job No.: 94.00237
P.O. NO.: 1408

Sample Description: MW-1 SHALLOW
Job Description: Griffith Landfill

Date Taken: 01/31/1994 Date Received: 02/01/1994

Parameter	Result		Units	Analyst/ Date of Analysis	Method Number	Method PQL
Chloride	46.		mg/L	ddm / 02/07/1994	S-9252	<2.
COD	34.		mg/L	ddm / 02/09/1994	E-410.4M	<10.
Conductivity	915		umhos/cm	sld / 02/14/1994	E-120.1	<5.
Fluoride	0.17		mg/L	ddm / 02/02/1994	E-340.2	<0.05
Nitrogen, Ammonia	2.7		mg/L	ddm / 02/04/1994	E-350.3	<0.10
Nitrogen, Nitrate	0.21		mg/L	ddm / 02/02/1994	E-353.3M	<0.10
pH	7.02		units	sld / 02/01/1994	S-9040	NA
Phenol	<0.005		mg/L	ddm / 02/07/1994	S-9065	<0.005
Solids, Dissolved	580		mg/L	sld / 02/07/1994	E-160.1	<10.
Sulfate	110		mg/L	ddm / 02/03/1994	S-9038	<5.
Arsenic, diss. (GFAA)	<0.005		mg/L	grf / 02/14/1994	S-7060	<0.005
Barium, diss. (ICP)	0.12		mg/L	bga / 02/10/1994	S-6010	<0.020
Boron, diss. (ICP)	0.33	b	mg/L	bga / 02/10/1994	S-6010	<0.010
Cadmium, diss. (ICP)	<0.005		mg/L	bga / 02/10/1994	S-6010	<0.005
Chromium, diss. (ICP)	<0.010		mg/L	bga / 02/10/1994	S-6010	<0.010
Copper, diss. (ICP)	0.01		mg/L	bga / 02/10/1994	S-6010	<0.010
Iron, diss. (ICP)	0.15	b	mg/L	bga / 02/10/1994	S-6010	<0.020
Lead, diss. (ICP)	<0.080		mg/L	bga / 02/10/1994	S-6010	<0.080
Manganese, diss. (ICP)	0.23		mg/L	bga / 02/10/1994	S-6010	<0.010
Mercury, diss. (CVAA)	<0.0005		mg/L	grf / 02/15/1994	S-7470	<0.0005
Selenium, diss. (GFAA)	<0.050	d2	mg/L	grf / 02/15/1994	S-7740	<0.0050
Silver, diss. (ICP)	<0.010		mg/L	bga / 02/10/1994	S-6010	<0.010
Sodium, diss. (ICP)	27.		mg/L	bga / 02/10/1994	S-6010	<1.0
Zinc, diss. (ICP)	0.04		mg/L	bga / 02/10/1994	S-6010	<0.020

NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Rick Miller
R.E. BLATTERT
5214 S. East Street
Suite 1
Indianapolis, IN 46227

02/16/1994

Sample No.: 80422
Job No.: 94.00237
P.O. NO.: 1408

Sample Description: MW-1 SHALLOW
Job Description: Griffith Landfill

Date Taken: 01/31/1994 Date Received: 02/01/1994

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Method PQL
VOLATILE ANALYSIS - AQUEOUS					
Dilution	1		rla / 02/01/1994	S - 8240	1
Acetone	<20.	ug/L	rla / 02/01/1994	S - 8240	<20.
Acrolein	<50.	ug/L	rla / 02/01/1994	S - 8240	<50.
Acrylonitrile	<50.	ug/L	rla / 02/01/1994	S - 8240	<50.
Benzene	<1.0	ug/L	rla / 02/01/1994	S - 8240	<1.0
Bromodichloromethane	<1.0	ug/L	rla / 02/01/1994	S - 8240	<1.0
Bromoform	<1.0	ug/L	rla / 02/01/1994	S - 8240	<1.0
Bromomethane	<5.0	ug/L	rla / 02/01/1994	S - 8240	<5.0
2-Butanone (MEK)	<10.	ug/L	rla / 02/01/1994	S - 8240	<10.
Carbon disulfide	<1.0	ug/L	rla / 02/01/1994	S - 8240	<1.0
Carbon tetrachloride	<1.0	ug/L	rla / 02/01/1994	S - 8240	<1.0
Chlorobenzene	<1.0	ug/L	rla / 02/01/1994	S - 8240	<1.0
Chloroethane	<10.	ug/L	rla / 02/01/1994	S - 8240	<10.
2-Chloroethyl vinyl ether	ND	ug/L	rla / 02/01/1994	S - 8240	ND
Chloroform	<1.0	ug/L	rla / 02/01/1994	S - 8240	<1.0
Chloromethane	<10.	ug/L	rla / 02/01/1994	S - 8240	<10.
Dibromomethane	<10.	ug/L	rla / 02/01/1994	S - 8240	<10.
Dibromochloromethane	<1.0	ug/L	rla / 02/01/1994	S - 8240	<1.0
Dichlorodifluoromethane	<10.	ug/L	rla / 02/01/1994	S - 8240	<10.
1,1-Dichloroethane	<1.0	ug/L	rla / 02/01/1994	S - 8240	<1.0
1,2-Dichloroethane	<1.0	ug/L	rla / 02/01/1994	S - 8240	<1.0
1,1-Dichloroethene	<1.0	ug/L	rla / 02/01/1994	S - 8240	<1.0
trans-1,2-Dichloroethene	<1.0	ug/L	rla / 02/01/1994	S - 8240	<1.0
cis-1,2-Dichloroethene	<1.0	ug/L	rla / 02/01/1994	S - 8240	<1.0
cis-1,3-Dichloropropene	<1.0	ug/L	rla / 02/01/1994	S - 8240	<1.0
trans-1,3-Dichloropropene	<1.0	ug/L	rla / 02/01/1994	S - 8240	<1.0
Ethylbenzene	<1.0	ug/L	rla / 02/01/1994	S - 8240	<1.0
Ethyl methacrylate	<10.	ug/L	rla / 02/01/1994	S - 8240	<10.
2-Hexanone	<10.	ug/L	rla / 02/01/1994	S - 8240	<10.
Iodomethane	<10.	ug/L	rla / 02/01/1994	S - 8240	<10.
Methylene chloride	<10.	ug/L	rla / 02/01/1994	S - 8240	<10.
4-Methyl-2-pentanone (MIBK)	<10.	ug/L	rla / 02/01/1994	S - 8240	<10.
Styrene	<1.0	ug/L	rla / 02/01/1994	S - 8240	<1.0
1,1,2,2-Tetrachloroethane	<1.0	ug/L	rla / 02/01/1994	S - 8240	<1.0

NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Rick Miller
R.E. BLATTERT
5214 S. East Street
Suite 1
Indianapolis, IN 46227

02/16/1994

Sample No.: 80422
Job No.: 94.00237
P.O. NO.: 1408

Sample Description: MW-1 SHALLOW
Job Description: Griffith Landfill

Date Taken: 01/31/1994 Date Received: 02/01/1994

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Method PQL
VOLATILE ANALYSIS - AQUEOUS					
Toluene	<1.0	ug/L	rla / 02/01/1994	S - 8240	<1.0
1,2,3-Trichloropropane	<10.	ug/L	rla / 02/01/1994	S - 8240	<10.
1,1,1-Trichloroethane	<1.0	ug/L	rla / 02/01/1994	S - 8240	<1.0
1,1,2-Trichloroethane	<1.0	ug/L	rla / 02/01/1994	S - 8240	<1.0
Trichloroethene	<1.0	ug/L	rla / 02/01/1994	S - 8240	<1.0
Trichlorofluoromethane	<1.0	ug/L	rla / 02/01/1994	S - 8240	<1.0
Vinyl acetate	<10.	ug/L	rla / 02/01/1994	S - 8240	<10.
Vinyl chloride	<5.	ug/L	rla / 02/01/1994	S - 8240	<5.
Xylenes	<1.0	ug/L	rla / 02/01/1994	S - 8240	<1.0
SURROGATE COMPOUNDS	% RECOVERY	LIMITS	rla / 02/01/1994	S - 8240	% RECOVERY
1,2-Dichloroethane-d4	80	76-114	rla / 02/01/1994	S - 8240	1
Toluene-d8	101	88-110	rla / 02/01/1994	S - 8240	1
4-Bromofluorobenzene	89	86-115	rla / 02/01/1994	S - 8240	1

NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Rick Miller
R.E. BLATTERT
5214 S. East Street
Suite 1
Indianapolis, IN 46227

02/16/1994

Sample No.: 80423
Job No.: 94.00237
P.O. NO.: 1408

Sample Description: MW-2 DEEP
Job Description: Griffith Landfill

Date Taken: 01/31/1994 Date Received: 02/01/1994

Parameter	Result		Units	Analyst/ Date of Analysis	Method Number	Method PQL
Chloride	20.		mg/L	ddm / 02/07/1994	S-9252	<2.
COD	<10.		mg/L	ddm / 02/09/1994	E-410.4M	<10.
Conductivity	805		umhos/cm	sld / 02/14/1994	E-120.1	<5.
Nitrogen, Ammonia	0.6		mg/L	ddm / 02/04/1994	E-350.3	<0.10
pH	7.56		units	sld / 02/01/1994	S-9040	NA
Phenol	<0.005		mg/L	ddm / 02/07/1994	S-9065	<0.005
Boron, diss. (ICP)	0.34	b	mg/L	bga / 02/10/1994	S-6010	<0.010
Sodium, diss. (ICP)	22.		mg/L	bga / 02/10/1994	S-6010	<1.0

OCEAN GROUP

NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Rick Miller
R.E. BLATTERT
5214 S. East Street
Suite 1
Indianapolis, IN 46227

02/16/1994

Sample No.: 80423
Job No.: 94.00237
P.O. NO.: 1408

Sample Description: MW-2 DEEP
Job Description: Griffith Landfill

Date Taken: 01/31/1994 Date Received: 02/01/1994

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Method PQL
VOLATILE ANALYSIS - AQUEOUS					
Dilution	1		rla / 02/01/1994	S - 8240	1
Benzene	<1.0	ug/L	rla / 02/01/1994	S - 8240	<1.0
2-Butanone (MEK)	<10.	ug/L	rla / 02/01/1994	S - 8240	<10.
1,1-Dichloroethane	<1.0	ug/L	rla / 02/01/1994	S - 8240	<1.0
1,1-Dichloroethene	<1.0	ug/L	rla / 02/01/1994	S - 8240	<1.0
Ethylbenzene	<1.0	ug/L	rla / 02/01/1994	S - 8240	<1.0
Methylene chloride	<10.	ug/L	rla / 02/01/1994	S - 8240	<10.
Toluene	<1.0	ug/L	rla / 02/01/1994	S - 8240	<1.0
SURROGATE COMPOUNDS	% RECOVERY	LIMITS	rla / 02/01/1994	S - 8240	% RECOVERY
1,2-Dichloroethane-d4	81	76-114	rla / 02/01/1994	S - 8240	1
Toluene-d8	103	88-110	rla / 02/01/1994	S - 8240	1
4-Bromofluorobenzene	89	86-115	rla / 02/01/1994	S - 8240	1

NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Rick Miller
R.E. BLATTERT
5214 S. East Street
Suite 1
Indianapolis, IN 46227

02/16/1994

Sample No.: 80424
Job No.: 94.00237
P.O. NO.: 1408

Sample Description: MW-2 SHALLOW
Job Description: Griffith Landfill

Date Taken: 01/31/1994 Date Received: 02/01/1994

Parameter	Result		Units	Analyst/- Date of Analysis	Method Number	Method PQL
Chloride	25.		mg/L	ddm / 02/07/1994	S-9252	<2.
COD	45.		mg/L	ddm / 02/09/1994	E-410.4M	<10.
Conductivity	840		umhos/cm	sld / 02/14/1994	E-120.1	<5.
Nitrogen, Ammonia	1.0		mg/L	ddm / 02/04/1994	E-350.3	<0.10
pH	7.25		units	sld / 02/01/1994	S-9040	NA
Phenol	<0.005		mg/L	ddm / 02/07/1994	S-9065	<0.005
Boron, diss. (ICP)	0.31	b	mg/L	bga / 02/10/1994	S-6010	<0.010
Sodium, diss. (ICP)	16.		mg/L	bga / 02/10/1994	S-6010	<1.0

NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Rick Miller
R.E. BLATTERT
5214 S. East Street
Suite 1
Indianapolis, IN 46227

02/16/1994

Sample No.: 80424
Job No.: 94.00237
P.O. NO.: 1408

Sample Description: MW-2 SHALLOW
Job Description: Griffith Landfill

Date Taken: 01/31/1994 Date Received: 02/01/1994

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Method PQL
VOLATILE ANALYSIS - AQUEOUS					
Dilution	1		rla / 02/01/1994	S - 8240	1
Benzene	<1.0	ug/L	rla / 02/01/1994	S - 8240	<1.0
2-Butanone (MEK)	<10.	ug/L	rla / 02/01/1994	S - 8240	<10.
1,1-Dichloroethane	<1.0	ug/L	rla / 02/01/1994	S - 8240	<1.0
1,1-Dichloroethene	<1.0	ug/L	rla / 02/01/1994	S - 8240	<1.0
Ethylbenzene	<1.0	ug/L	rla / 02/01/1994	S - 8240	<1.0
Methylene chloride	<10.	ug/L	rla / 02/01/1994	S - 8240	<10.
Toluene	<1.0	ug/L	rla / 02/01/1994	S - 8240	<1.0
SURROGATE COMPOUNDS	% RECOVERY	LIMITS	rla / 02/01/1994	S - 8240	% RECOVERY
1,2-Dichloroethane-d4	78	76-114	rla / 02/01/1994	S - 8240	1
Toluene-d8	104	88-110	rla / 02/01/1994	S - 8240	1
4-Bromofluorobenzene	90	86-115	rla / 02/01/1994	S - 8240	1

OCEAN GROUP

NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Rick Miller
R.E. BLATTERT
5214 S. East Street
Suite 1
Indianapolis, IN 46227

02/16/1994

Sample No.: 80425
Job No.: 94.00237
P.O. NO.: 1408

Sample Description: MW-3 DEEP
Job Description: Griffith Landfill

Date Taken: 01/31/1994 Date Received: 02/01/1994

Parameter	Result		Units	Analyst/ Date of Analysis	Method Number	Method PQL
Chloride	14.		mg/L	ddm / 02/07/1994	S-9252	<2.
COD	<10.		mg/L	ddm / 02/09/1994	E-410.4M	<10.
Conductivity	740		umhos/cm	sld / 02/14/1994	E-120.1	<5.
Nitrogen, Ammonia	0.7		mg/L	ddm / 02/04/1994	E-350.3	<0.10
pH	7.40		units	sld / 02/01/1994	S-9040	NA
Phenol	<0.005		mg/L	ddm / 02/07/1994	S-9065	<0.005
Boron, diss. (ICP)	0.34	b	mg/L	bga / 02/10/1994	S-6010	<0.010
Sodium, diss. (ICP)	17.		mg/L	bga / 02/10/1994	S-6010	<1.0

NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Rick Miller
R.E. BLATTERT
5214 S. East Street
Suite 1
Indianapolis, IN 46227

02/16/1994

Sample No.: 80425
Job No.: 94.00237
P.O. NO.: 1408

Sample Description: MW-3 DEEP
Job Description: Griffith Landfill

Date Taken: 01/31/1994 Date Received: 02/01/1994

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Method PQL
VOLATILE ANALYSIS - AQUEOUS					
Dilution	1		rla / 02/01/1994	S - 8240	1
Benzene	<1.0	ug/L	rla / 02/01/1994	S - 8240	<1.0
2-Butanone (MEK)	<10.	ug/L	rla / 02/01/1994	S - 8240	<10.
1,1-Dichloroethane	<1.0	ug/L	rla / 02/01/1994	S - 8240	<1.0
1,1-Dichloroethene	<1.0	ug/L	rla / 02/01/1994	S - 8240	<1.0
Ethylbenzene	<1.0	ug/L	rla / 02/01/1994	S - 8240	<1.0
Methylene chloride	<10.	ug/L	rla / 02/01/1994	S - 8240	<10.
Toluene	<1.0	ug/L	rla / 02/01/1994	S - 8240	<1.0
SURROGATE COMPOUNDS	% RECOVERY	LIMITS	rla / 02/01/1994	S - 8240	% RECOVERY
1,2-Dichloroethane-d4	82	76-114	rla / 02/01/1994	S - 8240	1
Toluene-d8	104	88-110	rla / 02/01/1994	S - 8240	1
4-Bromofluorobenzene	88	86-115	rla / 02/01/1994	S - 8240	1

NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Rick Miller
R.E. BLATTERT
5214 S. East Street
Suite 1
Indianapolis, IN 46227

02/16/1994

Sample No.: 80426
Job No.: 94.00237
P.O. NO.: 1408

Sample Description: MW-3 SHALLOW
Job Description: Griffith Landfill

Date Taken: 01/31/1994 Date Received: 02/01/1994

Parameter	Result		Units	Analyst/ Date of Analysis	Method Number	Method PQL
Chloride	34.		mg/L	ddm / 02/07/1994	S-9252	<2.
COD	35.		mg/L	ddm / 02/09/1994	E-410.4M	<10.
Conductivity	530		umhos/cm	sld / 02/14/1994	E-120.1	<5.
Nitrogen, Ammonia	0.5		mg/L	ddm / 02/04/1994	E-350.3	<0.10
pH	7.19		units	sld / 02/01/1994	S-9040	NA
Phenol	0.006		mg/L	ddm / 02/07/1994	S-9065	<0.005
Boron, diss. (ICP)	0.26	b	mg/L	bga / 02/10/1994	S-6010	<0.010
Sodium, diss. (ICP)	17.		mg/L	bga / 02/10/1994	S-6010	<1.0

OCEAN GROUP

NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Rick Miller
R.E. BLATTERT
5214 S. East Street
Suite 1
Indianapolis, IN 46227

02/16/1994

Sample No.: 80426
Job No.: 94.00237
P.O. NO.: 1408

Sample Description: MW-3 SHALLOW
Job Description: Griffith Landfill

Date Taken: 01/31/1994 Date Received: 02/01/1994

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Method PQL
VOLATILE ANALYSIS - AQUEOUS					
Dilution	1		rla / 02/01/1994	S - 8240	1
Benzene	<1.0	ug/L	rla / 02/01/1994	S - 8240	<1.0
2-Butanone (MEK)	<10.	ug/L	rla / 02/01/1994	S - 8240	<10.
1,1-Dichloroethane	<1.0	ug/L	rla / 02/01/1994	S - 8240	<1.0
1,1-Dichloroethene	<1.0	ug/L	rla / 02/01/1994	S - 8240	<1.0
Ethylbenzene	<1.0	ug/L	rla / 02/01/1994	S - 8240	<1.0
Methylene chloride	<10.	ug/L	rla / 02/01/1994	S - 8240	<10.
Toluene	<1.0	ug/L	rla / 02/01/1994	S - 8240	<1.0
SURROGATE COMPOUNDS	% RECOVERY	LIMITS	rla / 02/01/1994	S - 8240	% RECOVERY
1,2-Dichloroethane-d4	83	76-114	rla / 02/01/1994	S - 8240	1
Toluene-d8	102	88-110	rla / 02/01/1994	S - 8240	1
4-Bromofluorobenzene	89	86-115	rla / 02/01/1994	S - 8240	1

NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Rick Miller
R.E. BLATTERT
5214 S. East Street
Suite 1
Indianapolis, IN 46227

02/16/1994

Sample No.: 80427
Job No.: 94.00237
P.O. NO.: 1408

Sample Description: MW-4 DEEP
Job Description: Griffith Landfill

Date Taken: 01/31/1994 Date Received: 02/01/1994

Parameter	Result		Units	Analyst/ Date of Analysis	Method Number	Method PQL
Chloride	170		mg/L	ddm / 02/07/1994	S-9252	<2.
COD	17.		mg/L	ddm / 02/09/1994	E-410.4M	<10.
Conductivity	1,000		umhos/cm	sld / 02/14/1994	E-120.1	<5.
Nitrogen, Ammonia	0.5		mg/L	ddm / 02/04/1994	E-350.3	<0.10
pH	7.71		units	sld / 02/01/1994	S-9040	NA
Phenol	<0.005		mg/L	ddm / 02/07/1994	S-9065	<0.005
Boron, diss. (ICP)	0.37	b	mg/L	bga / 02/10/1994	S-6010	<0.010
Sodium, diss. (ICP)	64.		mg/L	bga / 02/10/1994	S-6010	<1.0

OCEAN GROUP

NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Rick Miller
R.E. BLATTERT
5214 S. East Street
Suite 1
Indianapolis, IN 46227

02/16/1994

Sample No.: 80427
Job No.: 94.00237
P.O. NO.: 1408

Sample Description: MW-4 DEEP
Job Description: Griffith Landfill

Date Taken: 01/31/1994 Date Received: 02/01/1994

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Method PQL
VOLATILE ANALYSIS - AQUEOUS					
Dilution	1		rla / 02/02/1994	S - 8240	1
Benzene	<1.0	ug/L	rla / 02/02/1994	S - 8240	<1.0
2-Butanone (MEK)	<10.	ug/L	rla / 02/02/1994	S - 8240	<10.
1,1-Dichloroethane	<1.0	ug/L	rla / 02/02/1994	S - 8240	<1.0
1,1-Dichloroethene	<1.0	ug/L	rla / 02/02/1994	S - 8240	<1.0
Ethylbenzene	<1.0	ug/L	rla / 02/02/1994	S - 8240	<1.0
Methylene chloride	<10.	ug/L	rla / 02/02/1994	S - 8240	<10.
Toluene	<1.0	ug/L	rla / 02/02/1994	S - 8240	<1.0
SURROGATE COMPOUNDS	% RECOVERY	LIMITS	rla / 02/02/1994	S - 8240	% RECOVERY
1,2-Dichloroethane-d4	92	76-114	rla / 02/02/1994	S - 8240	1
Toluene-d8	103	88-110	rla / 02/02/1994	S - 8240	1
4-Bromofluorobenzene	87	86-115	rla / 02/02/1994	S - 8240	1

OCEAN GROUP

NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Rick Miller
R.E. BLATTERT
5214 S. East Street
Suite 1
Indianapolis, IN 46227

02/16/1994

Sample No.: 80428
Job No.: 94.00237
P.O. NO.: 1408

Sample Description: MW-4 SHALLOW
Job Description: Griffith Landfill

Date Taken: 01/31/1994 Date Received: 02/01/1994

Parameter	Result		Units	Analyst/ Date of Analysis	Method Number	Method PQL
Chloride	670		mg/L	ddm / 02/07/1994	S-9252	<2.
COD	410		mg/L	ddm / 02/09/1994	E-410.4M	<10.
Conductivity	2,970		umhos/cm	sld / 02/14/1994	E-120.1	<5.
Nitrogen, Ammonia	14.		mg/L	ddm / 02/04/1994	E-350.3	<0.10
pH	6.65		units	sld / 02/01/1994	S-9040	NA
Phenol	0.017		mg/L	ddm / 02/07/1994	S-9065	<0.005
Boron, diss. (ICP)	0.86	b	mg/L	bga / 02/10/1994	S-6010	<0.010
Sodium, diss. (ICP)	90.		mg/L	bga / 02/10/1994	S-6010	<1.0

OCEAN GROUP

NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Rick Miller
R.E. BLATTERT
5214 S. East Street
Suite 1
Indianapolis, IN 46227

02/16/1994

Sample No.: 80428
Job No.: 94.00237
P.O. NO.: 1408

Sample Description: MW-4 SHALLOW
Job Description: Griffith Landfill

Date Taken: 01/31/1994 Date Received: 02/01/1994

Parameter	Result		Units	Analyst/ Date of Analysis	Method Number	Method PQL
VOLATILE ANALYSIS - AQUEOUS						
Dilution	10	d1		rla / 02/09/1994	S - 8240	10
Benzene	460	d1	ug/L	rla / 02/09/1994	S - 8240	<10.
2-Butanone (MEK)	170	d1	ug/L	rla / 02/09/1994	S - 8240	<100
1,1-Dichloroethane	<10.	d1	ug/L	rla / 02/09/1994	S - 8240	<10.
1,1-Dichloroethene	<10.	d1	ug/L	rla / 02/09/1994	S - 8240	<10.
Ethylbenzene	<10.	d1	ug/L	rla / 02/09/1994	S - 8240	<10.
Methylene chloride	<100	d1	ug/L	rla / 02/09/1994	S - 8240	<100
Toluene	<10.	d1	ug/L	rla / 02/09/1994	S - 8240	<10.
SURROGATE COMPOUNDS	% RECOVERY	d1	LIMITS	rla / 02/09/1994	S - 8240	% RECOVERY
1,2-Dichloroethane-d4	89	d1	76-114	rla / 02/09/1994	S - 8240	10
Toluene-d8	102	d1	88-110	rla / 02/09/1994	S - 8240	10
4-Bromofluorobenzene	88	d1	86-115	rla / 02/09/1994	S - 8240	10

NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Rick Miller
R.E. BLATTERT
5214 S. East Street
Suite 1
Indianapolis, IN 46227

02/16/1994

Sample No.: 80429
Job No.: 94.00237
P.O. NO.: 1408

Sample Description: MW-5 DEEP
Job Description: Griffith Landfill

Date Taken: 01/31/1994 Date Received: 02/01/1994

Parameter	Result		Units	Analyst/ Date of Analysis	Method Number	Method PQL
Chloride	57.		mg/L	ddm / 02/07/1994	S-9252	<2.
COD	24.		mg/L	ddm / 02/09/1994	E-410.4M	<10.
Conductivity	847		umhos/cm	sld / 02/14/1994	E-120.1	<5.
Nitrogen, Ammonia	0.6		mg/L	ddm / 02/04/1994	E-350.3	<0.10
pH	7.53		units	sld / 02/01/1994	S-9040	NA
Phenol	0.006		mg/L	ddm / 02/07/1994	S-9065	<0.005
Boron, diss. (ICP)	0.49	b	mg/L	bga / 02/10/1994	S-6010	<0.010
Sodium, diss. (ICP)	23.		mg/L	bga / 02/10/1994	S-6010	<1.0

OCEAN GROUP

NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Rick Miller
R.E. BLATTERT
5214 S. East Street
Suite 1
Indianapolis, IN 46227

02/16/1994

Sample No.: 80429
Job No.: 94.00237
P.O. NO.: 1408

Sample Description: MW-5 DEEP
Job Description: Griffith Landfill

Date Taken: 01/31/1994 Date Received: 02/01/1994

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Method PQL
VOLATILE ANALYSIS - AQUEOUS					
Dilution	1		rla / 02/02/1994	S - 8240	1
Benzene	<1.0	ug/L	rla / 02/02/1994	S - 8240	<1.0
2-Butanone (MEK)	<10.	ug/L	rla / 02/02/1994	S - 8240	<10.
1,1-Dichloroethane	<1.0	ug/L	rla / 02/02/1994	S - 8240	<1.0
1,1-Dichloroethene	<1.0	ug/L	rla / 02/02/1994	S - 8240	<1.0
Ethylbenzene	<1.0	ug/L	rla / 02/02/1994	S - 8240	<1.0
Methylene chloride	<10.	ug/L	rla / 02/02/1994	S - 8240	<10.
Toluene	<1.0	ug/L	rla / 02/02/1994	S - 8240	<1.0
SURROGATE COMPOUNDS	% RECOVERY	LIMITS	rla / 02/02/1994	S - 8240	% RECOVERY
1,2-Dichloroethane-d4	89	76-114	rla / 02/02/1994	S - 8240	1
Toluene-d8	104	88-110	rla / 02/02/1994	S - 8240	1
4-Bromofluorobenzene	88	86-115	rla / 02/02/1994	S - 8240	1

NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Rick Miller
R.E. BLATTERT
5214 S. East Street
Suite 1
Indianapolis, IN 46227

02/16/1994

Sample No.: 80430
Job No.: 94.00237
P.O. NO.: 1408

Sample Description: MW-5 SHALLOW
Job Description: Griffith Landfill

Date Taken: 01/31/1994 Date Received: 02/01/1994

Parameter	Result		Units	Analyst/ Date of Analysis	Method Number	Method PQL
Chloride	45.		mg/L	ddm / 02/07/1994	S-9252	<2.
COD	62.		mg/L	ddm / 02/09/1994	E-410.4M	<10.
Conductivity	884		umhos/cm	sld / 02/14/1994	E-120.1	<5.
Nitrogen, Ammonia	1.5		mg/L	ddm / 02/04/1994	E-350.3	<0.10
pH	6.89		units	sld / 02/01/1994	S-9040	NA
Phenol	<0.005		mg/L	ddm / 02/07/1994	S-9065	<0.005
Boron, diss. (ICP)	0.36	b	mg/L	bga / 02/10/1994	S-6010	<0.010
Sodium, diss. (ICP)	24.		mg/L	bga / 02/10/1994	S-6010	<1.0

OCEAN GROUP

NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Rick Miller
R.E. BLATTERT
5214 S. East Street
Suite 1
Indianapolis, IN 46227

02/16/1994

Sample No.: 80430
Job No.: 94.00237
P.O. NO.: 1408

Sample Description: MW-5 SHALLOW
Job Description: Griffith Landfill

Date Taken: 01/31/1994 Date Received: 02/01/1994

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Method PQL
VOLATILE ANALYSIS - AQUEOUS					
Dilution	1		rla / 02/09/1994	S - 8240	1
Benzene	<1.0	ug/L	rla / 02/09/1994	S - 8240	<1.0
2-Butanone (MEK)	<10.	ug/L	rla / 02/09/1994	S - 8240	<10.
1,1-Dichloroethane	<1.0	ug/L	rla / 02/09/1994	S - 8240	<1.0
1,1-Dichloroethene	<1.0	ug/L	rla / 02/09/1994	S - 8240	<1.0
Ethylbenzene	<1.0	ug/L	rla / 02/09/1994	S - 8240	<1.0
Methylene chloride	<10.	ug/L	rla / 02/09/1994	S - 8240	<10.
Toluene	<1.0	ug/L	rla / 02/09/1994	S - 8240	<1.0
SURROGATE COMPOUNDS	% RECOVERY	LIMITS	rla / 02/09/1994	S - 8240	% RECOVERY
1,2-Dichloroethane-d4	91	76-114	rla / 02/09/1994	S - 8240	1
Toluene-d8	100	88-110	rla / 02/09/1994	S - 8240	1
4-Bromofluorobenzene	86	86-115	rla / 02/09/1994	S - 8240	1

NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Rick Miller
R.E. BLATTERT
5214 S. East Street
Suite 1
Indianapolis, IN 46227

02/16/1994

Sample No.: 80431
Job No.: 94.00237
P.O. NO.: 1408

Sample Description: DUPLICATE
Job Description: Griffith Landfill

Date Taken: 01/31/1994 Date Received: 02/01/1994

Parameter	Result		Units	Analyst/ Date of Analysis	Method Number	Method PQL
Chloride	680		mg/L	ddm / 02/07/1994	S-9252	<2.
COD	370		mg/L	ddm / 02/09/1994	E-410.4M	<10.
Conductivity	3,040		umhos/cm	sld / 02/14/1994	E-120.1	<5.
Fluoride	0.10		mg/L	ddm / 02/02/1994	E-340.2	<0.05
Nitrogen, Ammonia	11		mg/L	ddm / 02/04/1994	E-350.3	<0.10
Nitrogen, Nitrate	0.62		mg/L	ddm / 02/02/1994	E-353.3M	<0.10
pH	6.71		units	sld / 02/01/1994	S-9040	NA
Phenol	0.015		mg/L	ddm / 02/07/1994	S-9065	<0.005
Solids, Dissolved	2,000		mg/L	sld / 02/07/1994	E-160.1	<10.
Sulfate	<5.0		mg/L	ddm / 02/03/1994	S-9038	<5.
Arsenic, diss. (GFAA)	<0.005		mg/L	grf / 02/14/1994	S-7060	<0.005
Barium, diss. (ICP)	0.48		mg/L	bga / 02/10/1994	S-6010	<0.020
Boron, diss. (ICP)	0.67	b	mg/L	bga / 02/10/1994	S-6010	<0.010
Cadmium, diss. (ICP)	<0.005		mg/L	bga / 02/10/1994	S-6010	<0.005
Chromium, diss. (ICP)	0.01		mg/L	bga / 02/10/1994	S-6010	<0.010
Copper, diss. (ICP)	<0.010		mg/L	bga / 02/10/1994	S-6010	<0.010
Iron, diss. (ICP)	0.21	b	mg/L	bga / 02/10/1994	S-6010	<0.020
Lead, diss. (ICP)	<0.080		mg/L	bga / 02/10/1994	S-6010	<0.080
Manganese, diss. (ICP)	0.35		mg/L	bga / 02/10/1994	S-6010	<0.010
Mercury, diss. (CVAA)	<0.0005		mg/L	grf / 02/15/1994	S-7470	<0.0005
Selenium, diss. (GFAA)	<0.050	d2	mg/L	grf / 02/15/1994	S-7740	<0.0050
Silver, diss. (ICP)	<0.010		mg/L	bga / 02/10/1994	S-6010	<0.010
Sodium, diss. (ICP)	96.		mg/L	bga / 02/10/1994	S-6010	<1.0
Zinc, diss. (ICP)	0.04		mg/L	bga / 02/10/1994	S-6010	<0.020

OCEAN GROUP

NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Rick Miller
R.E. BLATTERT
5214 S. East Street
Suite 1
Indianapolis, IN 46227

02/16/1994

Sample No.: 80431
Job No.: 94.00237
P.O. NO.: 1408

Sample Description: DUPLICATE
Job Description: Griffith Landfill

Date Taken: 01/31/1994 Date Received: 02/01/1994

Parameter	Result		Units	Analyst/ Date of Analysis	Method Number	Method PQL
VOLATILE ANALYSIS - AQUEOUS						
Dilution	1			rla / 02/02/1994	S - 8240	1
Acetone	<20.		ug/L	rla / 02/02/1994	S - 8240	<20.
Acrolein	<50.		ug/L	rla / 02/02/1994	S - 8240	<50.
Acrylonitrile	<50.		ug/L	rla / 02/02/1994	S - 8240	<50.
Benzene	360	d1	ug/L	rla / 02/09/1994	S - 8240	<10
Bromodichloromethane	<1.0		ug/L	rla / 02/02/1994	S - 8240	<1.0
Bromoform	<1.0		ug/L	rla / 02/02/1994	S - 8240	<1.0
Bromomethane	<5.0		ug/L	rla / 02/02/1994	S - 8240	<5.0
2-Butanone (MEK)	170		ug/L	rla / 02/02/1994	S - 8240	<10.
Carbon disulfide	<1.0		ug/L	rla / 02/02/1994	S - 8240	<1.0
Carbon tetrachloride	<1.0		ug/L	rla / 02/02/1994	S - 8240	<1.0
Chlorobenzene	<1.0		ug/L	rla / 02/02/1994	S - 8240	<1.0
Chloroethane	<10.		ug/L	rla / 02/02/1994	S - 8240	<10.
2-Chloroethyl vinyl ether	ND		ug/L	rla / 02/02/1994	S - 8240	ND
Chloroform	<1.0		ug/L	rla / 02/02/1994	S - 8240	<1.0
Chloromethane	<10.		ug/L	rla / 02/02/1994	S - 8240	<10.
Dibromomethane	<10.		ug/L	rla / 02/02/1994	S - 8240	<10.
Dibromochloromethane	<1.0		ug/L	rla / 02/02/1994	S - 8240	<1.0
Dichlorodifluoromethane	<10.		ug/L	rla / 02/02/1994	S - 8240	<10.
1,1-Dichloroethane	<1.0		ug/L	rla / 02/02/1994	S - 8240	<1.0
1,2-Dichloroethane	<1.0		ug/L	rla / 02/02/1994	S - 8240	<1.0
1,1-Dichloroethene	<1.0		ug/L	rla / 02/02/1994	S - 8240	<1.0
trans-1,2-Dichloroethene	53.		ug/L	rla / 02/02/1994	S - 8240	<1.0
cis-1,2-Dichloroethene	<1.0		ug/L	rla / 02/02/1994	S - 8240	<1.0
cis-1,3-Dichloropropene	<1.0		ug/L	rla / 02/02/1994	S - 8240	<1.0
trans-1,3-Dichloropropene	<1.0		ug/L	rla / 02/02/1994	S - 8240	<1.0
Ethylbenzene	<1.0		ug/L	rla / 02/02/1994	S - 8240	<1.0
Ethyl methacrylate	<10.		ug/L	rla / 02/02/1994	S - 8240	<10.
2-Hexanone	420	d1	ug/L	rla / 02/09/1994	S - 8240	<100
Iodomethane	<10.		ug/L	rla / 02/02/1994	S - 8240	<10.
Methylene chloride	<10.		ug/L	rla / 02/02/1994	S - 8240	<10.
4-Methyl-2-pentanone (MIBK)	<10.		ug/L	rla / 02/02/1994	S - 8240	<10.
Styrene	<1.0		ug/L	rla / 02/02/1994	S - 8240	<1.0
1,1,2,2-Tetrachloroethane	<1.0		ug/L	rla / 02/02/1994	S - 8240	<1.0

NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Rick Miller
R.E. BLATTERT
5214 S. East Street
Suite 1
Indianapolis, IN 46227

02/16/1994

Sample No.: 80431
Job No.: 94.00237
P.O. NO.: 1408

Sample Description: DUPLICATE
Job Description: Griffith Landfill

Date Taken: 01/31/1994 Date Received: 02/01/1994

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Method PQL
VOLATILE ANALYSIS - AQUEOUS					
Toluene	1.2	ug/L	rla / 02/02/1994	S - 8240	<1.0
1,2,3-Trichloropropane	<10.	ug/L	rla / 02/02/1994	S - 8240	<10.
1,1,1-Trichloroethane	<1.0	ug/L	rla / 02/02/1994	S - 8240	<1.0
1,1,2-Trichloroethane	<1.0	ug/L	rla / 02/02/1994	S - 8240	<1.0
Trichloroethene	<1.0	ug/L	rla / 02/02/1994	S - 8240	<1.0
Trichlorofluoromethane	<1.0	ug/L	rla / 02/02/1994	S - 8240	<1.0
Vinyl acetate	<10.	ug/L	rla / 02/02/1994	S - 8240	<10.
Vinyl chloride	<5.	ug/L	rla / 02/02/1994	S - 8240	<5.
Xylenes	<1.0	ug/L	rla / 02/02/1994	S - 8240	<1.0
SURROGATE COMPOUNDS	% RECOVERY	LIMITS	rla / 02/02/1994	S - 8240	% RECOVERY
1,2-Dichloroethane-d4	92	76-114	rla / 02/02/1994	S - 8240	1
Toluene-d8	101	88-110	rla / 02/02/1994	S - 8240	1
4-Bromofluorobenzene	87	86-115	rla / 02/02/1994	S - 8240	1

OCEAN GROUP

NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Rick Miller
R.E. BLATTERT
5214 S. East Street
Suite 1
Indianapolis, IN 46227

02/16/1994

Sample No.: 80432
Job No.: 94.00237
P.O. NO.: 1408

Sample Description: TRIP BLANK
Job Description: Griffith Landfill

Date Taken: Date Received: 02/01/1994

Parameter	Result		Units	Analyst/ Date of Analysis	Method Number	Method PQL
Chloride	<2.0		mg/L	ddm / 02/07/1994	S-9252	<2.
COD	<10.		mg/L	ddm / 02/09/1994	E-410.4M	<10.
Conductivity	28.9		umhos/cm	sld / 02/14/1994	E-120.1	<5.
Fluoride	<0.1		mg/L	ddm / 02/02/1994	E-340.2	<0.05
Nitrogen, Ammonia	<0.10		mg/L	ddm / 02/04/1994	E-350.3	<0.10
Nitrogen, Nitrate	0.14		mg/L	ddm / 02/02/1994	E-353.3M	<0.10
pH	4.95		units	sld / 02/01/1994	S-9040	NA
Phenol	<0.005		mg/L	ddm / 02/07/1994	S-9065	<0.005
Solids, Dissolved	<20		mg/L	sld / 02/07/1994	E-160.1	<10.
Sulfate	<5.0		mg/L	ddm / 02/03/1994	S-9038	<5.
Arsenic, diss. (GFAA)	<0.005		mg/L	grf / 02/14/1994	S-7060	<0.005
Barium, diss. (ICP)	0.02		mg/L	bga / 02/10/1994	S-6010	<0.020
Boron, diss. (ICP)	0.22	b	mg/L	bga / 02/10/1994	S-6010	<0.010
Cadmium, diss. (ICP)	<0.005		mg/L	bga / 02/10/1994	S-6010	<0.005
Chromium, diss. (ICP)	<0.010		mg/L	bga / 02/10/1994	S-6010	<0.010
Copper, diss. (ICP)	0.08		mg/L	bga / 02/10/1994	S-6010	<0.010
Iron, diss. (ICP)	0.14	b	mg/L	bga / 02/10/1994	S-6010	<0.020
Lead, diss. (ICP)	<0.080		mg/L	bga / 02/10/1994	S-6010	<0.080
Manganese, diss. (ICP)	<0.010		mg/L	bga / 02/10/1994	S-6010	<0.010
Mercury, diss. (CVAA)	<0.0005		mg/L	grf / 02/15/1994	S-7470	<0.0005
Selenium, diss. (GFAA)	<0.050	d2	mg/L	grf / 02/15/1994	S-7740	<0.0050
Silver, diss. (ICP)	<0.010		mg/L	bga / 02/10/1994	S-6010	<0.010
Sodium, diss. (ICP)	1.3		mg/L	bga / 02/10/1994	S-6010	<1.0
Zinc, diss. (ICP)	0.07		mg/L	bga / 02/10/1994	S-6010	<0.020

OCEAN GROUP

NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Rick Miller
R.E. BLATTERT
5214 S. East Street
Suite 1
Indianapolis, IN 46227

02/16/1994

Sample No.: 80432
Job No.: 94.00237
P.O. NO.: 1408

Sample Description: TRIP BLANK
Job Description: Griffith Landfill

Date Taken: Date Received: 02/01/1994

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Method PQL
VOLATILE ANALYSIS - AQUEOUS					
Dilution	1		rla / 02/02/1994	S - 8240	1
Acetone	<20.	ug/L	rla / 02/02/1994	S - 8240	<20.
Acrolein	<50.	ug/L	rla / 02/02/1994	S - 8240	<50.
Acrylonitrile	<50.	ug/L	rla / 02/02/1994	S - 8240	<50.
Benzene	<1.0	ug/L	rla / 02/02/1994	S - 8240	<1.0
Bromodichloromethane	<1.0	ug/L	rla / 02/02/1994	S - 8240	<1.0
Bromoform	<1.0	ug/L	rla / 02/02/1994	S - 8240	<1.0
Bromomethane	<5.0	ug/L	rla / 02/02/1994	S - 8240	<5.0
2-Butanone (MEK)	<10.	ug/L	rla / 02/02/1994	S - 8240	<10.
Carbon disulfide	<1.0	ug/L	rla / 02/02/1994	S - 8240	<1.0
Carbon tetrachloride	<1.0	ug/L	rla / 02/02/1994	S - 8240	<1.0
Chlorobenzene	<1.0	ug/L	rla / 02/02/1994	S - 8240	<1.0
Chloroethane	<10.	ug/L	rla / 02/02/1994	S - 8240	<10.
2-Chloroethyl vinyl ether	ND	ug/L	rla / 02/02/1994	S - 8240	ND
Chloroform	<1.0	ug/L	rla / 02/02/1994	S - 8240	<1.0
Chloromethane	<10.	ug/L	rla / 02/02/1994	S - 8240	<10.
Dibromomethane	<10.	ug/L	rla / 02/02/1994	S - 8240	<10.
Dibromochloromethane	<1.0	ug/L	rla / 02/02/1994	S - 8240	<1.0
Dichlorodifluoromethane	<10.	ug/L	rla / 02/02/1994	S - 8240	<10.
1,1-Dichloroethane	<1.0	ug/L	rla / 02/02/1994	S - 8240	<1.0
1,2-Dichloroethane	<1.0	ug/L	rla / 02/02/1994	S - 8240	<1.0
1,1-Dichloroethene	<1.0	ug/L	rla / 02/02/1994	S - 8240	<1.0
trans-1,2-Dichloroethene	<1.0	ug/L	rla / 02/02/1994	S - 8240	<1.0
cis-1,2-Dichloroethene	<1.0	ug/L	rla / 02/02/1994	S - 8240	<1.0
cis-1,3-Dichloropropene	<1.0	ug/L	rla / 02/02/1994	S - 8240	<1.0
trans-1,3-Dichloropropene	<1.0	ug/L	rla / 02/02/1994	S - 8240	<1.0
Ethylbenzene	<1.0	ug/L	rla / 02/02/1994	S - 8240	<1.0
Ethyl methacrylate	<10.	ug/L	rla / 02/02/1994	S - 8240	<10.
2-Hexanone	<10.	ug/L	rla / 02/02/1994	S - 8240	<10.
Iodomethane	<10.	ug/L	rla / 02/02/1994	S - 8240	<10.
Methylene chloride	<10.	ug/L	rla / 02/02/1994	S - 8240	<10.
4-Methyl-2-pentanone (MIBK)	<10.	ug/L	rla / 02/02/1994	S - 8240	<10.
Styrene	<1.0	ug/L	rla / 02/02/1994	S - 8240	<1.0
1,1,2,2-Tetrachloroethane	<1.0	ug/L	rla / 02/02/1994	S - 8240	<1.0

NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Rick Miller
R.E. BLATTERT
5214 S. East Street
Suite 1
Indianapolis, IN 46227

02/16/1994

Sample No.: 80432
Job No.: 94.00237
P.O. NO.: 1408

Sample Description: TRIP BLANK
Job Description: Griffith Landfill

Date Taken: Date Received: 02/01/1994

Parameter	Result	Units	Analyst/ Date of Analysis	Method Number	Method PQL
VOLATILE ANALYSIS - AQUEOUS					
Toluene	<1.0	ug/L	rla / 02/02/1994	S - 8240	<1.0
1,2,3-Trichloropropane	<10.	ug/L	rla / 02/02/1994	S - 8240	<10.
1,1,1-Trichloroethane	<1.0	ug/L	rla / 02/02/1994	S - 8240	<1.0
1,1,2-Trichloroethane	<1.0	ug/L	rla / 02/02/1994	S - 8240	<1.0
Trichloroethene	<1.0	ug/L	rla / 02/02/1994	S - 8240	<1.0
Trichlorofluoromethane	<1.0	ug/L	rla / 02/02/1994	S - 8240	<1.0
Vinyl acetate	<10.	ug/L	rla / 02/02/1994	S - 8240	<10.
Vinyl chloride	<5.	ug/L	rla / 02/02/1994	S - 8240	<5.
Xylenes	<1.0	ug/L	rla / 02/02/1994	S - 8240	<1.0
SURROGATE COMPOUNDS	% RECOVERY	LIMITS	rla / 02/02/1994	S - 8240	% RECOVERY
1,2-Dichloroethane-d4	86	76-114	rla / 02/02/1994	S - 8240	1
Toluene-d8	102	88-110	rla / 02/02/1994	S - 8240	1
4-Bromofluorobenzene	87	86-115	rla / 02/02/1994	S - 8240	1

OCEAN GROUP

NET® NATIONAL ENVIRONMENTAL TESTING, INC.

CHAIN OF CUSTODY RECORD

COMPANY: R.E. Blattert & Assoc
ADDRESS: 5214 S East ST
PHONE: 787-9167 FAX:
PROJECT NAME/LOCATION: Griffith Landfill
PROJECT NUMBER: 1408
PROJECT MANAGER: Rick Miller

REPORT TO: REB
INVOICE TO: REB
P.O. NO. 1408
NET QUOTE NO.

SAMPLED BY
Rick Miller (PRINT NAME) — Rick Miller SIGNATURE
David Norris (PRINT NAME) — David Norris SIGNATURE

DATE	TIME	SAMPLE ID/DESCRIPTION	GRAB	COMP	# OF CONTAINERS TYPE	MATRIX	PRESERVED Y/N	ANALYSES: VOA	Metals	etc.	COMMENTS
1/31/94	2:00 P	MW-1 Deep	X			H_2O	Y				phase II
	2:00 P	MW-1 Shallow									phase II
	11:00 A	MW-2 Deep									phase I
	11:15 A	MW-2 Shallow									
	12:00 P	MW-3 Deep									
	12:00 P	MW-3 Shallow									
	1:15 P	MW-4 Deep									
	1:15 P	MW-4 Shallow									
	12:30 P	MW-5 Deep									
	12:45 P	MW-5 Shallow									
	1:15 P	Dup									phase II
		Trip									phase II
											Per 327 IAC 2-16

CONDITION OF SAMPLE: BOTTLES INTACT? YES / NO
FIELD FILTERED? YES (NO)
COC SEALS PRESENT AND INTACT? YES / NO
VOLATILES FREE OF HEADSPACE? YES / NO
TEMPERATURE UPON RECEIPT:

SAMPLE REMAINDER DISPOSAL: RETURN SAMPLE REMAINDER TO CLIENT VIA
I REQUEST NET TO DISPOSE OF ALL SAMPLE REMAINDERS — DATE

RELINQUISHED BY:	DATE/TIME	RECEIVED BY:	RELINQUISHED BY:	DATE/TIME	RECEIVED FOR NET BY:
Rick Miller	2/1/94 11:30A	Mindy Mathison			

METHOD OF SHIPMENT

REMARKS: careful on MW-40, 45, & Dup strong odor / must be filtered quick!
some 24 hour holds

PT 1 - ORIGINAL - WHITE PT 2 - NET PROJECT MANAGER - YELLOW PT 3 - CUSTOMER COPY - PINK

RECEIVED MAR 0 2 1994

Rick

NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

QUALITY CONTROL REPORT

Mr. Rick Miller
R.E. BLATTERT
5214 S. East Street
Suite 1
Indianapolis, IN 46227

02/16/1994

NET Job Number: 94.00237
Project Description: Griffith Landfill

Parameter	Date of Analysis	Units	Blank Conc.	CCV/ICV Conc.	CCV/ICV Result	CCV/ICV % Rec.	LCS Conc.	LCS Result	LCS % Rec.
Chloride	02/07/1994	mg/L	<2.0	15.	15.4	102.7			
COD	02/09/1994	mg/L	<10.	50.	46.054	92.1	50.	44.23	88.5
Conductivity	02/14/1994	umhos/c	0.955	1430.	1334	93.3			
Fluoride	02/02/1994	mg/L	<0.1	5.0	5.01	100.2			
Nitrogen, Ammonia	02/04/1994	mg/L	<0.10	5.0	4.81	96.2			
Nitrogen, Nitrate	02/02/1994	mg/L	<0.1	1.2	1.223	101.9			
pH	02/01/1994	units		7.00	7.02	100.3			
pH	02/01/1994	units		7.00	7.09	101.3			
Phenol	02/07/1994	mg/L	<0.005	0.12	0.1168	97.3	0.12	0.1211	100.9
Solids, Dissolved	02/07/1994	mg/L	<20	300.	281	93.7			
Sulfate	02/03/1994	mg/L	<5.0	30.	28.141	93.8			
Arsenic, diss. (GFAA)	02/14/1994	mg/L	<0.005	0.025	0.0259	103.6	0.040	0.0343	85.8
Barium, diss. (ICP)	02/10/1994	mg/L	<0.020	1.00	0.967	96.7	1.00	0.931	93.1
Boron, diss. (ICP)	02/10/1994	mg/L	0.08	1.00	1.02	102.0	1.00	1.20	120.0
Cadmium, diss. (ICP)	02/10/1994	mg/L	<0.005	1.00	0.911	91.1	1.00	0.860	86.0
Chromium, diss. (ICP)	02/10/1994	mg/L	<0.010	1.00	0.964	96.4	1.00	0.889	88.9
Copper, diss. (ICP)	02/10/1994	mg/L	<0.010	1.00	0.966	96.6	1.00	0.881	88.1
Iron, diss. (ICP)	02/10/1994	mg/L	0.04	1.00	0.956	95.6	1.00	0.887	88.7
Lead, diss. (ICP)	02/10/1994	mg/L	<0.080	1.00	0.974	97.4	1.00	0.879	87.9
Manganese, diss. (ICP)	02/10/1994	mg/L	<0.010	1.00	0.962	96.2	1.00	0.853	85.3
Mercury, diss. (CVAA)	02/15/1994	mg/L	<0.0005	0.015	0.0158	105.3	0.0150	0.0159	106.0
Selenium, diss. (GFAA)	02/15/1994	mg/L	<0.005	0.025	0.0250	100.0	0.020	0.0180	90.0
Silver, diss. (ICP)	02/10/1994	mg/L	<0.010	1.00	1.05	105.0	1.00	0.926	92.6
Sodium, diss. (ICP)	02/10/1994	mg/L	<1.0	1.00	0.928	92.8	10.0	8.99	89.9
Zinc, diss. (ICP)	02/10/1994	mg/L	<0.020	1.00	0.959	95.9	1.00	0.887	88.7

NOTE: Matrix Spike Samples may not be samples from this job.

Beth Day
Quality Control Review

Advisory Control Limits for Quality Control Indicators:

Blank should be less than the reporting limit
CCV/ICV recovery should be 90 - 110%
LCS recovery should be 80 - 120%
MS/MSD recovery should be 75 - 125%

Key to terminology:

CCV - Continuing Calibration Verification
ICV - Independent Calibration Verification
LCS - Laboratory Control Standard
MS - Matrix Spike

OCEMS GROUP

NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

QUALITY CONTROL REPORT

Mr. Rick Miller
R.E. BLATTERT
5214 S. East Street
Suite 1
Indianapolis, IN 46227

02/16/1994

NET Job Number: 94.00237
Project Description: Griffith Landfill

Parameter	Units	MS Result	Sample Result	Spike Amount	MS % Rec.	MSD Result	MSD % Rec.	RPD	Original Result	Duplicate Result	RPD
Chloride	mg/L	14.8	<2.0	15.	98.7	15.5	103.3	4.5			
COD	mg/L	20.504	<10.	25.	82.0	21.924	87.7	6.7			
Conductivity	umhos\c								3,040	3,040	0.0
Fluoride	mg/L	4.59	<0.1	5.0	91.8	4.55	91.0	0.9			
Nitrogen, Ammonia	mg/L	4.97	<0.10	5.0	99.4	5.1	102.0	2.5			
Nitrogen, Nitrate	mg/L	1.323	0.14	1.2	98.6	1.2309	90.9	8.1			
pH	units								7.71	7.73	0.3
Phenol	mg/L	0.1223	<0.005	0.12	101.9	0.1149	95.8	6.1			
Solids, Dissolved	mg/L								530	570	7.3
Sulfate	mg/L	27.867	<5.0	30	92.9	27.138	90.5	2.6			
Arsenic, diss. (GFAA)	mg/L	0.0220	<0.005	0.040	55.0	0.0223	55.8	1.4			
Barium, diss. (ICP)	mg/L	1.15	0.25	1.00	90.0	0.947	69.7	25.4			
Boron, diss. (ICP)	mg/L	1.44	0.49	1.00	95.0	1.28	79.0	18.4			
Cadmium, diss. (ICP)	mg/L	0.880	<0.005	1.00	88.0	0.714	71.4	20.			
Chromium, diss. (ICP)	mg/L	0.859	<0.010	1.00	85.9	0.740	74.0	14.9			
Chromium, diss. (ICP)	mg/L	0.857	0.02	1.00	83.7	0.875	85.5	2.1			
Copper, diss. (ICP)	mg/L	0.905	0.02	1.00	88.5	0.799	77.9	13.			
Iron, diss. (ICP)	mg/L	0.892	0.11	1.00	78.2	0.921	81.1	3.6			
Lead, diss. (ICP)	mg/L	0.940	0.08	1.00	86.0	0.846	76.6	11.6			
Lead, diss. (ICP)	mg/L	0.894	0.11	1.00	78.4	0.954	84.4	7.4			
Manganese, diss. (ICP)	mg/L	0.825	0.01	1.00	81.5	0.768	75.8	7.2			
Selenium, diss. (GFAA)	mg/L	0.0	<0.005	0.020	0.0	0.0	0.0	0.0			
Silver, diss. (ICP)	mg/L	0.861	<0.010	1.00	86.1	0.787	78.7	9.0			
Sodium, diss. (ICP)	mg/L	31.4	29.	1.00	240.0	29.3	30.0	155.5			
Zinc, diss. (ICP)	mg/L	0.902	0.03	1.00	87.2	0.790	76.0	14.			

NOTE: Matrix Spike Samples may not be samples from this job.

Quality Control Review

Advisory Control Limits for Quality Control Indicators:

Blank should be less than the reporting limit
CCV/ICV recovery should be 90 - 110%
LCS recovery should be 80 - 120%
MS/MSD recovery should be 75 - 125%
RPD should be equal to or less than 20%

Key to terminology:

CCV - Continuing Calibration Verification
ICV - Independent Calibration Verification
LCS - Laboratory Control Standard
MS - Matrix Spike
MSD - Matrix Spike Duplicate

OCEAN GROUP

NATIONAL ENVIRONMENTAL TESTING, INC.

Indianapolis Division
6964 Hillsdale Ct.
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

PROJECT NARRATIVE

JOB NUMBER:94.00237

GFAA Se MS/MSD, for this digestion batch, produced low % recoveries possibly due to matrix interference. Spl #80421 was diluted to 10x to produce acceptable recoveries.

The method blank associated with these samples was found to contain Boron, and Iron. Boron = 0.078 mg/L, Iron = 0.034 mg/L.

Poor recovery of the MS/MSD for several ICP metals was observed. Sodium recovery was poor due to the amount of Sodium in the sample was approximately 30 times the amount of spike. a postdigest spike was performed on 2/14/1994. Copies of the post digest spike are included.

Method: ALLELM Sample Name: 80421 DISS Operator: bga
Run Time: 02/14/94 10:53:22
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	As	Ba	Be	Ca	Cd
Avge	.0092	.1335	-.0627	.2637	.0001	72.53	.0028
SDev	.0055	.0262	.0642	.0012	.0001	.90	.0071
%RSD	59.27	19.66	102.3	.4442	211.8	1.235	251.3
#1	.0101	.1188	-.1334	.2647	-.0001	71.66	.0088
#2	.0142	.1179	-.0083	.2624	.0001	72.47	.0047
#3	.0034	.1638	-.0464	.2639	.0002	73.45	-.0050

Elem	Co	Cr	Cu	Fe	K	Mg	Mn
Avge	-.0008	.0066	.0091	.1255	34.31	44.17	.0236
SDev	.0052	.0025	.0043	.0042	3.82	.26	.0011
%RSD	624.2	38.33	46.98	3.381	11.15	.5994	4.845
#1	-.0064	.0075	.0044	.1214	30.27	43.95	.0225
#2	.0039	.0085	.0103	.1250	34.79	44.11	.0236
#3	-.0000	.0037	.0127	.1299	37.88	44.47	.0248

Elem	Na	Ni	Pb	Sb	Se	Tl	V
Avge	34.08	.0083	.0206	.0938	-.0209	.1447	-.0055
SDev	.23	.0100	.0052	.0234	.0358	.0674	.0034
%RSD	.6702	120.0	24.98	24.93	171.7	46.61	61.75
#1	34.34	.0198	.0181	.0710	-.0131	.0669	-.0095
#2	33.90	.0033	.0172	.1177	.0104	.1870	-.0035
#3	34.00	.0018	.0266	.0928	-.0600	.1802	-.0037

Elem	Zn	B_2496
Avge	.0339	.5020
SDev	.0014	.0077
%RSD	4.186	1.529
#1	.0324	.4981
#2	.0353	.4970
#3	.0339	.5108

Method: ALLELM Sample Name: 80421 MS DIG Operator: bga
Run Time: 02/14/94 10:57:43
Comment: SPIKE CONC. = 1.00 mg/L
Mode: CONC Corr. Factor: 1

Elem	Ag 87.4	Al	As	Ba 91.0	Be	Ca	Cd 88.1
Avge	.8739	1.207	.8644	1.171	.9389	77.91	.8810
SDev	.0022	.037	.0362	.017	.0086	.33	.0063
%RSD	.2567	3.058	4.189	1.430	.9183	.4290	.7183
#1	.8765	1.209	.8751	1.186	.9459	77.93	.8826
#2	.8728	1.244	.8940	1.174	.9415	78.23	.8864
#3	.8724	1.170	.8240	1.153	.9292	77.56	.8741

Elem	Co	Cr 89.5	Cu 96.3	Fe 90.0	K	Mg	Mn 89.5
Avge	.8982	.8948	.9680	1.017	94.69	47.03	.9153

SDev	.0039	.0015	.0105	.009	1.36	.43	.0059
%RSD	.4386	.1715	1.080	.8398	1.437	.9078	.6405
#1	.8946	.8957	.9768	1.017	93.13	47.36	.9193
#2	.9024	.8957	.9708	1.026	95.65	47.18	.9181
#3	.8975	.8930	.9564	1.009	95.29	46.55	.9086

Elem	Na 130.0	Ni	Pb 101.0	Sb	Se	Tl	V
Avge	35.31	.8798	1.013	1.065	.9074	1.099	.9183
SDev	.50	.0251	.012	.025	.0503	.035	.0037
%RSD	1.425	2.857	1.221	2.365	5.541	3.214	.3994
#1	35.76	.8634	.9999	1.092	.9647	1.058	.9208
#2	35.42	.8672	1.016	1.042	.8865	1.123	.9200
#3	34.77	.9087	1.024	1.061	.8708	1.115	.9141

Elem	Zn 91.4	B_2496 91.0
Avge	.9441	1.414
SDev	.0028	.012
%RSD	.3004	.8566
#1	.9441	1.422
#2	.9469	1.420
#3	.9413	1.400

Method: ALLELM Sample Name: 80421 MSD DIG Operator: bga
Run Time: 02/14/94 11:02:02
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag 77.6	Al	As	Ba 81.0	Be	Ca	Cd 82.4
Avge	.7757	1.384	.8070	1.072	.8629	72.65	.8239
SDev	.0110	.007	.0491	.020	.0133	.59	.0144
%RSD	1.413	.5154	6.088	1.886	1.544	.8152	1.746
#1	.7706	1.392	.7882	1.060	.8560	72.38	.8114
#2	.7682	1.381	.7701	1.060	.8544	72.25	.8207
#3	.7883	1.379	.8628	1.095	.8782	73.33	.8396

Elem	Co	Cr 83.6	Cu 88.7	Fe 90.0	K	Mg	Mn 83.3
Avge	.8340	.8362	.8869	1.019	85.94	43.78	.8529
SDev	.0066	.0068	.0134	.010	.56	.61	.0093
%RSD	.7909	.8090	1.515	.9535	.6556	1.398	1.087
#1	.8316	.8323	.8796	1.016	86.20	43.50	.8481
#2	.8290	.8323	.8788	1.010	86.32	43.35	.8469
#3	.8415	.8440	.9024	1.029	85.29	44.48	.8635

Elem	Na ϕ	Ni	Pb 87.2	Sb	Se	Tl	V
Avge	32.98	.8301	.8717	.9468	.7921	.9734	.8527
SDev	.67	.0073	.0021	.0513	.0235	.0836	.0090
%RSD	2.029	.8857	.2436	5.420	2.969	8.588	1.058
#1	32.61	.8251	.8727	.8876	.7686	1.070	.8489
#2	32.57	.8267	.8732	.9762	.7920	.9223	.8462
#3	33.75	.8385	.8692	.9767	.8156	.9280	.8630

Elem	Zn 84.9	B_2496 93.0
Avge	.8781	1.428
SDev	.0081	.026
%RSD	.9237	1.850
#1	.8720	1.417
#2	.8748	1.409
#3	.8873	1.458

Method: ALLELM Sample Name: 80421 MS POST Operator: bga
Run Time: 02/14/94 11:06:24
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag 87.1	Al	As	Ba 92.0	Be	Ca	Cd 87.9
Avge	.8710	1.067	.8843	1.185	.9482	71.21	.8798
SDev	.0039	.007	.0196	.016	.0059	.54	.0095
%RSD	.4426	.6317	2.221	1.345	.6201	.7613	1.076
#1	.8718	1.074	.8857	1.199	.9516	70.60	.8696
#2	.8743	1.060	.9033	1.189	.9516	71.40	.8883
#3	.8668	1.067	.8641	1.168	.9415	71.64	.8813

Elem	Co	Cr 89.5	Cu 91.2	Fe 90.0	K	Mg	Mn 88.9
Avge	.8832	.8953	.9125	1.023	82.42	43.59	.9093
SDev	.0073	.0022	.0081	.004	4.40	.09	.0034
%RSD	.8310	.2479	.8834	.4375	5.344	.2159	.3752
#1	.8751	.8935	.9188	1.022	77.64	43.61	.9054
#2	.8853	.8978	.9153	1.028	83.31	43.68	.9113
#3	.8893	.8946	.9034	1.019	86.32	43.49	.9113

Elem	Na 89.0	Ni	Pb 90.0	Sb	Se	Tl	V
Avge	42.91	.8923	.8996	.9534	.8630	1.012	.9155
SDev	.58	.0153	.0469	.0280	.0313	.035	.0024
%RSD	1.362	1.710	5.218	2.939	3.629	3.497	.2611
#1	43.41	.8999	.8728	.9223	.8316	.9853	.9129
#2	43.07	.8748	.8722	.9613	.8630	.9990	.9161
#3	42.27	.9023	.9538	.9767	.8943	1.052	.9175

Elem	Zn 89.2	B_2496 95.0
Avge	.9219	1.454
SDev	.0037	.011
%RSD	.4038	.7306
#1	.9177	1.462
#2	.9234	1.457
#3	.9247	1.442

Method: ALLELM Sample Name: CCV Operator: bga
Run Time: 02/14/94 11:10:45
Comment:

ethod: ALLELM Sample Name: 80421 MSD POST Operator: bga
un Time: 02/14/94 11:41:59
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag 89.4	Al	As	Ba 93.0	Be	Ca	Cd 96.7
Avge	.8441 RPD 3.1	1.049	.8055	1.188 RPD 1.1	.9412	68.04	.8672 RPD 1.4
SDev	.0049	.021	.0665	.011	.0062	1.20	.0114
%RSD	.5748	1.966	8.261	.9280	.6533	1.765	1.313
#1	.8390	1.030	.8401	1.192	.9370	66.65	.8542
#2	.8486	1.071	.7288	1.196	.9483	68.65	.8757
#3	.8447	1.048	.8476	1.175	.9384	68.81	.8715

Elem	Co	Cr 88.6	Cu 89.1	Fe 89.0	K	Mg	Mn 88 RPD 96.3
Avge	.8486	.8857 RPD 1.1	.8914 RPD 2.3	1.013 RPD 1.1	-30.66	42.59	.8832 RPD 3.0
SDev	.0166	.0118	.0063	.013	2.48	.37	.0054
%RSD	1.961	1.333	.7039	1.280	8.078	.8728	.6165
#1	.8302	.8722	.8892	1.002	-28.05	42.21	.8769
#2	.8533	.8940	.8985	1.027	-30.97	42.95	.8863
#3	.8625	.8908	.8865	1.011	-32.98	42.61	.8863

Elem	Na 94.0	Ni	Pb 96.2	Sb	Se	Tl	V
Avge	43.39 RPD 5.5	.8794	.8616 RPD 4.3	.8807	.9199	.7231	.8947
SDev	.43	.0253	.0425	.0131	.0275	.0405	.0121
%RSD	.9874	2.873	4.926	1.490	2.994	5.600	1.357
#1	43.61	.8647	.8179	.8692	.9223	.6828	.8810
#2	43.67	.9085	.8643	.8780	.8912	.7229	.9040
#3	42.90	.8648	.9027	.8950	.9461	.7637	.8992

Elem	Zn 97.0	B_2496 97.0
Avge	.9003 RPD 2.5	1.370 RPD 9.8
SDev	.0136	.008
%RSD	1.514	.5632
#1	.8892	1.366
#2	.9156	1.379
#3	.8962	1.365

Method: ALLELM Sample Name: 80422 DISS Operator: bga
Run Time: 02/14/94 11:46:18
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	As	Ba	Be	Ca	Cd
Avge	.0005	.1524	-.0954	.1244	-.0000	108.3	-.0006
SDev	.0038	.0108	.0310	.0013	.0000	.7	.0020
%RSD	831.6	7.064	32.54	1.054	3.898	.6221	358.7
#1	.0024	.1423	-.1017	.1229	-.0000	107.5	.0004
#2	-.0039	.1637	-.1228	.1249	-.0000	108.7	.0008
#3	.0028	.1512	-.0617	.1254	-.0000	108.7	-.0029

CERTIFICATE OF ANALYSIS

R.E. Blattert and Assoc.
5214 South East Street
Suite 1, Park 31 South
Indianapolis, Indiana 46227
Attn: David E. Norris

Order #: 95-01-591
Date: 02/23/95 11:27
Work ID: 1408 Town Of Griffith
Date Received: 01/27/95
Date Completed: 02/13/95

Purchase Order: IN003
Invoice Number:

Client Code: BLATTERT

SAMPLE IDENTIFICATION

Sample Number	Sample Description	Sample Number	Sample Description
01	MW-1S Water	06	MW-3D Water
02	MW-1D Water	07	MW-4S Water
03	MW-2S Water	08	MW-4D Water
04	MW-2D Water	09	MW-5S Water
05	MW-3S Water	10	MW-5D Water

This report may not be reproduced except in full, without prior approval.

Certified By

TEST RESULTS BY SAMPLE

Sample: 01BW MW-1S Water Collected: 01/26/95 Category: WATER

Test Description	Result	Limit	Units	Analyzed	By
Chlorides, Titrimetric	88.0	10.0	mg/L	02/10/95	MB
Fluoride	0.156	0.020	mg/L	02/10/95	MB
N-Nitrate, Cd Reduct. Col.	<0.50	0.50	mg/L N-NO3	01/27/95	TLO
Sulfate, Turbidimetric	470.0	5.0	mg/L SO4	02/13/95	TLO
Total Diss Solids at 180°C	460.0	1.0	mg/L	02/10/95	TLO

Sample: 01CW MW-1S Water Collected: 01/26/95 Category: WATER

Test Description	Result	Limit	Units	Analyzed	By
Dissolved Arsenic, GFAAS	<0.010	0.010	mg/L	02/06/95	KAK
Dissolved Barium, ICAPES	0.274	0.050	mg/L	02/03/95	CPV
Dissolved Boron, ICAPES	0.293	0.020	mg/L	02/06/95	CPV
Dissolved Cadmium, GFAAS	<0.0010	0.0010	mg/L	02/07/95	KAK
Dissolved Chromium, ICAPES	<0.020	0.020	mg/L	02/03/95	CPV
Dissolved Copper, ICAPES	<0.020	0.020	mg/L	02/03/95	CPV
Dissolved Iron, ICAPES	2.450	0.010	mg/L	02/03/95	CPV
Dissolved Lead, GFAAS	<0.0050	0.0050	mg/L	02/06/95	KAK
Dissolved Manganese, ICAPES	0.682	0.010	mg/L	02/03/95	CPV
Dissolved Mercury, CVAAS	<0.00050	0.0005	mg/L	02/03/95	KAK
Dissolved Selenium, GFAAS	<0.010	0.010	mg/L	02/06/95	KAK
Dissolved Silver, ICAPES	<0.010	0.010	mg/L	02/03/95	CPV
Dissolved Sodium, ICAPES	63.00	2.00	mg/L	02/06/95	CPV
Dissolved Zinc, ICAPES	0.018	0.010	mg/L	02/03/95	CPV

Sample: 01DW MW-1S Water Collected: 01/26/95 Category: WATER

Test Description	Result	Limit	Units	Analyzed	By
Ammonia-N	10.00	5.00	mg/L	02/10/95	SS
Chemical Oxygen Demand	40.0	10.0	mg/L O2	01/30/95	TLO

Sample: 01EW MW-1S Water Collected: 01/26/95 Category: WATER

Test Description	Result	Limit	Units	Analyzed	By
Phenols, Manual 4AAP	<0.005	0.0050	mg/L	02/10/95	TLO

Sample: 02BW MW-1D Water Collected: 01/26/95 Category: WATER

Test Description	Result	Limit	Units	Analyzed	By
Chlorides, Titrimetric	58.0	10.0	mg/L	02/10/95	MB
Fluoride	0.373	0.020	mg/L	02/10/95	MB
N-Nitrate, Cd Reduct. Col.	<0.50	0.50	mg/L N-NO3	01/27/95	TLO
Sulfate, Turbidimetric	102.0	5.0	mg/L SO4	02/13/95	TLO
Total Diss Solids at 180°C	508.0	1.0	mg/L	02/10/95	TLO

Sample: 02CW MW-1D Water Collected: 01/26/95 Category: WATER

Test Description	Result	Limit	Units	Analyzed	By
Dissolved Arsenic, GFAAS	<0.010	0.010	mg/L	02/06/95	KAK
Dissolved Barium, ICAPES	0.228	0.050	mg/L	02/03/95	CPV
Dissolved Boron, ICAPES	0.315	0.020	mg/L	02/06/95	CPV

TEST RESULTS BY SAMPLE

Test Description	Result	Limit	Units	Analyzed	By
Dissolved Cadmium, GFAAS	<0.0010	0.0010	mg/L	02/07/95	KAK
Dissolved Chromium, ICAPES	<0.020	0.020	mg/L	02/03/95	CPV
Dissolved Copper, ICAPES	<0.020	0.020	mg/L	02/03/95	CPV
Dissolved Iron, ICAPES	<0.010	0.010	mg/L	02/03/95	CPV
Dissolved Lead, GFAAS	<0.0050	0.0050	mg/L	02/06/95	KAK
Dissolved Manganese,ICAPES	0.026	0.010	mg/L	02/03/95	CPV
Dissolved Mercury, CVAAS	<0.00050	0.0005	mg/L	02/03/95	KAK
Dissolved Selenium, GFAAS	<0.010	0.010	mg/L	02/06/95	KAK
Dissolved Silver, ICAPES	<0.010	0.010	mg/L	02/03/95	CPV
Dissolved Sodium, ICAPES	38.80	1.00	mg/L	02/06/95	CPV
Dissolved Zinc, ICAPES	0.027	0.010	mg/L	02/03/95	CPV

Sample: 02DW MW-1D Water Collected: 01/26/95 Category: WATER

Test Description	Result	Limit	Units	Analyzed	By
Ammonia-N	<5.0	5.00	mg/L	02/10/95	SS
Chemical Oxygen Demand	<10.0	10.0	mg/L O2	01/30/95	TLO

Sample: 02EW MW-1D Water Collected: 01/26/95 Category: WATER

Test Description	Result	Limit	Units	Analyzed	By
Phenols, Manual 4AAP	<0.005	0.0050	mg/L	02/10/95	TLO

Sample: 03BW MW-2S Water Collected: 01/26/95 Category: WATER

Test Description	Result	Limit	Units	Analyzed	By
Chlorides, Titrimetric	<10.0	10.0	mg/L	02/10/95	MB

Sample: 03CW MW-2S Water Collected: 01/26/95 Category: WATER

Test Description	Result	Limit	Units	Analyzed	By
Dissolved Boron, ICAPES	0.196	0.020	mg/L	02/06/95	CPV
Dissolved Sodium, ICAPES	12.20	1.00	mg/L	02/06/95	CPV

Sample: 03DW MW-2S Water Collected: 01/26/95 Category: WATER

Test Description	Result	Limit	Units	Analyzed	By
Ammonia-N	<5.0	5.00	mg/L	02/10/95	SS
Chemical Oxygen Demand	10.0	10.0	mg/L O2	01/30/95	TLO

Sample: 03EW MW-2S Water Collected: 01/26/95 Category: WATER

Test Description	Result	Limit	Units	Analyzed	By
Phenols, Manual 4AAP	<0.005	0.0050	mg/L	02/10/95	TLO

Sample: 04BW MW-2D Water Collected: 01/26/95 Category: WATER

Test Description	Result	Limit	Units	Analyzed	By
Chlorides, Titrimetric	26.0	10.0	mg/L	02/10/95	MB

TEST RESULTS BY SAMPLE

Sample: 04CW MW-2D Water Collected: 01/26/95 Category: WATER

Test Description	Result	Limit	Units	Analyzed	By
Dissolved Boron, ICAPES	0.328	0.020	mg/L	02/06/95	CPV
Dissolved Sodium, ICAPES	32.10	1.00	mg/L	02/06/95	CPV

Sample: 04DW MW-2D Water Collected: 01/26/95 Category: WATER

Test Description	Result	Limit	Units	Analyzed	By
Ammonia-N	<5.0	5.00	mg/L	02/10/95	SS
Chemical Oxygen Demand	<10.0	10.0	mg/L O2	01/30/95	TLO

Sample: 04EW MW-2D Water Collected: 01/26/95 Category: WATER

Test Description	Result	Limit	Units	Analyzed	By
Phenols, Manual 4AAP	<0.005	0.0050	mg/L	02/10/95	TLO

Sample: 05BW MW-3S Water Collected: 01/26/95 Category: WATER

Test Description	Result	Limit	Units	Analyzed	By
Chlorides, Titrimetric	39.0	10.0	mg/L	02/10/95	MB

Sample: 05CW MW-3S Water Collected: 01/26/95 Category: WATER

Test Description	Result	Limit	Units	Analyzed	By
Dissolved Boron, ICAPES	0.187	0.020	mg/L	02/06/95	CPV
Dissolved Sodium, ICAPES	28.10	1.00	mg/L	02/06/95	CPV

Sample: 05DW MW-3S Water Collected: 01/26/95 Category: WATER

Test Description	Result	Limit	Units	Analyzed	By
Ammonia-N	<5.0	5.00	mg/L	02/10/95	SS
Chemical Oxygen Demand	24.0	10.0	mg/L O2	01/30/95	TLO

Sample: 05EW MW-3S Water Collected: 01/26/95 Category: WATER

Test Description	Result	Limit	Units	Analyzed	By
Phenols, Manual 4AAP	<0.005	0.0050	mg/L	02/10/95	TLO

Sample: 06BW MW-3D Water Collected: 01/26/95 Category: WATER

Test Description	Result	Limit	Units	Analyzed	By
Chlorides, Titrimetric	10.0	10.0	mg/L	02/10/95	MB

Sample: 06CW MW-3D Water Collected: 01/26/95 Category: WATER

Test Description	Result	Limit	Units	Analyzed	By
Dissolved Boron, ICAPES	0.216	0.020	mg/L	02/06/95	CPV
Dissolved Sodium, ICAPES	25.20	1.00	mg/L	02/06/95	CPV

TEST RESULTS BY SAMPLE

Sample: 06DW MW-3D Water Collected: 01/26/95 Category: WATER

Test Description	Result	Limit	Units	Analyzed	By
Ammonia-N	<5.0	5.00	mg/L	02/10/95	SS
Chemical Oxygen Demand	<10.0	10.0	mg/L O2	01/30/95	TLO

Sample: 06EW MW-3D Water Collected: 01/26/95 Category: WATER

Test Description	Result	Limit	Units	Analyzed	By
Phenols, Manual 4AAP	<0.005	0.0050	mg/L	02/10/95	TLO

Sample: 07BW MW-4S Water Collected: 01/26/95 Category: WATER

Test Description	Result	Limit	Units	Analyzed	By
Chlorides, Titrimetric	777.0	10.0	mg/L	02/10/95	MB

Sample: 07CW MW-4S Water Collected: 01/26/95 Category: WATER

Test Description	Result	Limit	Units	Analyzed	By
Dissolved Boron, ICAPES	0.558	0.020	mg/L	02/06/95	CPV
Dissolved Sodium, ICAPES	149.00	5.00	mg/L	02/06/95	CPV

Sample: 07DW MW-4S Water Collected: 01/26/95 Category: WATER

Test Description	Result	Limit	Units	Analyzed	By
Ammonia-N	16.50	5.00	mg/L	02/10/95	SS
Chemical Oxygen Demand	90.0	10.0	mg/L O2	01/30/95	TLO

Sample: 07EW MW-4S Water Collected: 01/26/95 Category: WATER

Test Description	Result	Limit	Units	Analyzed	By
Phenols, Manual 4AAP	<0.005	0.0050	mg/L	02/10/95	TLO

Sample: 08BW MW-4D Water Collected: 01/26/95 Category: WATER

Test Description	Result	Limit	Units	Analyzed	By
Chlorides, Titrimetric	140.0	10.0	mg/L	02/10/95	MB

Sample: 08CW MW-4D Water Collected: 01/26/95 Category: WATER

Test Description	Result	Limit	Units	Analyzed	By
Dissolved Boron, ICAPES	0.257	0.020	mg/L	02/06/95	CPV
Dissolved Sodium, ICAPES	76.00	2.00	mg/L	02/06/95	CPV

Sample: 08DW MW-4D Water Collected: 01/26/95 Category: WATER

Test Description	Result	Limit	Units	Analyzed	By
Ammonia-N	<5.0	5.00	mg/L	02/10/95	SS
Chemical Oxygen Demand	14.0	10.0	mg/L O2	01/30/95	TLO

TEST RESULTS BY SAMPLE

Sample: 08EW MW-4D Water Collected: 01/26/95 Category: WATER

Test Description	Result	Limit	Units	Analyzed	By
Phenols, Manual 4AAP	<0.005	0.0050	mg/L	02/10/95	TLO

Sample: 09BW MW-5S Water Collected: 01/26/95 Category: WATER

Test Description	Result	Limit	Units	Analyzed	By
Chlorides, Titrimetric	52.0	10.0	mg/L	02/10/95	MB

Sample: 09CW MW-5S Water Collected: 01/26/95 Category: WATER

Test Description	Result	Limit	Units	Analyzed	By
Dissolved Boron, ICAPES	0.261	0.020	mg/L	02/06/95	CPV
Dissolved Sodium, ICAPES	31.60	1.00	mg/L	02/06/95	CPV

Sample: 09DW MW-5S Water Collected: 01/26/95 Category: WATER

Test Description	Result	Limit	Units	Analyzed	By
Ammonia-N	<5.0	5.00	mg/L	02/10/95	SS
Chemical Oxygen Demand	39.0	10.0	mg/L O2	01/30/95	TLO

Sample: 09EW MW-5S Water Collected: 01/26/95 Category: WATER

Test Description	Result	Limit	Units	Analyzed	By
Phenols, Manual 4AAP	<0.005	0.0050	mg/L	02/10/95	TLO

Sample: 10BW MW-5D Water Collected: 01/26/95 Category: WATER

Test Description	Result	Limit	Units	Analyzed	By
Chlorides, Titrimetric	46.0	10.0	mg/L	02/10/95	MB

Sample: 10CW MW-5D Water Collected: 01/26/95 Category: WATER

Test Description	Result	Limit	Units	Analyzed	By
Dissolved Boron, ICAPES	0.230	0.020	mg/L	02/06/95	CPV
Dissolved Sodium, ICAPES	28.50	1.00	mg/L	02/06/95	CPV

Sample: 10DW MW-5D Water Collected: 01/26/95 Category: WATER

Test Description	Result	Limit	Units	Analyzed	By
Ammonia-N	<5.0	5.00	mg/L	02/10/95	SS
Chemical Oxygen Demand	19.0	10.0	mg/L O2	01/30/95	TLO

Sample: 10EW MW-5D Water Collected: 01/26/95 Category: WATER

Test Description	Result	Limit	Units	Analyzed	By
Phenols, Manual 4AAP	<0.005	0.0050	mg/L	02/10/95	TLO

TEST RESULTS BY SAMPLE

Sample Description: MW-1S Water Lab No: 01A
Test Description: Volatile Organics, PATGCMS Method: SW846_8260 Test Code: VOC_44
Collected: 01/26/95 Category: WATER

PARAMETER	CAS NUMBER	RESULT	LIMIT	BLANK	BLANK LIMIT
Dichlorodifluoromethane	75-71-8	ND	10	ND	10
Chloromethane	74-87-3	ND	10	ND	10
Vinyl chloride	75-01-4	ND	10	ND	10
Bromomethane	74-83-9	ND	10	ND	10
Chloroethane	75-00-3	ND	10	ND	10
Trichlorofluoromethane	75-69-4	ND	10	ND	10
Acrolein	107-02-8	ND	25	ND	25
Acetone	67-64-1	ND	25	ND	25
1,1-Dichloroethene	75-35-4	NA	5.0	ND	5.0
Iodomethane	74-88-4	ND	5.0	ND	5.0
Acrylonitrile	107-13-1	ND	5.0	ND	5.0
Methylene chloride	75-09-2	ND	5.0	BQL	5.0
Carbon disulfide	75-15-0	BQL	5.0	ND	5.0
trans-1,2-Dichloroethene	156-60-5	ND	5.0	ND	5.0
1,1-Dichloroethane	75-34-3	ND	5.0	ND	5.0
Vinyl acetate	108-05-4	ND	25	ND	25
2-Butanone (MEK)	78-93-3	BQL	10	BQL	10
cis-1,2-Dichloroethene	159-59-2	ND	5.0	ND	5.0
Chloroform	67-66-3	ND	5.0	ND	5.0
1,1,1-Trichloroethane	71-55-6	ND	5.0	ND	5.0
1,2-Dichloroethane	107-06-2	ND	5.0	ND	5.0
Benzene	71-43-2	ND	5.0	ND	5.0

TEST RESULTS BY SAMPLE

Sample Description: MW-1S Water Lab No: 01A
Test Description: Volatile Organics, PATGCMS Method: SW846_8260 Test Code: VOC_44
Collected: 01/26/95 Category: WATER

Carbon tetrachloride	56-23-5	ND	5.0	ND	5.0
1,2-Dichloropropane	78-87-5	NA	5.0	ND	5.0
Dibromomethane	106-93-4	ND	5.0	ND	5.0
Trichloroethene	79-01-6	ND	5.0	ND	5.0
2-Chloroethyl vinyl ether	110-75-8	ND	10	ND	10
Bromodichloromethane	75-27-4	ND	5.0	ND	5.0
2-Hexanone	591-78-6	ND	5.0	ND	5.0
trans-1,3-Dichloropropene	10061-02-6	ND	5.0	ND	5.0
cis-1,3-Dichloropropene	10061-01-5	ND	5.0	ND	5.0
Toluene	108-88-3	ND	5.0	ND	5.0
1,1,2-Trichloroethane	79-00-5	ND	5.0	ND	5.0
Ethylmethacrylate	97-63-2	ND	10	ND	10
4-Methyl-2-pentanone (MIBK)	108-10-1	ND	5.0	ND	5.0
Dibromochloromethane	124-48-1	ND	5.0	ND	5.0
Tetrachloroethene	127-18-4	NA	5.0	ND	5.0
Chlorobenzene	108-90-7	ND	5.0	ND	5.0
Ethylbenzene	100-41-4	ND	5.0	ND	5.0
Total xylenes	1330-20-7	ND	5.0	ND	5.0
Bromoform	75-25-2	ND	5.0	ND	5.0
Styrene	500-42-5	ND	5.0	ND	5.0
1,1,2,2-Tetrachloroethane	79-34-5	ND	5.0	ND	5.0
1,2,3-Trichloropropane	96-18-4	ND	5.0	ND	5.0
1,3-Dichlorobenzene	541-73-1	NA	5.0	ND	5.0
1,4-Dichlorobenzene	106-46-7	NA	5.0	ND	5.0
1,2-Dichlorobenzene	95-50-1	NA	5.0	ND	5.0

TEST RESULTS BY SAMPLE

Sample Description: MW-1S Water Lab No: 01A
Test Description: Volatile Organics, PATGCMS Method: SW846_8260 Test Code: VOC_44
Collected: 01/26/95 Category: WATER

SURROGATE	%RECOVERY	LIMITS
1,2-Dichloroethane-d4	101	79 - 114
Toluene-d8	101	75 - 126
p-Bromofluorobenzene	99	71 - 114

Analytical Run Information:

EXTRACTED	
DATE RUN	01/30/95
ANALYST	JM
INSTRUMENT	5971MS
FILE ID	1501012.D
CONC FACTOR	1.00
UNITS	ug/L

TEST RESULTS BY SAMPLE

Sample Description: MW-1D Water Lab No: 02A
Test Description: Volatile Organics, PATGCMS Method: SW846_8260 Test Code: VOC_44
Collected: 01/26/95 Category: WATER

PARAMETER	CAS NUMBER	RESULT	LIMIT	BLANK	BLANK LIMIT
Dichlorodifluoromethane	75-71-8	ND	10	ND	10
Chloromethane	74-87-3	ND	10	ND	10
Vinyl chloride	75-01-4	ND	10	ND	10
Bromomethane	74-83-9	ND	10	ND	10
Chloroethane	75-00-3	ND	10	ND	10
Trichlorofluoromethane	75-69-4	ND	10	ND	10
Acrolein	107-02-8	ND	25	ND	25
Acetone	67-64-1	ND	25	ND	25
1,1-Dichloroethene	75-35-4	NA	5.0	ND	5.0
Iodomethane	74-88-4	ND	5.0	ND	5.0
Acrylonitrile	107-13-1	ND	5.0	ND	5.0
Methylene chloride	75-09-2	ND	5.0	BQL	5.0
Carbon disulfide	75-15-0	10	5.0	ND	5.0
trans-1,2-Dichloroethene	156-60-5	ND	5.0	ND	5.0
1,1-Dichloroethane	75-34-3	ND	5.0	ND	5.0
Vinyl acetate	108-05-4	ND	25	ND	25
2-Butanone (MEK)	78-93-3	BQL	10	BQL	10
cis-1,2-Dichloroethene	159-59-2	ND	5.0	ND	5.0
Chloroform	67-66-3	ND	5.0	ND	5.0
1,1,1-Trichloroethane	71-55-6	ND	5.0	ND	5.0
1,2-Dichloroethane	107-06-2	ND	5.0	ND	5.0
Benzene	71-43-2	ND	5.0	ND	5.0

TEST RESULTS BY SAMPLE

Sample Description: MW-1D Water Lab No: 02A
Test Description: Volatile Organics, PATGCMS Method: SW846_8260 Test Code: VOC_44
Collected: 01/26/95 Category: WATER

Carbon tetrachloride	56-23-5	ND	5.0	ND	5.0
1,2-Dichloropropane	78-87-5	NA	5.0	ND	5.0
Dibromomethane	106-93-4	ND	5.0	ND	5.0
Trichloroethene	79-01-6	ND	5.0	ND	5.0
2-Chloroethyl vinyl ether	110-75-8	ND	10	ND	10
Bromodichloromethane	75-27-4	ND	5.0	ND	5.0
2-Hexanone	591-78-6	ND	5.0	ND	5.0
trans-1,3-Dichloropropene	10061-02-6	ND	5.0	ND	5.0
cis-1,3-Dichloropropene	10061-01-5	ND	5.0	ND	5.0
Toluene	108-88-3	ND	5.0	ND	5.0
1,1,2-Trichloroethane	79-00-5	ND	5.0	ND	5.0
Ethylmethacrylate	97-63-2	ND	10	ND	10
4-Methyl-2-pentanone (MIBK)	108-10-1	ND	5.0	ND	5.0
Dibromochloromethane	124-48-1	ND	5.0	ND	5.0
Tetrachloroethene	127-18-4	NA	5.0	ND	5.0
Chlorobenzene	108-90-7	ND	5.0	ND	5.0
Ethylbenzene	100-41-4	ND	5.0	ND	5.0
Total xylenes	1330-20-7	ND	5.0	ND	5.0
Bromoform	75-25-2	ND	5.0	ND	5.0
Styrene	500-42-5	ND	5.0	ND	5.0
1,1,2,2-Tetrachloroethane	79-34-5	ND	5.0	ND	5.0
1,2,3-Trichloropropane	96-18-4	ND	5.0	ND	5.0
1,3-Dichlorobenzene	541-73-1	NA	5.0	ND	5.0
1,4-Dichlorobenzene	106-46-7	NA	5.0	ND	5.0
1,2-Dichlorobenzene	95-50-1	NA	5.0	ND	5.0

TEST RESULTS BY SAMPLE

Sample Description: MW-1D Water Lab No: 02A
Test Description: Volatile Organics, PATGCMS Method: SW846_8260 Test Code: VOC_44
Collected: 01/26/95 Category: WATER

SURROGATE	%RECOVERY	LIMITS
1,2-Dichloroethane-d4	100	79 - 114
Toluene-d8	98	75 - 126
p-Bromofluorobenzene	102	71 - 114

Analytical Run Information:

EXTRACTED	
DATE RUN	01/30/95
ANALYST	JM
INSTRUMENT	5971MS
FILE ID	1601013.D
CONC FACTOR	1.00
UNITS	ug/L

TEST RESULTS BY SAMPLE

Sample Description: MW-2S Water Lab No: 03A
Test Description: Volatile Organics, PATGCMS Method: EPA_624 Test Code: VOC_LF
Collected: 01/26/95 Category: WATER

PARAMETER	CAS NUMBER	RESULT	LIMIT	BLANK	BLANK LIMIT
Methylene chloride	75-09-2	ND	5.0	BQL	5.0
trans-1,2-Dichloroethene	156-60-5	ND	5.0	ND	5.0
1,1-Dichloroethane	75-34-3	ND	5.0	ND	5.0
2-Butanone	78-93-3	BQL	10	BQL	10
cis-1,2-Dichloroethene	159-59-2	ND	5.0	ND	5.0
Benzene	71-43-2	ND	5.0	ND	5.0
Toluene	108-88-3	ND	5.0	ND	5.0
Ethylbenzene	100-41-4	ND	5.0	ND	5.0

SURROGATE	%RECOVERY	LIMITS
1,2-Dichloroethane-d4	101	79 - 114
Toluene-d8	100	75 - 126
p-Bromofluorobenzene	102	71 - 114

Analytical Run Information:

EXTRACTED	
DATE RUN	01/30/95
ANALYST	JM
INSTRUMENT	5971MS
FILE ID	0101014.D
CONC FACTOR	1.00
UNITS	ug/L

TEST RESULTS BY SAMPLE

Sample Description: MW-2D Water Lab No: 04A
Test Description: Volatile Organics, PATGCMS Method: EPA_624 Test Code: VOC_LF
Collected: 01/26/95 Category: WATER

PARAMETER	CAS NUMBER	RESULT	LIMIT	BLANK	BLANK LIMIT
Methylene chloride	75-09-2	ND	5.0	BQL	5.0
trans-1,2-Dichloroethene	156-60-5	ND	5.0	ND	5.0
1,1-Dichloroethane	75-34-3	ND	5.0	ND	5.0
2-Butanone	78-93-3	BQL	10	BQL	10
cis-1,2-Dichloroethene	159-59-2	ND	5.0	ND	5.0
Benzene	71-43-2	ND	5.0	ND	5.0
Toluene	108-88-3	ND	5.0	ND	5.0
Ethylbenzene	100-41-4	ND	5.0	ND	5.0

SURROGATE	%RECOVERY	LIMITS
1,2-Dichloroethane-d4	97	79 - 114
Toluene-d8	93	75 - 126
p-Bromofluorobenzene	95	71 - 114

Analytical Run Information:

EXTRACTED	
DATE RUN	01/31/95
ANALYST	JM
INSTRUMENT	5971MS
FILE ID	1401002.D
CONC FACTOR	1.00
UNITS	ug/L

TEST RESULTS BY SAMPLE

Sample Description: MW-3S Water Lab No: 05A
Test Description: Volatile Organics, PATGCMS Method: EPA_624 Test Code: VOC_LF
Collected: 01/26/95 Category: WATER

PARAMETER	CAS NUMBER	RESULT	LIMIT	BLANK	BLANK LIMIT
Methylene chloride	75-09-2	ND	5.0	BQL	5.0
trans-1,2-Dichloroethene	156-60-5	ND	5.0	ND	5.0
1,1-Dichloroethane	75-34-3	ND	5.0	ND	5.0
2-Butanone	78-93-3	BQL	10	BQL	10
cis-1,2-Dichloroethene	159-59-2	ND	5.0	ND	5.0
Benzene	71-43-2	ND	5.0	ND	5.0
Toluene	108-88-3	ND	5.0	ND	5.0
Ethylbenzene	100-41-4	ND	5.0	ND	5.0

SURROGATE	%RECOVERY	LIMITS
1,2-Dichloroethane-d4	101	79 - 114
Toluene-d8	101	75 - 126
p-Bromofluorobenzene	98	71 - 114

Analytical Run Information:

EXTRACTED	
DATE RUN	01/31/95
ANALYST	JM
INSTRUMENT	5971MS
FILE ID	1501003.D
CONC FACTOR	1.00
UNITS	ug/L

TEST RESULTS BY SAMPLE

Sample Description: MW-3D Water Lab No: 06A
Test Description: Volatile Organics, PATGCMS Method: EPA_624 Test Code: VOC_LF
Collected: 01/26/95 Category: WATER

PARAMETER	CAS NUMBER	RESULT	LIMIT	BLANK	BLANK LIMIT
Methylene chloride	75-09-2	ND	5.0	BQL	5.0
trans-1,2-Dichloroethene	156-60-5	ND	5.0	ND	5.0
1,1-Dichloroethane	75-34-3	ND	5.0	ND	5.0
2-Butanone	78-93-3	BQL	10	BQL	10
cis-1,2-Dichloroethene	159-59-2	ND	5.0	ND	5.0
Benzene	71-43-2	ND	5.0	ND	5.0
Toluene	108-88-3	ND	5.0	ND	5.0
Ethylbenzene	100-41-4	ND	5.0	ND	5.0

SURROGATE	%RECOVERY	LIMITS
1,2-Dichloroethane-d4	98	79 - 114
Toluene-d8	98	75 - 126
p-Bromofluorobenzene	102	71 - 114

Analytical Run Information:

EXTRACTED	
DATE RUN	01/31/95
ANALYST	JM
INSTRUMENT	5971MS
FILE ID	1601004.D
CONC FACTOR	1.00
UNITS	ug/L

TEST RESULTS BY SAMPLE

Sample Description: MW-4S Water Lab No: 07A
Test Description: Volatile Organics, PATGCMS Method: EPA_624 Test Code: VOC_LF
Collected: 01/26/95 Category: WATER

PARAMETER	CAS NUMBER	RESULT	LIMIT	BLANK	BLANK LIMIT
Methylene chloride	75-09-2	7.3	5.0	BQL	5.0
trans-1,2-Dichloroethene	156-60-5	47	5.0	ND	5.0
1,1-Dichloroethane	75-34-3	ND	5.0	ND	5.0
2-Butanone	78-93-3	BQL	10	BQL	10
cis-1,2-Dichloroethene	159-59-2	ND	5.0	ND	5.0
Benzene	71-43-2	610	120	ND	5.0
Toluene	108-88-3	BQL	5.0	ND	5.0
Ethylbenzene	100-41-4	ND	5.0	ND	5.0

SURROGATE	%RECOVERY	LIMITS
1,2-Dichloroethane-d4	110	79 - 114
Toluene-d8	101	75 - 126
p-Bromofluorobenzene	97	71 - 114

Analytical Run Information:

EXTRACTED	
DATE RUN	01/31/95
ANALYST	JM
INSTRUMENT	5971MS
FILE ID	0701010.D
CONC FACTOR	1.00
UNITS	ug/L

TEST RESULTS BY SAMPLE

Sample Description: MW-4D Water Lab No: 08A
Test Description: Volatile Organics, PATGCMS Method: EPA_624 Test Code: VOC_LF
Collected: 01/26/95 Category: WATER

PARAMETER	CAS NUMBER	RESULT	LIMIT	BLANK	BLANK LIMIT
Methylene chloride	75-09-2	ND	5.0	BQL	5.0
trans-1,2-Dichloroethene	156-60-5	ND	5.0	ND	5.0
1,1-Dichloroethane	75-34-3	ND	5.0	ND	5.0
2-Butanone	78-93-3	BQL	10	BQL	10
cis-1,2-Dichloroethene	159-59-2	ND	5.0	ND	5.0
Benzene	71-43-2	ND	5.0	ND	5.0
Toluene	108-88-3	ND	5.0	ND	5.0
Ethylbenzene	100-41-4	ND	5.0	ND	5.0

SURROGATE	%RECOVERY	LIMITS
1,2-Dichloroethane-d4	102	79 - 114
Toluene-d8	99	75 - 126
p-Bromofluorobenzene	101	71 - 114

Analytical Run Information:

EXTRACTED	
DATE RUN	01/31/95
ANALYST	JM
INSTRUMENT	5971MS
FILE ID	0101005.D
CONC FACTOR	1.00
UNITS	ug/L

TEST RESULTS BY SAMPLE

Sample Description: MW-5S Water Lab No: 09A
Test Description: Volatile Organics, PATGCMS Method: EPA_624 Test Code: VOC_LF
Collected: 01/26/95 Category: WATER

PARAMETER	CAS NUMBER	RESULT	LIMIT	BLANK	BLANK LIMIT
Methylene chloride	75-09-2	ND	5.0	BQL	5.0
trans-1,2-Dichloroethene	156-60-5	ND	5.0	ND	5.0
1,1-Dichloroethane	75-34-3	ND	5.0	ND	5.0
2-Butanone	78-93-3	BQL	10	BQL	10
cis-1,2-Dichloroethene	159-59-2	ND	5.0	ND	5.0
Benzene	71-43-2	ND	5.0	ND	5.0
Toluene	108-88-3	ND	5.0	ND	5.0
Ethylbenzene	100-41-4	ND	5.0	ND	5.0

SURROGATE	%RECOVERY	LIMITS
1,2-Dichloroethane-d4	99	79 - 114
Toluene-d8	96	75 - 126
p-Bromofluorobenzene	99	71 - 114

Analytical Run Information:

EXTRACTED	
DATE RUN	01/31/95
ANALYST	JM
INSTRUMENT	5971MS
FILE ID	0201006.D
CONC FACTOR	1.00
UNITS	ug/L

TEST RESULTS BY SAMPLE

Sample Description: MW-5D Water Lab No: 10A
Test Description: Volatile Organics, PATGCMS Method: EPA_624 Test Code: VOC_LF
Collected: 01/26/95 Category: WATER

PARAMETER	CAS NUMBER	RESULT	LIMIT	BLANK	BLANK LIMIT
Methylene chloride	75-09-2	ND	5.0	BQL	5.0
trans-1,2-Dichloroethene	156-60-5	ND	5.0	ND	5.0
1,1-Dichloroethane	75-34-3	ND	5.0	ND	5.0
2-Butanone	78-93-3	BQL	10	BQL	10
cis-1,2-Dichloroethene	159-59-2	ND	5.0	ND	5.0
Benzene	71-43-2	BQL	5.0	ND	5.0
Toluene	108-88-3	ND	5.0	ND	5.0
Ethylbenzene	100-41-4	ND	5.0	ND	5.0

SURROGATE	%RECOVERY	LIMITS
1,2-Dichloroethane-d4	103	79 - 114
Toluene-d8	103	75 - 126
p-Bromofluorobenzene	100	71 - 114

Analytical Run Information:

EXTRACTED	
DATE RUN	01/31/95
ANALYST	JM
INSTRUMENT	5971MS
FILE ID	0401007.D
CONC FACTOR	1.00
UNITS	ug/L

CERTIFICATE OF ANALYSIS

R.E. Blattert and Assoc.
5214 South East Street
Suite 1, Park 31 South
Indianapolis, Indiana 46227
Attn: David E. Norris

Order #: 95-01-592
Date: 02/23/95 11:35
Work ID: 1408 Town Of Griffith
Date Received: 01/27/95
Date Completed: 02/13/95

Purchase Order: IN003
Invoice Number:

Client Code: BLATTERT

SAMPLE IDENTIFICATION

Sample Number	Sample Description	Sample Number	Sample Description
01	Duplicate Water	02	Trip Blank Water

This report may not be reproduced except in full, without prior approval.

ESG

Certified By

Environmental Service Group
DIVISION OF ASTBURY GABRIEL CORP.
5933 WEST 71ST STREET INDIANAPOLIS, INDIANA 46278
(317) 290-1471
FAX (317) 290-1670

TEST RESULTS BY SAMPLE

Sample: 01BW Duplicate Water **Collected: 01/26/95 Category: WATER**

Test Description	Result	Limit	Units	Analyzed	By
Chlorides, Titrimetric	53.0	10.0	mg/L	02/10/95	MB
Fluoride	0.374	0.020	mg/L	02/10/95	MB
N-Nitrate, Cd Reduct. Col.	<0.50	0.50	mg/L N-NO3	01/27/95	TLO
Sulfate, Turbidimetric	101.0	5.0	mg/L SO4	02/13/95	TLO
Total Diss Solids at 180°C	528.0	1.0	mg/L	02/10/95	TLO

Sample: 01CW Duplicate Water **Collected: 01/26/95 Category: WATER**

Test Description	Result	Limit	Units	Analyzed	By
Dissolved Arsenic, GFAAS	<0.010	0.010	mg/L	02/06/95	KAK
Dissolved Barium, ICAPES	0.220	0.050	mg/L	02/03/95	CPV
Dissolved Boron, ICAPES	0.299	0.020	mg/L	02/06/95	CPV
Dissolved Cadmium, GFAAS	<0.0010	0.0010	mg/L	02/07/95	KAK
Dissolved Chromium, ICAPES	<0.020	0.020	mg/L	02/03/95	CPV
Dissolved Copper, ICAPES	<0.020	0.020	mg/L	02/03/95	CPV
Dissolved Iron, ICAPES	<0.010	0.010	mg/L	02/03/95	CPV
Dissolved Lead, GFAAS	<0.0050	0.0050	mg/L	02/06/95	KAK
Dissolved Manganese,ICAPES	0.025	0.010	mg/L	02/03/95	CPV
Dissolved Mercury, CVAAS	<0.00050	0.0005	mg/L	02/03/95	KAK
Dissolved Selenium, GFAAS	<0.010	0.010	mg/L	02/06/95	KAK
Dissolved Silver, ICAPES	<0.010	0.010	mg/L	02/03/95	CPV
Dissolved Sodium, ICAPES	36.30	1.00	mg/L	02/06/95	CPV
Dissolved Zinc, ICAPES	0.020	0.010	mg/L	02/03/95	CPV

Sample: 01DW Duplicate Water **Collected: 01/26/95 Category: WATER**

Test Description	Result	Limit	Units	Analyzed	By
Ammonia-N	<5.0	5.00	mg/L	02/10/95	SS
Chemical Oxygen Demand	11.0	10.0	mg/L O2	01/30/95	TLO

Sample: 01EW Duplicate Water **Collected: 01/26/95 Category: WATER**

Test Description	Result	Limit	Units	Analyzed	By
Phenols, Manual 4AAP	<0.005	0.0050	mg/L	02/10/95	TLO

Sample: 02BW Trip Blank Water **Collected: 01/26/95 Category: WATER**

Test Description	Result	Limit	Units	Analyzed	By
Chlorides, Titrimetric	<10.0	10.0	mg/L	02/10/95	MB
Fluoride	<0.02	0.020	mg/L	02/10/95	MB
N-Nitrate, Cd Reduct. Col.	<0.50	0.50	mg/L N-NO3	01/27/95	TLO
Sulfate, Turbidimetric	<5.0	5.0	mg/L SO4	02/13/95	TLO
Total Diss Solids at 180°C	2.0	1.0	mg/L	02/10/95	TLO

Sample: 02CW Trip Blank Water **Collected: 01/26/95 Category: WATER**

Test Description	Result	Limit	Units	Analyzed	By
Dissolved Arsenic, GFAAS	<0.010	0.010	mg/L	02/06/95	KAK
Dissolved Barium, ICAPES	<0.050	0.050	mg/L	02/03/95	CPV
Dissolved Boron, ICAPES	<0.020	0.020	mg/L	02/06/95	CPV

TEST RESULTS BY SAMPLE

Test Description	Result	Limit	Units	Analyzed	By
Dissolved Cadmium, GFAAS	<0.0010	0.0010	mg/L	02/07/95	KAK
Dissolved Chromium, ICAPES	<0.020	0.020	mg/L	02/03/95	CPV
Dissolved Copper, ICAPES	<0.020	0.020	mg/L	02/03/95	CPV
Dissolved Iron, ICAPES	<0.010	0.010	mg/L	02/03/95	CPV
Dissolved Lead, GFAAS	<0.0050	0.0050	mg/L	02/06/95	KAK
Dissolved Manganese,ICAPES	<0.010	0.010	mg/L	02/03/95	CPV
Dissolved Mercury, CVAAS	<0.00050	0.0005	mg/L	02/03/95	KAK
Dissolved Selenium, GFAAS	<0.010	0.010	mg/L	02/06/95	KAK
Dissolved Silver, ICAPES	<0.010	0.010	mg/L	02/03/95	CPV
Dissolved Sodium, ICAPES	<1.00	1.00	mg/L	02/06/95	CPV
Dissolved Zinc, ICAPES	<0.010	0.010	mg/L	02/03/95	CPV

Sample: 02DW Trip Blank Water **Collected: 01/26/95** **Category: WATER**

Test Description	Result	Limit	Units	Analyzed	By
Ammonia-N	<5.0	5.00	mg/L	02/10/95	SS
Chemical Oxygen Demand	<10.0	10.0	mg/L O2	01/30/95	TLO

Sample: 02EW Trip Blank Water **Collected: 01/26/95** **Category: WATER**

Test Description	Result	Limit	Units	Analyzed	By
Phenols, Manual 4AAP	<0.005	0.0050	mg/L	02/10/95	TLO

ESG

TEST RESULTS BY SAMPLE

Sample Description: Duplicate Water Lab No: 01A
Test Description: Volatile Organics, PATGCMS Method: SW846_8260 Test Code: VOC_44
Collected: 01/26/95 Category: WATER

PARAMETER	CAS NUMBER	RESULT	LIMIT	BLANK	BLANK LIMIT
Dichlorodifluoromethane	75-71-8	ND	10	ND	10
Chloromethane	74-87-3	ND	10	ND	10
Vinyl chloride	75-01-4	ND	10	ND	10
Bromomethane	74-83-9	ND	10	ND	10
Chloroethane	75-00-3	ND	10	ND	10
Trichlorofluoromethane	75-69-4	ND	10	ND	10
Acrolein	107-02-8	ND	25	ND	25
Acetone	67-64-1	ND	25	ND	25
1,1-Dichloroethene	75-35-4	NA	5.0	ND	5.0
Iodomethane	74-88-4	ND	5.0	ND	5.0
Acrylonitrile	107-13-1	ND	5.0	ND	5.0
Methylene chloride	75-09-2	ND	5.0	BQL	5.0
Carbon disulfide	75-15-0	15	5.0	ND	5.0
trans-1,2-Dichloroethene	156-60-5	ND	5.0	ND	5.0
1,1-Dichloroethane	75-34-3	ND	5.0	ND	5.0
Vinyl acetate	108-05-4	ND	25	ND	25
2-Butanone (MEK)	78-93-3	BQL	10	BQL	10
cis-1,2-Dichloroethene	159-59-2	ND	5.0	ND	5.0
Chloroform	67-66-3	ND	5.0	ND	5.0
1,1,1-Trichloroethane	71-55-6	ND	5.0	ND	5.0
1,2-Dichloroethane	107-06-2	ND	5.0	ND	5.0
Benzene	71-43-2	ND	5.0	ND	5.0

TEST RESULTS BY SAMPLE

Sample Description: Duplicate Water Lab No: 01A
Test Description: Volatile Organics, PATGCMS Method: SW846_8260 Test Code: VOC_44
Collected: 01/26/95 Category: WATER

Carbon tetrachloride	56-23-5	ND	5.0	ND	5.0
1,2-Dichloropropane	78-87-5	NA	5.0	ND	5.0
Dibromomethane	106-93-4	ND	5.0	ND	5.0
Trichloroethene	79-01-6	ND	5.0	ND	5.0
2-Chloroethyl vinyl ether	110-75-8	ND	10	ND	10
Bromodichloromethane	75-27-4	ND	5.0	ND	5.0
2-Hexanone	591-78-6	ND	5.0	ND	5.0
trans-1,3-Dichloropropene	10061-02-6	ND	5.0	ND	5.0
cis-1,3-Dichloropropene	10061-01-5	ND	5.0	ND	5.0
Toluene	108-88-3	ND	5.0	ND	5.0
1,1,2-Trichloroethane	79-00-5	ND	5.0	ND	5.0
Ethylmethacrylate	97-63-2	ND	10	ND	10
4-Methyl-2-pentanone (MIBK)	108-10-1	ND	5.0	ND	5.0
Dibromochloromethane	124-48-1	ND	5.0	ND	5.0
Tetrachloroethene	127-18-4	NA	5.0	ND	5.0
Chlorobenzene	108-90-7	ND	5.0	ND	5.0
Ethylbenzene	100-41-4	ND	5.0	ND	5.0
Total xylenes	1330-20-7	ND	5.0	ND	5.0
Bromoform	75-25-2	ND	5.0	ND	5.0
Styrene	500-42-5	ND	5.0	ND	5.0
1,1,2,2-Tetrachloroethane	79-34-5	ND	5.0	ND	5.0
1,2,3-Trichloropropane	96-18-4	ND	5.0	ND	5.0
1,3-Dichlorobenzene	541-73-1	NA	5.0	ND	5.0
1,4-Dichlorobenzene	106-46-7	NA	5.0	ND	5.0
1,2-Dichlorobenzene	95-50-1	NA	5.0	ND	5.0

TEST RESULTS BY SAMPLE

Sample Description: Duplicate Water Lab No: 01A
Test Description: Volatile Organics, PATGCMS Method: SW846_8260 Test Code: VOC_44
Collected: 01/26/95 Category: WATER

SURROGATE	%RECOVERY	LIMITS
1,2-Dichloroethane-d4	103	79 - 114
Toluene-d8	100	75 - 126
p-Bromofluorobenzene	97	71 - 114

Analytical Run Information:

EXTRACTED	
DATE RUN	01/31/95
ANALYST	JM
INSTRUMENT	5971MS
FILE ID	0501008.D
CONC FACTOR	1.00
UNITS	ug/L

TEST RESULTS BY SAMPLE

Sample Description: Trip Blank Water Lab No: 02A
Test Description: Volatile Organics, PATGCMS Method: SW846_8260 Test Code: VOC_44
Collected: 01/26/95 Category: WATER

PARAMETER	CAS NUMBER	RESULT	LIMIT	BLANK	BLANK LIMIT
Dichlorodifluoromethane	75-71-8	ND	10	ND	10
Chloromethane	74-87-3	ND	10	ND	10
Vinyl chloride	75-01-4	ND	10	ND	10
Bromomethane	74-83-9	ND	10	ND	10
Chloroethane	75-00-3	ND	10	ND	10
Trichlorofluoromethane	75-69-4	ND	10	ND	10
Acrolein	107-02-8	ND	25	ND	25
Acetone	67-64-1	ND	25	ND	25
1,1-Dichloroethene	75-35-4	NA	5.0	ND	5.0
Iodomethane	74-88-4	ND	5.0	ND	5.0
Acrylonitrile	107-13-1	ND	5.0	ND	5.0
Methylene chloride	75-09-2	ND	5.0	BQL	5.0
Carbon disulfide	75-15-0	ND	5.0	ND	5.0
trans-1,2-Dichloroethene	156-60-5	ND	5.0	ND	5.0
1,1-Dichloroethane	75-34-3	ND	5.0	ND	5.0
Vinyl acetate	108-05-4	ND	25	ND	25
2-Butanone (MEK)	78-93-3	BQL	10	BQL	10
cis-1,2-Dichloroethene	159-59-2	ND	5.0	ND	5.0
Chloroform	67-66-3	ND	5.0	ND	5.0
1,1,1-Trichloroethane	71-55-6	ND	5.0	ND	5.0
1,2-Dichloroethane	107-06-2	ND	5.0	ND	5.0
Benzene	71-43-2	ND	5.0	ND	5.0

TEST RESULTS BY SAMPLE

Sample Description: Trip Blank Water Lab No: 02A
Test Description: Volatile Organics, PATGCMS Method: SW846_8260 Test Code: VOC_44
Collected: 01/26/95 Category: WATER

Carbon tetrachloride	56-23-5	ND	5.0	ND	5.0
1,2-Dichloropropane	78-87-5	NA	5.0	ND	5.0
Dibromomethane	106-93-4	ND	5.0	ND	5.0
Trichloroethene	79-01-6	ND	5.0	ND	5.0
2-Chloroethyl vinyl ether	110-75-8	ND	10	ND	10
Bromodichloromethane	75-27-4	ND	5.0	ND	5.0
2-Hexanone	591-78-6	ND	5.0	ND	5.0
trans-1,3-Dichloropropene	10061-02-6	ND	5.0	ND	5.0
cis-1,3-Dichloropropene	10061-01-5	ND	5.0	ND	5.0
Toluene	108-88-3	ND	5.0	ND	5.0
1,1,2-Trichloroethane	79-00-5	ND	5.0	ND	5.0
Ethylmethacrylate	97-63-2	ND	10	ND	10
4-Methyl-2-pentanone (MIBK)	108-10-1	ND	5.0	ND	5.0
Dibromochloromethane	124-48-1	ND	5.0	ND	5.0
Tetrachloroethene	127-18-4	NA	5.0	ND	5.0
Chlorobenzene	108-90-7	ND	5.0	ND	5.0
Ethylbenzene	100-41-4	ND	5.0	ND	5.0
Total xylenes	1330-20-7	ND	5.0	ND	5.0
Bromoform	75-25-2	ND	5.0	ND	5.0
Styrene	500-42-5	ND	5.0	ND	5.0
1,1,2,2-Tetrachloroethane	79-34-5	ND	5.0	ND	5.0
1,2,3-Trichloropropane	96-18-4	ND	5.0	ND	5.0
1,3-Dichlorobenzene	541-73-1	NA	5.0	ND	5.0
1,4-Dichlorobenzene	106-46-7	NA	5.0	ND	5.0
1,2-Dichlorobenzene	95-50-1	NA	5.0	ND	5.0

TEST RESULTS BY SAMPLE

Sample Description: Trip Blank Water Lab No: 02A
Test Description: Volatile Organics, PATGCMS Method: SW846_8260 Test Code: VOC_44
Collected: 01/26/95 Category: WATER

SURROGATE	%RECOVERY	LIMITS
1,2-Dichloroethane-d4	97	79 - 114
Toluene-d8	100	75 - 126
p-Bromofluorobenzene	97	71 - 114

Analytical Run Information:

EXTRACTED	
DATE RUN	01/31/95
ANALYST	JM
INSTRUMENT	5971MS
FILE ID	1301001.D
CONC FACTOR	1.00
UNITS	ug/L

ESG ENVIRONMENTAL SERVICE GROUP
A DIVISION OF ASTBURY GABRIEL CORPORATION

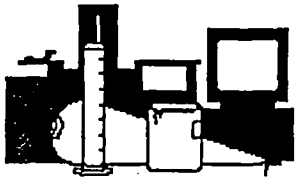


Fig 7.1
Rev: 2. 7/94.kg

CHAIN OF CUSTODY RECORD

ENVIRONMENTAL SERVICE GROUP
5933 WEST 71 ST. STREET
INDIANAPOLIS,IN. 46278
PHONE # (317) 290-1471 FAX # (317) 290-1670

CLIENT: R. E. Blattert + Assoc.

7501591, 92

PROJECT NO.: 1408

PROJECT NAME: Town on Griffith

SAMPLERS:(SIGNATURE) [signature] (David E. Norris)

STA. NO.	DATE	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONT-AINERS	Phase I	Phase II					REMARKS
	1/26/95	3:35p		✓	MW-1S	6		✓					Bruce Peavler
		3:45p		✓	MW-1D			✓					Has the list
		2:30p		✓	MW-2S		✓						of Parameters
		2:45p		✓	MW-2D		✓						
		1:30p		✓	MW-3S		✓						
		1:45p		✓	MW-3D		✓						
		10:40A		✓	MW-4S		✓						
		11:25A		✓	MW-4D		✓						
		12:45p		✓	MW-5S		✓						
		1:00p		✓	MW-5D		✓						
		—		✓	Duplicate			✓					
				✓	Trip Blank			✓					

RELINQUISHED BY:(SIGNATURE)	DATE	TIME	RECEIVED BY:(SIGNATURE)
[signature]	1/27/95	8:00A	
RELINQUISHED BY:(SIGNATURE)	DATE	TIME	RECEIVED BY:(SIGNATURE)
			[signature]
RELINQUISHED BY:(SIGNATURE)	DATE	TIME	RECEIVED BY LABORATORY:(SIGNATURE)
			[signature]

REMARKS:

1995
3Q

CERTIFICATE OF ANALYSIS

ATC Blattert Inc.
5214 South East Street
Suite 1, Park 31 South
Indianapolis, Indiana 46227
Attn: David Norris
Invoice Number:

Order #: 95-07-287
Date: 07/31/95 15:03
Work ID: 1408 Griffith MW-1D
Date Received: 07/13/95
Date Completed: 07/31/95
Client Code: BLATTERT

SAMPLE IDENTIFICATION

Sample Number	Sample Description	Sample Number	Sample Description
01	MW-1D Water		

This report may not be reproduced except in full, without the written approval of the laboratory. All results relate only to the items tested.

Certified By

TEST RESULTS BY SAMPLE

Sample: 01BW MW-1D Water **Collected: 07/13/95** **Category: WATER**

Test Description	Result	Limit	Units	Analyzed	By
Chlorides, Titrimetric	60.0	10.0	mg/L	07/27/95	MB

Sample: 01CW MW-1D Water **Collected: 07/13/95** **Category: WATER**

Test Description	Result	Limit	Units	Analyzed	By
Phenols, Manual 4AAP	<0.005	0.0050	mg/L	07/28/95	TLO

Sample: 01DW MW-1D Water **Collected: 07/13/95** **Category: WATER**

Test Description	Result	Limit	Units	Analyzed	By
Ammonia-N	<5.0	5.00	mg/L	07/28/95	SS
Chemical Oxygen Demand	<10.0	10.0	mg/L O2	07/28/95	TLO

Sample: 01EW MW-1D Water **Collected: 07/13/95** **Category: WATER**

Test Description	Result	Limit	Units	Analyzed	By
Dissolved Boron, ICAPES	0.277	0.020	mg/L	07/21/95	SEC
Dissolved Sodium, ICAPES	36.00	1.00	mg/L	07/19/95	SEC

TEST RESULTS BY SAMPLE

Sample Description: MW-1D Water Lab No: 01A
Test Description: Volatile Organics, PATGCMS Method: EPA_624 Test Code: VOC_LF
Collected: 07/13/95 Category: WATER

PARAMETER	CAS NUMBER	RESULT	LIMIT	BLANK	BLANK LIMIT
Methylene chloride	75-09-2	ND	5.0	ND	5.0
trans-1,2-Dichloroethene	156-60-5	ND	5.0	ND	5.0
1,1-Dichloroethane	75-34-3	ND	5.0	ND	5.0
2-Butanone	78-93-3	BQL	10	BQL	10
cis-1,2-Dichloroethene	159-59-2	ND	5.0	ND	5.0
Benzene	71-43-2	ND	5.0	ND	5.0
Toluene	108-88-3	ND	5.0	ND	5.0
Ethylbenzene	100-41-4	ND	5.0	ND	5.0

SURROGATE	%RECOVERY	LIMITS
1,2-Dichloroethane-d4	96	79 - 114
Toluene-d8	102	75 - 126
p-Bromofluorobenzene	100	71 - 114

Analytical Run Information:

EXTRACTED	
DATE RUN	07/18/95
ANALYST	KAH
INSTRUMENT	5971MS
FILE ID	1501001.D
CONC FACTOR	1.0
UNITS	ug/L

ATC BLATTERT INC.

CHAIN OF CUSTODY RECORD

Sheet _____ of _____

Geological & Environmental Engineering Services

5214 S East Street • Indianapolis, IN 46227 • (317) 787-9167 • Fax (317) 788-0683

9507274 9507288

Project No.
1408 Griffith

Samplers: (signature)
Dale Mac

Station No.	Date	Time	Comp	Grab	Station Location	No. of Containers	Phase II	Phase I	BTEX	LEAD	VOCs		REMARKS
MW-4S	7/13	8:00		✓		6	✓						
MW-4D		8:45		✓		6	✓						
Duplicate				✓		6	✓						
MW-5S		9:35		✓		6		✓					
MW-5D		9:41		✓		6		✓					
MW-3S		10:15		✓		6		✓					
MW-3D		10:40		✓		6		✓					
MW-2S		11:20		✓		6		✓					
MW-2D		11:40		✓		6		✓					
MW-1S		12:25		✓		6		✓					
MW-1D		12:40		✓		4		✓					
Trip Blank				✓			✓						

Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time	Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time
Dale Mac 4:05 7/13	7/13 4:05		
Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time	Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time
Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time	Remarks:	
Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time		

CERTIFICATE OF ANALYSIS

ATC Blattert Inc.
5214 South East Street
Suite 1, Park 31 South
Indianapolis, Indiana 46227
Attn: David Norris
Invoice Number:

Order #: 95-07-286
Date: 07/31/95 15:02
Work ID: 1408 Griffith MW-1S
Date Received: 07/13/95
Date Completed: 07/31/95
Client Code: BLATTERT

SAMPLE IDENTIFICATION

Sample Number	Sample Description	Sample Number	Sample Description
01	MW-1S Water		

This report may not be reproduced except in full, without the written approval of the laboratory. All results relate only to the items tested.

Certified By

Environmental Service Group
A2LA ACCREDITED
5933 WEST 71ST STREET INDIANAPOLIS, INDIANA 46278
(317) 290-1471
FAX (317) 290-1670

TEST RESULTS BY SAMPLE

Sample: 01BW MW-1S Water **Collected: 07/13/95** **Category: WATER**

Test Description	Result	Limit	Units	Analyzed	By
Chlorides, Titrimetric	69.0	10.0	mg/L	07/27/95	MB

Sample: 01CW MW-1S Water **Collected: 07/13/95** **Category: WATER**

Test Description	Result	Limit	Units	Analyzed	By
Phenols, Manual 4AAP	<0.005	0.0050	mg/L	07/28/95	TLO

Sample: 01DW MW-1S Water **Collected: 07/13/95** **Category: WATER**

Test Description	Result	Limit	Units	Analyzed	By
Ammonia-N	8.40	5.00	mg/L	07/28/95	SS
Chemical Oxygen Demand	39.0	10.0	mg/L O2	07/28/95	TLO

Sample: 01EW MW-1S Water **Collected: 07/13/95** **Category: WATER**

Test Description	Result	Limit	Units	Analyzed	By
Dissolved Boron, ICAPES	0.214	0.020	mg/L	07/21/95	SEC
Dissolved Sodium, ICAPES	49.30	1.00	mg/L	07/19/95	SEC

TEST RESULTS BY SAMPLE

Sample Description: MW-1S Water Lab No: 01A
Test Description: Volatile Organics, PATGCMS Method: EPA_624 Test Code: VOC_LF
Collected: 07/13/95 Category: WATER

PARAMETER	CAS NUMBER	RESULT	LIMIT	BLANK	BLANK LIMIT
Methylene chloride	75-09-2	ND	5.0	ND	5.0
trans-1,2-Dichloroethene	156-60-5	ND	5.0	ND	5.0
1,1-Dichloroethane	75-34-3	ND	5.0	ND	5.0
2-Butanone	78-93-3	BQL	10	BQL	10
cis-1,2-Dichloroethene	159-59-2	ND	5.0	ND	5.0
Benzene	71-43-2	ND	5.0	ND	5.0
Toluene	108-88-3	ND	5.0	ND	5.0
Ethylbenzene	100-41-4	ND	5.0	ND	5.0

SURROGATE	%RECOVERY	LIMITS
1,2-Dichloroethane-d4	94	79 - 114
Toluene-d8	104	75 - 126
p-Bromofluorobenzene	106	71 - 114

Analytical Run Information:

EXTRACTED	
DATE RUN	07/18/95
ANALYST	KAH
INSTRUMENT	5971MS
FILE ID	0718A.D
CONC FACTOR	1.0
UNITS	ug/L

ATC BLATTERT INC.

CHAIN OF CUSTODY RECORD

Sheet _____ of _____

Geological & Environmental Engineering Services

5214 S East Street • Indianapolis, IN 46227 • (317) 787-9167 • Fax (317) 788-0683

9507274 9507288

Project No.
1408 Griffith

Samplers: (signature)
[signature]

Station No.	Date	Time	Comp	Grab	Station Location	No. of Containers	Phase II	Phase I	BTEX	LEAD	VOCs		REMARKS
MW-4S	7/13	8:10		✓		6	✓						
MW-4D		8:45		✓		6	✓						
Duplicate				✓		6	✓						
MW-5S		9:35		✓		6		✓					
MW-5D		9:41		✓		6		✓					
MW-3S		10:15		✓		6		✓					
MW-3D		10:40		✓		6		✓					
MW-2S		11:20		✓		6		✓					
MW-2D		11:40		✓		4		✓					
MW-1S		12:25		✓		6		✓					
MW-1D		12:40		✓		4		✓					
Trip Blank	↓			✓			✓						

Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time	Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time
[signature] 4:05 7/13	[signature] 7/13 4:05		
Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time	Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time
Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time	Remarks:	
Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time		

CERTIFICATE OF ANALYSIS

ATC Blattert Inc.
5214 South East Street
Suite 1, Park 31 South
Indianapolis, Indiana 46227
Attn: David Norris
Invoice Number:

Order #: 95-07-285
Date: 07/31/95 15:01
Work ID: 1408 Griffith MW-2D
Date Received: 07/13/95
Date Completed: 07/31/95
Client Code: BLATTERT

SAMPLE IDENTIFICATION

Sample Number	Sample Description	Sample Number	Sample Description
01	MW-2D Water		

This report may not be reproduced except in full, without the written approval of the laboratory. All results relate only to the items tested.

Certified By

Environmental Service Group
A2LA ACCREDITED
5933 WEST 71ST STREET INDIANAPOLIS, INDIANA 46278
(317) 290-1471
FAX (317) 290-1670

TEST RESULTS BY SAMPLE

Sample: 01BW MW-2D Water **Collected: 07/13/95** **Category: WATER**

Test Description	Result	Limit	Units	Analyzed	By
Chlorides, Titrimetric	39.0	10.0	mg/L	07/27/95	MB

Sample: 01CW MW-2D Water **Collected: 07/13/95** **Category: WATER**

Test Description	Result	Limit	Units	Analyzed	By
Phenols, Manual 4AAP	<0.005	0.0050	mg/L	07/28/95	TLO

Sample: 01DW MW-2D Water **Collected: 07/13/95** **Category: WATER**

Test Description	Result	Limit	Units	Analyzed	By
Ammonia-N	<5.0	5.00	mg/L	07/28/95	SS
Chemical Oxygen Demand	<10.0	10.0	mg/L O2	07/28/95	TLO

Sample: 01EW MW-2D Water **Collected: 07/13/95** **Category: WATER**

Test Description	Result	Limit	Units	Analyzed	By
Dissolved Boron, ICAPES	0.311	0.020	mg/L	07/21/95	SEC
Dissolved Sodium, ICAPES	32.10	1.00	mg/L	07/19/95	SEC

TEST RESULTS BY SAMPLE

Sample Description: MW-2D Water Lab No: 01A
Test Description: Volatile Organics, PATGCMS Method: EPA_624 Test Code: VOC_LF
Collected: 07/13/95 Category: WATER

PARAMETER	CAS NUMBER	RESULT	LIMIT	BLANK	BLANK LIMIT
Methylene chloride	75-09-2	BQL	5.0	ND	5.0
trans-1,2-Dichloroethene	156-60-5	ND	5.0	ND	5.0
1,1-Dichloroethane	75-34-3	ND	5.0	ND	5.0
2-Butanone	78-93-3	BQL	10	BQL	10
cis-1,2-Dichloroethene	159-59-2	ND	5.0	ND	5.0
Benzene	71-43-2	ND	5.0	ND	5.0
Toluene	108-88-3	ND	5.0	ND	5.0
Ethylbenzene	100-41-4	ND	5.0	ND	5.0

SURROGATE	%RECOVERY	LIMITS
1,2-Dichloroethane-d4	98	79 - 114
Toluene-d8	106	75 - 126
p-Bromofluorobenzene	106	71 - 114

Analytical Run Information:

EXTRACTED	
DATE RUN	07/17/95
ANALYST	KAH
INSTRUMENT	5971MS
FILE ID	0601015.D
CONC FACTOR	1.0
UNITS	ug/L

ATC BLATTERT INC.

CHAIN OF CUSTODY RECORD

Sheet _____ of _____

Geological & Environmental Engineering Services

5214 S East Street • Indianapolis, IN 46227 • (317) 787-9167 • Fax (317) 788-0683

9507274 9507288

Project No.
1408 Griffith

Samplers: (signature)

Station No.	Date	Time	Comp	Grab	Station Location	No. of Containers	Phase II	Phase I	BTEX	LEAD	VOCs		REMARKS
MW-4S	7/13	8:10		✓		6	✓						
MW-4D		8:45		✓		6	✓						
Duplicate				✓		6	✓						
MW-5S		9:35		✓		6		✓					
MW-5D		9:41		✓		6		✓					
MW-3S		10:15		✓		6		✓					
MW-3D		10:40		✓		6		✓					
MW-2S		11:20		✓		6		✓					
MW-2D		11:50		✓		6		✓					
MW-1S		12:35		✓		6		✓					
MW-1D		12:50		✓		4		✓					
Trip Blank				✓			✓						

Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time	Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time
4:05 7/13	7/13 4:05		
Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time	Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time
Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time	Remarks:	
Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time		

CERTIFICATE OF ANALYSIS

ATC Blattert Inc.
5214 South East Street
Suite 1, Park 31 South
Indianapolis, Indiana 46227
Attn: David Norris
Invoice Number:

Order #: 95-07-284
Date: 07/31/95 15:01
Work ID: 1408 Griffith MW-2S
Date Received: 07/13/95
Date Completed: 07/31/95
Client Code: BLATTERT

SAMPLE IDENTIFICATION

Sample Number	Sample Description	Sample Number	Sample Description
01	MW-2S Water		

This report may not be reproduced except in full, without the written approval of the laboratory. All results relate only to the items tested.

Certified By

Environmental Service Group
A2LA ACCREDITED
5933 WEST 71ST STREET INDIANAPOLIS INDIANA 46278
(317) 290-1471
FAX (317) 290-1670

TEST RESULTS BY SAMPLE

Sample: 01BW MW-2S Water **Collected: 07/13/95** **Category: WATER**

Test Description	Result	Limit	Units	Analyzed	By
Chlorides, Titrimetric	20.0	10.0	mg/L	07/27/95	MB

Sample: 01CW MW-2S Water **Collected: 07/13/95** **Category: WATER**

Test Description	Result	Limit	Units	Analyzed	By
Phenols, Manual 4AAP	<0.005	0.0050	mg/L	07/28/95	TLO

Sample: 01DW MW-2S Water **Collected: 07/13/95** **Category: WATER**

Test Description	Result	Limit	Units	Analyzed	By
Ammonia-N	<5.0	5.00	mg/L	07/28/95	SS
Chemical Oxygen Demand	20.0	10.0	mg/L O2	07/28/95	TLO

Sample: 01EW MW-2S Water **Collected: 07/13/95** **Category: WATER**

Test Description	Result	Limit	Units	Analyzed	By
Dissolved Boron, ICAPES	0.155	0.020	mg/L	07/21/95	SEC
Dissolved Sodium, ICAPES	15.60	1.00	mg/L	07/19/95	SEC

TEST RESULTS BY SAMPLE

Sample Description: MW-2S Water Lab No: 01A
Test Description: Volatile Organics, PATGCMS Method: EPA_624 Test Code: VOC_LF
Collected: 07/13/95 Category: WATER

PARAMETER	CAS NUMBER	RESULT	LIMIT	BLANK	BLANK LIMIT
Methylene chloride	75-09-2	BQL	5.0	ND	5.0
trans-1,2-Dichloroethene	156-60-5	ND	5.0	ND	5.0
1,1-Dichloroethane	75-34-3	ND	5.0	ND	5.0
2-Butanone	78-93-3	BQL	10	BQL	10
cis-1,2-Dichloroethene	159-59-2	ND	5.0	ND	5.0
Benzene	71-43-2	ND	5.0	ND	5.0
Toluene	108-88-3	ND	5.0	ND	5.0
Ethylbenzene	100-41-4	ND	5.0	ND	5.0

SURROGATE	%RECOVERY	LIMITS
1,2-Dichloroethane-d4	103	79 - 114
Toluene-d8	102	75 - 126
p-Bromofluorobenzene	104	71 - 114

Analytical Run Information:

EXTRACTED	
DATE RUN	07/17/95
ANALYST	KAH
INSTRUMENT	5971MS
FILE ID	0501014.D
CONC FACTOR	1.0
UNITS	ug/L

ATC BLATTERT INC.

CHAIN OF CUSTODY RECORD

Sheet _____ of _____

Geological & Environmental Engineering Services

5214 S East Street • Indianapolis, IN 46227 • (317) 787-9167 • Fax (317) 788-0683

9507274 9507218

Project No.
1408 Griffith

Samplers: (signature)

Station No.	Date	Time	Comp	Grab	Station Location	No. of Containers	Phase II	Phase I	BTEX	LEAD	VOCs		REMARKS
MW-4S	7/13	8:00		✓		6	✓						
MW-4D		8:45		✓		6	✓						
Duplicate				✓		6	✓						
MW-5S		9:25		✓		6		✓					
MW-5D		9:40		✓		6		✓					
MW-3S		10:05		✓		6		✓					
MW-3D		10:20		✓		6		✓					
MW-2S		11:20		✓		6		✓					
MW-2D		11:40		✓		6		✓					
MW-1S		12:25		✓		6		✓					
MW-1D		12:40		✓		4		✓					
Trip Blank				✓			✓						

Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time	Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time
4:05 7/13	7/13 4:05		
Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time	Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time
Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time	Remarks:	
Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time		

CERTIFICATE OF ANALYSIS

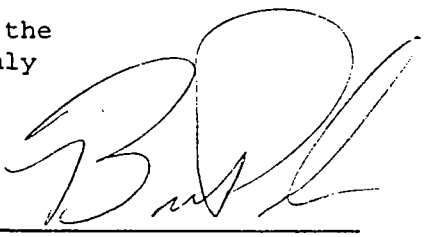
ATC Blattert Inc.
5214 South East Street
Suite 1, Park 31 South
Indianapolis, Indiana 46227
Attn: David Norris
Invoice Number:

Order #: 95-07-283
Date: 07/31/95 15:01
Work ID: 1408 Griffith MW-3D
Date Received: 07/13/95
Date Completed: 07/31/95
Client Code: BLATTERT

SAMPLE IDENTIFICATION

Sample Number	Sample Description	Sample Number	Sample Description
01	MW-3D Water		

This report may not be reproduced except in full, without the written approval of the laboratory. All results relate only to the items tested.



Certified By

TEST RESULTS BY SAMPLE

Sample: 01BW MW-3D Water **Collected: 07/13/95** **Category: WATER**

Test Description	Result	Limit	Units	Analyzed	By
Chlorides, Titrimetric	20.0	10.0	mg/L	07/27/95	MB

Sample: 01CW MW-3D Water **Collected: 07/13/95** **Category: WATER**

Test Description	Result	Limit	Units	Analyzed	By
Phenols, Manual 4AAP	<0.005	0.0050	mg/L	07/28/95	TLO

Sample: 01DW MW-3D Water **Collected: 07/13/95** **Category: WATER**

Test Description	Result	Limit	Units	Analyzed	By
Ammonia-N	<5.0	5.00	mg/L	07/28/95	SS
Chemical Oxygen Demand	13.0	10.0	mg/L O2	07/28/95	TLO

Sample: 01EW MW-3D Water **Collected: 07/13/95** **Category: WATER**

Test Description	Result	Limit	Units	Analyzed	By
Dissolved Boron, ICAPES	0.203	0.020	mg/L	07/21/95	SEC
Dissolved Sodium, ICAPES	24.20	1.00	mg/L	07/19/95	SEC

TEST RESULTS BY SAMPLE

Sample Description: MW-3D Water Lab No: 01A
Test Description: Volatile Organics, PATGCMS Method: EPA_624 Test Code: VOC_LF
Collected: 07/13/95 Category: WATER

PARAMETER	CAS NUMBER	RESULT	LIMIT	BLANK	BLANK LIMIT
Methylene chloride	75-09-2	BQL	5.0	ND	5.0
trans-1,2-Dichloroethene	156-60-5	ND	5.0	ND	5.0
1,1-Dichloroethane	75-34-3	ND	5.0	ND	5.0
2-Butanone	78-93-3	BQL	10	BQL	10
cis-1,2-Dichloroethene	159-59-2	ND	5.0	ND	5.0
Benzene	71-43-2	ND	5.0	ND	5.0
Toluene	108-88-3	ND	5.0	ND	5.0
Ethylbenzene	100-41-4	ND	5.0	ND	5.0

SURROGATE	%RECOVERY	LIMITS
1,2-Dichloroethane-d4	99	79 - 114
Toluene-d8	103	75 - 126
p-Bromofluorobenzene	104	71 - 114

Analytical Run Information:

EXTRACTED	
DATE RUN	07/17/95
ANALYST	KAH
INSTRUMENT	5971MS
FILE ID	0401013.D
CONC FACTOR	1.0
UNITS	ug/L

ATC BLATTERT INC.

CHAIN OF CUSTODY RECORD

Sheet _____ of _____

Geological & Environmental Engineering Services

5214 S. East Street • Indianapolis, IN 46227 • (317) 787-9167 • Fax (317) 788-0683

9507274 9507288

Project No.

1408 Griffith

Samplers: (signature)

Dale Mast

Station No.	Date	Time	Comp	Grab	Station Location	No. of Containers	Phase II	Phase I	BTEX	LEAD	VOCs		REMARKS
MW-4S	7/13	8:10		✓		6	✓						
MW-4D		8:45		✓		6	✓						
Duplicate				✓		6	✓						
MW-5S		9:35		✓		6		✓					
MW-5D		9:41		✓		6		✓					
MW-3S		10:05		✓		6		✓					
MW-3D		10:40		✓		6		✓					
MW-2S		11:20		✓		6		✓					
MW-2D		11:40		✓		4		✓					
MW-1S		12:25		✓		4		✓					
MW-1D		12:40		✓		4		✓					
Trip Blank				✓		4	✓						

Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time	Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time
Dale Mast 4:05 7/13	7/13 4:05		
Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time	Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time
Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time	Remarks:	
Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time		

CERTIFICATE OF ANALYSIS

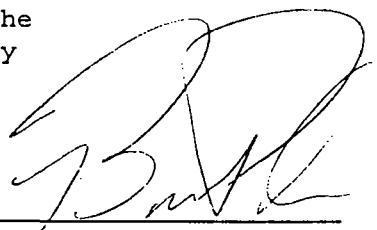
ATC Blattert Inc.
5214 South East Street
Suite 1, Park 31 South
Indianapolis, Indiana 46227
Attn: David Norris
Invoice Number:

Order #: 95-07-282
Date: 07/31/95 15:00
Work ID: 1408 Griffith MW-3S
Date Received: 07/13/95
Date Completed: 07/31/95
Client Code: BLATTERT

SAMPLE IDENTIFICATION

Sample Number	Sample Description	Sample Number	Sample Description
01	MW-3S Water		

This report may not be reproduced except in full, without the written approval of the laboratory. All results relate only to the items tested.



Certified By

Environmental Service Group
A2LA ACCREDITED
5933 WEST 71ST STREET INDIANAPOLIS, INDIANA 46278
(317) 290-1471
FAX (317) 290-1670

TEST RESULTS BY SAMPLE

Sample: 01BW MW-3S Water **Collected: 07/13/95** **Category: WATER**

Test Description	Result	Limit	Units	Analyzed	By
Chlorides, Titrimetric	45.0	10.0	mg/L	07/27/95	MB

Sample: 01CW MW-3S Water **Collected: 07/13/95** **Category: WATER**

Test Description	Result	Limit	Units	Analyzed	By
Phenols, Manual 4AAP	<0.005	0.0050	mg/L	07/28/95	TLO

Sample: 01DW MW-3S Water **Collected: 07/13/95** **Category: WATER**

Test Description	Result	Limit	Units	Analyzed	By
Ammonia-N	<5.0	5.00	mg/L	07/28/95	SS
Chemical Oxygen Demand	33.0	10.0	mg/L O2	07/28/95	TLO

Sample: 01EW MW-3S Water **Collected: 07/13/95** **Category: WATER**

Test Description	Result	Limit	Units	Analyzed	By
Dissolved Boron, ICAPES	0.171	0.020	mg/L	07/21/95	SEC
Dissolved Sodium, ICAPES	26.10	1.00	mg/L	07/19/95	SEC

TEST RESULTS BY SAMPLE

Sample Description: MW-3S Water Lab No: 01A
Test Description: Volatile Organics, PATGCMS Method: EPA_624 Test Code: VOC_LF
Collected: 07/13/95 Category: WATER

PARAMETER	CAS NUMBER	RESULT	LIMIT	BLANK	BLANK LIMIT
Methylene chloride	75-09-2	BQL	5.0	ND	5.0
trans-1,2-Dichloroethene	156-60-5	ND	5.0	ND	5.0
1,1-Dichloroethane	75-34-3	ND	5.0	ND	5.0
2-Butanone	78-93-3	BQL	10	BQL	10
cis-1,2-Dichloroethene	159-59-2	ND	5.0	ND	5.0
Benzene	71-43-2	BQL	5.0	ND	5.0
Toluene	108-88-3	ND	5.0	ND	5.0
Ethylbenzene	100-41-4	ND	5.0	ND	5.0

SURROGATE	%RECOVERY	LIMITS
1,2-Dichloroethane-d4	96	79 - 114
Toluene-d8	102	75 - 126
p-Bromofluorobenzene	102	71 - 114

Analytical Run Information:

EXTRACTED	
DATE RUN	07/17/95
ANALYST	KAH
INSTRUMENT	5971MS
FILE ID	0201012.D
CONC FACTOR	1.0
UNITS	ug/L

ATC BLATTERT INC.

CHAIN OF CUSTODY RECORD

Sheet _____ of _____

Geological & Environmental Engineering Services

5214 S. East Street • Indianapolis, IN 46227 • (317) 787-9167 • Fax (317) 788-0683

9507274 9507288

Project No.
1408 Griffith

Samplers: (signature)

Station No.	Date	Time	Comp	Grab	Station Location	No. of Containers	Phase II	Phase I	BTEX	LEAD	VOCs		REMARKS
MW-45	7/13	8:00		✓		6	✓						
MW-40		8:45		✓		6	✓						
Duplicate				✓		6	✓						
MW-55		9:25		✓		6		✓					
MW-50		9:40		✓		6		✓					
MW-35		10:15		✓		6		✓					
MW-30		10:40		✓		6		✓					
MW-25		11:20		✓		6		✓					
MW-20		11:40		✓		4		✓					
MW-15		12:25		✓		4		✓					
MW-10		12:40		✓		4		✓					
Trip Blank				✓		4	✓						

Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time	Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time
4:05 7/13	7/13 4:05		
Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time	Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time
Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time	Remarks:	
Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time		

CERTIFICATE OF ANALYSIS

ATC Blattert Inc.
5214 South East Street
Suite 1, Park 31 South
Indianapolis, Indiana 46227
Attn: David Norris
Invoice Number:

Order #: 95-07-280
Date: 07/31/95 15:00
Work ID: 1408 Griffith MW-5S
Date Received: 07/13/95
Date Completed: 07/31/95
Client Code: BLATTERT

SAMPLE IDENTIFICATION

Sample Number	Sample Description	Sample Number	Sample Description
01	MW-5S Water		

This report may not be reproduced except in full, without the written approval of the laboratory. All results relate only to the items tested.

Certified By

TEST RESULTS BY SAMPLE

Sample: 01BW MW-5S Water **Collected: 07/13/95** **Category: WATER**

Test Description	Result	Limit	Units	Analyzed	By
Chlorides, Titrimetric	34.0	10.0	mg/L	07/27/95	MB

Sample: 01CW MW-5S Water **Collected: 07/13/95** **Category: WATER**

Test Description	Result	Limit	Units	Analyzed	By
Phenols, Manual 4AAP	<0.005	0.0050	mg/L	07/28/95	TLO

Sample: 01DW MW-5S Water **Collected: 07/13/95** **Category: WATER**

Test Description	Result	Limit	Units	Analyzed	By
Ammonia-N	<5.0	5.00	mg/L	07/28/95	SS
Chemical Oxygen Demand	46.0	10.0	mg/L O2	07/28/95	TLO

Sample: 01EW MW-5S Water **Collected: 07/13/95** **Category: WATER**

Test Description	Result	Limit	Units	Analyzed	By
Dissolved Boron, ICAPES	0.298	0.020	mg/L	07/21/95	SEC
Dissolved Sodium, ICAPES	28.50	1.00	mg/L	07/19/95	SEC

TEST RESULTS BY SAMPLE

Sample Description: MW-5S Water Lab No: 01A
Test Description: Volatile Organics, PATGCMS Method: EPA_624 Test Code: VOC_LF
Collected: 07/13/95 Category: WATER

PARAMETER	CAS NUMBER	RESULT	LIMIT	BLANK	BLANK LIMIT
Methylene chloride	75-09-2	BQL	5.0	BQL	5.0
trans-1,2-Dichloroethene	156-60-5	ND	5.0	ND	5.0
1,1-Dichloroethane	75-34-3	ND	5.0	ND	5.0
2-Butanone	78-93-3	BQL	10	BQL	10
cis-1,2-Dichloroethene	159-59-2	ND	5.0	ND	5.0
Benzene	71-43-2	ND	5.0	ND	5.0
Toluene	108-88-3	ND	5.0	ND	5.0
Ethylbenzene	100-41-4	ND	5.0	ND	5.0

SURROGATE	%RECOVERY	LIMITS
1,2-Dichloroethane-d4	92	79 - 114
Toluene-d8	99	75 - 126
p-Bromofluorobenzene	100	71 - 114

Analytical Run Information:

EXTRACTED	
DATE RUN	07/14/95
ANALYST	JM
INSTRUMENT	5971MS
FILE ID	1001004.D
CONC FACTOR	1.0
UNITS	ug/L

ATC BLATTERT INC.

CHAIN OF CUSTODY RECORD

Sheet _____ of _____

Geological & Environmental Engineering Services

5214 S. East Street • Indianapolis, IN 46227 • (317) 787-9167 • Fax (317) 788-0683

9507274 9507288

Project No.
1408 Griffith

Samplers: (signature)
Dale Mac

Station No.	Date	Time	Comp	Grab	Station Location	No. of Containers	Phase II	Phase I	BTEX	LEAD	VOCs		REMARKS
MW-45	7/13	8:10		✓		6	✓						
MW-40		8:45		✓		6	✓						
Duplicate				✓		6	✓						
MW-55		9:25		✓		6		✓					
MW-50		9:40		✓		6		✓					
MW-35		10:05		✓		6		✓					
MW-30		10:40		✓		6		✓					
MW-25		11:20		✓		6		✓					
MW-20		11:50		✓		4		✓					
MW-15		12:35		✓		4		✓					
MW-10		12:40		✓		4		✓					
Trip Blank				✓		4	✓						

Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time	Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time
Dale Mac 4:05 7/13	7/13 Host		
Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time	Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time
Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time	Remarks:	
Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time		

CERTIFICATE OF ANALYSIS

ATC Blattert Inc.
5214 South East Street
Suite 1, Park 31 South
Indianapolis, Indiana 46227
Attn: David Norris
Invoice Number:

Order #: 95-07-278
Date: 07/31/95 14:59
Work ID: 1408 Griffith MW-4D
Date Received: 07/13/95
Date Completed: 07/31/95
Client Code: BLATTERT

SAMPLE IDENTIFICATION

Sample Number	Sample Description	Sample Number	Sample Description
01	MW-4D Water		

This report may not be reproduced except in full, without the written approval of the laboratory. All results relate only to the items tested.

Certified By

TEST RESULTS BY SAMPLE

Sample: 01BW MW-4D Water **Collected: 07/13/95** **Category: WATER**

Test Description	Result	Limit	Units	Analyzed	By
Chlorides, Titrimetric	136.0	10.0	mg/L	07/27/95	MB
Fluoride	0.224	0.020	mg/L	07/18/95	TLO
N-Nitrate, Cd Reduct. Col.	<0.50	0.500	mg/L N-NO3	07/14/95	TLO
Sulfate, Turbidimetric	<5.0	5.0	mg/L SO4	07/26/95	TLO
Total Diss Solids at 180°C	585.0	1.0	mg/L	07/26/95	TLO

Sample: 01CW MW-4D Water **Collected: 07/13/95** **Category: WATER**

Test Description	Result	Limit	Units	Analyzed	By
Phenols, Manual 4AAP	<0.005	0.0050	mg/L	07/28/95	TLO

Sample: 01DW MW-4D Water **Collected: 07/13/95** **Category: WATER**

Test Description	Result	Limit	Units	Analyzed	By
Ammonia-N	<5.0	5.00	mg/L	07/26/95	TLO
Chemical Oxygen Demand	12.0	10.0	mg/L O2	07/28/95	TLO

Sample: 01EW MW-4D Water **Collected: 07/13/95** **Category: WATER**

Test Description	Result	Limit	Units	Analyzed	By
Dissolved Arsenic, GFAAS	<0.010	0.010	mg/L	07/18/95	KAK
Dissolved Barium, ICAPES	0.178	0.050	mg/L	07/20/95	CPV
Dissolved Boron, ICAPES	0.217	0.020	mg/L	07/21/95	SEC
Dissolved Cadmium, GFAAS	<0.0010	0.0010	mg/L	07/19/95	KAK
Dissolved Chromium, ICAPES	<0.020	0.020	mg/L	07/20/95	CPV
Dissolved Copper, ICAPES	<0.020	0.020	mg/L	07/20/95	CPV
Dissolved Iron, ICAPES	<0.010	0.010	mg/L	07/20/95	CPV
Dissolved Lead, GFAAS	<0.0050	0.0050	mg/L	07/17/95	KAK
Dissolved Manganese, ICAPES	0.027	0.010	mg/L	07/20/95	CPV
Dissolved Mercury, CVAAS	<0.00050	0.0005	mg/L	07/18/95	KAK
Dissolved Selenium, GFAAS	<0.010	0.010	mg/L	07/18/95	KAK
Dissolved Silver, ICAPES	<0.010	0.010	mg/L	07/20/95	CPV
Dissolved Sodium, ICAPES	66.30	2.00	mg/L	07/19/95	SEC
Dissolved Zinc, ICAPES	<0.010	0.010	mg/L	07/20/95	CPV

TEST RESULTS BY SAMPLE

Sample Description: MW-4D Water Lab No: 01A
Test Description: Volatile Organics, PATGCMS Method: SW846_8260 Test Code: VOC_44
Collected: 07/13/95 Category: WATER

PARAMETER	CAS NUMBER	RESULT	LIMIT	BLANK	BLANK LIMIT
Dichlorodifluoromethane	75-71-8	ND	10	ND	10
Chloromethane	74-87-3	ND	10	ND	10
Vinyl chloride	75-01-4	ND	10	ND	10
Bromomethane	74-83-9	BQL	10	BQL	10
Chloroethane	75-00-3	BQL	10	ND	10
Trichlorofluoromethane	75-69-4	ND	10	ND	10
Acrolein	107-02-8	ND	25	ND	25
Acetone	67-64-1	BQL	25	BQL	25
1,1-Dichloroethene	75-35-4	ND	5.0	ND	5.0
Iodomethane	74-88-4	ND	5.0	ND	5.0
Acrylonitrile	107-13-1	ND	5.0	ND	5.0
Methylene chloride	75-09-2	BQL	5.0	BQL	5.0
Carbon disulfide	75-15-0	ND	5.0	ND	5.0
trans-1,2-Dichloroethene	156-60-5	ND	5.0	ND	5.0
1,1-Dichloroethane	75-34-3	ND	5.0	ND	5.0
Vinyl acetate	108-05-4	ND	25	ND	25
2-Butanone (MEK)	78-93-3	BQL	10	BQL	10
cis-1,2-Dichloroethene	159-59-2	ND	5.0	ND	5.0
Chloroform	67-66-3	ND	5.0	ND	5.0
1,1,1-Trichloroethane	71-55-6	ND	5.0	ND	5.0
1,2-Dichloroethane	107-06-2	ND	5.0	ND	5.0
Benzene	71-43-2	ND	5.0	ND	5.0

TEST RESULTS BY SAMPLE

Sample Description: MW-4D Water Lab No: 01A
Test Description: Volatile Organics, PATGCMS Method: SW846_8260 Test Code: VOC_44
Collected: 07/13/95 Category: WATER

Carbon tetrachloride	56-23-5	ND	5.0	ND	5.0
1,2-Dichloropropane	78-87-5	ND	5.0	ND	5.0
Dibromomethane	106-93-4	ND	5.0	ND	5.0
Trichloroethene	79-01-6	ND	5.0	ND	5.0
2-Chloroethyl vinyl ether	110-75-8	ND	10	ND	10
Bromodichloromethane	75-27-4	ND	5.0	ND	5.0
2-Hexanone	591-78-6	ND	5.0	ND	5.0
trans-1,3-Dichloropropene	10061-02-6	ND	5.0	ND	5.0
cis-1,3-Dichloropropene	10061-01-5	ND	5.0	ND	5.0
Toluene	108-88-3	ND	5.0	ND	5.0
1,1,2-Trichloroethane	79-00-5	ND	5.0	ND	5.0
Ethylmethacrylate	97-63-2	ND	10	ND	10
4-Methyl-2-pentanone (MIBK)	108-10-1	ND	5.0	ND	5.0
Dibromochloromethane	124-48-1	ND	5.0	ND	5.0
Tetrachloroethene	127-18-4	ND	5.0	ND	5.0
Chlorobenzene	108-90-7	ND	5.0	ND	5.0
Ethylbenzene	100-41-4	ND	5.0	ND	5.0
Total xylenes	1330-20-7	ND	5.0	ND	5.0
Bromoform	75-25-2	ND	5.0	ND	5.0
Styrene	500-42-5	ND	5.0	ND	5.0
1,1,2,2-Tetrachloroethane	79-34-5	ND	5.0	ND	5.0
1,2,3-Trichloropropane	96-18-4	ND	5.0	ND	5.0
1,3-Dichlorobenzene	541-73-1	ND	5.0	ND	5.0
1,4-Dichlorobenzene	106-46-7	ND	5.0	ND	5.0
1,2-Dichlorobenzene	95-50-1	ND	5.0	ND	5.0

TEST RESULTS BY SAMPLE

Sample Description: MW-4D Water Lab No: 01A
Test Description: Volatile Organics, PATGCMS Method: SW846_8260 Test Code: VOC_44
Collected: 07/13/95 Category: WATER

SURROGATE	%RECOVERY	LIMITS
1,2-Dichloroethane-d4	95	79 - 114
Toluene-d8	103	75 - 126
p-Bromofluorobenzene	104	71 - 114

Analytical Run Information:

EXTRACTED	
DATE RUN	07/14/95
ANALYST	JM
INSTRUMENT	5971MS
FILE ID	0801002.D
CONC FACTOR	1.0
UNITS	ug/L

ATC BLATTERT INC.

CHAIN OF CUSTODY RECORD

Sheet _____ of _____

Geological & Environmental Engineering Services

5214 S. East Street • Indianapolis, IN 46227 • (317) 787-9167 • Fax (317) 788-0683

9507274 9507218

Project No.
1408 Griffith

Samplers: (signature)
Dale Mac

Station No.	Date	Time	Comp	Grab	Station Location	No. of Containers	Phase II	Phase I	BTEX	LEAD	VOCs		REMARKS
MW-4S	7/13	8:00		✓		6	✓						
MW-4D		8:45		✓		6	✓						
Duplicate				✓		6	✓						
MW-5S		9:35		✓		6		✓					
MW-5D		9:40		✓		6		✓					
MW-3S		10:15		✓		6		✓					
MW-3D		10:40		✓		6		✓					
MW-2S		11:20		✓		6		✓					
MW-2D		11:40		✓		4		✓					
MW-1S		12:35		✓		4		✓					
MW-1D		12:40		✓		4		✓					
Trip Blank	↓			✓		4	✓						

Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time	Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time
Dale Mac 4:05 7/13	7/13 4:05		
Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time	Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time
Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time	Remarks:	
Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time		

CERTIFICATE OF ANALYSIS

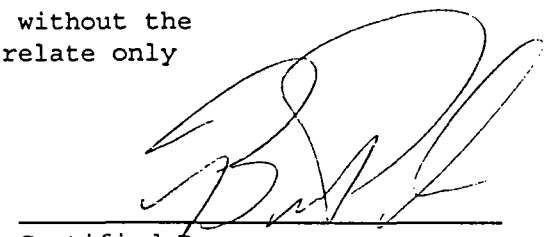
ATC Blattert Inc.
5214 South East Street
Suite 1, Park 31 South
Indianapolis, Indiana 46227
Attn: David Norris
Invoice Number:

Order #: 95-07-281
Date: 07/31/95 15:00
Work ID: 1408 Griffith MW-5D
Date Received: 07/13/95
Date Completed: 07/31/95
Client Code: BLATTERT

SAMPLE IDENTIFICATION

Sample Number	Sample Description	Sample Number	Sample Description
01	MW-5D Water		

This report may not be reproduced except in full, without the written approval of the laboratory. All results relate only to the items tested.



Certified By

TEST RESULTS BY SAMPLE

Sample: 01BW MW-5D Water **Collected: 07/13/95** **Category: WATER**

Test Description	Result	Limit	Units	Analyzed	By
Chlorides, Titrimetric	30.0	10.0	mg/L	07/27/95	MB

Sample: 01CW MW-5D Water **Collected: 07/13/95** **Category: WATER**

Test Description	Result	Limit	Units	Analyzed	By
Phenols, Manual 4AAP	<0.005	0.0050	mg/L	07/28/95	TLO

Sample: 01DW MW-5D Water **Collected: 07/13/95** **Category: WATER**

Test Description	Result	Limit	Units	Analyzed	By
Ammonia-N	<5.0	5.00	mg/L	07/28/95	SS
Chemical Oxygen Demand	14.0	10.0	mg/L O2	07/28/95	TLO

Sample: 01EW MW-5D Water **Collected: 07/13/95** **Category: WATER**

Test Description	Result	Limit	Units	Analyzed	By
Dissolved Boron, ICAPES	0.207	0.020	mg/L	07/21/95	SEC
Dissolved Sodium, ICAPES	22.30	1.00	mg/L	07/19/95	SEC

TEST RESULTS BY SAMPLE

Sample Description: MW-5D Water Lab No: 01A
Test Description: Volatile Organics, PATGCMS Method: EPA_624 Test Code: VOC_LF
Collected: 07/13/95 Category: WATER

PARAMETER	CAS NUMBER	RESULT	LIMIT	BLANK	BLANK LIMIT
Methylene chloride	75-09-2	BQL	5.0	BQL	5.0
trans-1,2-Dichloroethene	156-60-5	ND	5.0	ND	5.0
1,1-Dichloroethane	75-34-3	ND	5.0	ND	5.0
2-Butanone	78-93-3	BQL	10	BQL	10
cis-1,2-Dichloroethene	159-59-2	ND	5.0	ND	5.0
Benzene	71-43-2	ND	5.0	ND	5.0
Toluene	108-88-3	ND	5.0	ND	5.0
Ethylbenzene	100-41-4	ND	5.0	ND	5.0

SURROGATE	%RECOVERY	LIMITS
1,2-Dichloroethane-d4	90	79 - 114
Toluene-d8	104	75 - 126
p-Bromofluorobenzene	96	71 - 114

Analytical Run Information:

EXTRACTED	
DATE RUN	07/14/95
ANALYST	JM
INSTRUMENT	5971MS
FILE ID	1101005.D
CONC FACTOR	1.0
UNITS	ug/L

ATC BLATTERT INC.

CHAIN OF CUSTODY RECORD

Sheet _____ of _____

Geological & Environmental Engineering Services

5214 S. East Street • Indianapolis, IN 46227 • (317) 787-9167 • Fax (317) 788-0683

9507277 9507288

Project No.
1408 Griffith

Samplers: (signature)
D E Mark

Station No.	Date	Time	Comp	Grab	Station Location	No. of Containers	Phase II	Phase I	BTEX	LEAD	VOCs		REMARKS
MW-45	7/13	8:10		✓		6	✓						
MW-40		8:45		✓		6	✓						
Duplicate				✓		6	✓						
MW-55		9:25		✓		6		✓					
MW-50		9:40		✓		6		✓					
MW-35		10:15		✓		6		✓					
MW-30		10:40		✓		6		✓					
MW-25		11:20		✓		6		✓					
MW-20		11:40		✓		4		✓					
MW-15		12:35		✓		6		✓					
MW-10		12:40		✓		4		✓					
Trip Blank				✓			✓						

Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time	Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time
D E Mark 4:05 7/13	7/13 4:05		
Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time	Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time
Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time	Remarks:	
Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time		

CERTIFICATE OF ANALYSIS

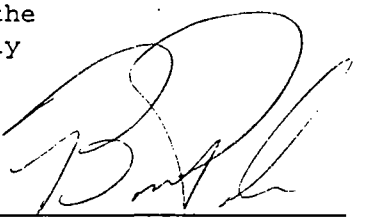
ATC Blattert Inc.
5214 South East Street
Suite 1, Park 31 South
Indianapolis, Indiana 46227
Attn: David Norris
Invoice Number:

Order #: 95-07-279
Date: 07/31/95 14:59
Work ID: 1408 Griffith Duplicate
Date Received: 07/13/95
Date Completed: 07/31/95
Client Code: BLATTERT

SAMPLE IDENTIFICATION

Sample Number	Sample Description	Sample Number	Sample Description
01	Duplicate Water		

This report may not be reproduced except in full, without the written approval of the laboratory. All results relate only to the items tested.



Certified By

TEST RESULTS BY SAMPLE

Sample: 01BW Duplicate Water **Collected: 07/13/95** **Category: WATER**

Test Description	Result	Limit	Units	Analyzed	By
Chlorides, Titrimetric	557.0	10.0	mg/L	07/27/95	MB
Fluoride	0.118	0.020	mg/L	07/18/95	TLO
N-Nitrate, Cd Reduct. Col.	<0.50	0.500	mg/L N-NO3	07/14/95	TLO
Sulfate, Turbidimetric	60.0	5.0	mg/L SO4	07/26/95	TLO
Total Diss Solids at 180°C	2100.0	1.0	mg/L	07/26/95	TLO

Sample: 01CW Duplicate Water **Collected: 07/13/95** **Category: WATER**

Test Description	Result	Limit	Units	Analyzed	By
Phenols, Manual 4AAP	<0.005	0.0050	mg/L	07/28/95	TLO

Sample: 01DW Duplicate Water **Collected: 07/13/95** **Category: WATER**

Test Description	Result	Limit	Units	Analyzed	By
Ammonia-N	11.20	5.00	mg/L	07/28/95	SS
Chemical Oxygen Demand	146.0	10.0	mg/L O2	07/28/95	TLO

Sample: 01EW Duplicate Water **Collected: 07/13/95** **Category: WATER**

Test Description	Result	Limit	Units	Analyzed	By
Dissolved Arsenic, GFAAS	<0.010	0.010	mg/L	07/18/95	KAK
Dissolved Barium, ICAPES	0.718	0.050	mg/L	07/20/95	CPV
Dissolved Boron, ICAPES	0.554	0.020	mg/L	07/21/95	SEC
Dissolved Cadmium, GFAAS	<0.0010	0.0010	mg/L	07/19/95	KAK
Dissolved Chromium, ICAPES	<0.020	0.020	mg/L	07/20/95	CPV
Dissolved Copper, ICAPES	<0.020	0.020	mg/L	07/20/95	CPV
Dissolved Iron, ICAPES	19.800	0.100	mg/L	07/20/95	CPV
Dissolved Lead, GFAAS	<0.0050	0.0050	mg/L	07/17/95	KAK
Dissolved Manganese, ICAPES	0.634	0.010	mg/L	07/20/95	CPV
Dissolved Mercury, CVAAS	<0.00050	0.0005	mg/L	07/18/95	KAK
Dissolved Selenium, GFAAS	<0.010	0.010	mg/L	07/18/95	KAK
Dissolved Silver, ICAPES	<0.010	0.010	mg/L	07/20/95	CPV
Dissolved Sodium, ICAPES	118.00	5.00	mg/L	07/19/95	SEC
Dissolved Zinc, ICAPES	<0.010	0.010	mg/L	07/20/95	CPV

TEST RESULTS BY SAMPLE

Sample Description: Duplicate Water Lab No: 01A
Test Description: Volatile Organics, PATGCMS Method: SW846_8260 Test Code: VOC_44
Collected: 07/13/95 Category: WATER

PARAMETER	CAS NUMBER	RESULT	LIMIT	BLANK	BLANK LIMIT
Dichlorodifluoromethane	75-71-8	ND	10	ND	10
Chloromethane	74-87-3	BQL	10	ND	10
Vinyl chloride	75-01-4	BQL	10	ND	10
Bromomethane	74-83-9	BQL	10	BQL	10
Chloroethane	75-00-3	540	250	ND	10
Trichlorofluoromethane	75-69-4	ND	10	ND	10
Acrolein	107-02-8	ND	25	ND	25
Acetone	67-64-1	BQL	25	BQL	25
1,1-Dichloroethene	75-35-4	ND	5.0	ND	5.0
Iodomethane	74-88-4	ND	5.0	ND	5.0
Acrylonitrile	107-13-1	ND	5.0	ND	5.0
Methylene chloride	75-09-2	19	5.0	BQL	5.0
Carbon disulfide	75-15-0	ND	5.0	ND	5.0
trans-1,2-Dichloroethene	156-60-5	24	5.0	ND	5.0
1,1-Dichloroethane	75-34-3	ND	5.0	ND	5.0
Vinyl acetate	108-05-4	ND	25	ND	25
2-Butanone (MEK)	78-93-3	BQL	10	BQL	10
cis-1,2-Dichloroethene	159-59-2	ND	5.0	ND	5.0
Chloroform	67-66-3	ND	5.0	ND	5.0
1,1,1-Trichloroethane	71-55-6	ND	5.0	ND	5.0
1,2-Dichloroethane	107-06-2	ND	5.0	ND	5.0
Benzene	71-43-2	470	120	ND	5.0

TEST RESULTS BY SAMPLE

Sample Description: Duplicate Water Lab No: 01A
Test Description: Volatile Organics, PATGCMS Method: SW846_8260 Test Code: VOC_44
Collected: 07/13/95 Category: WATER

Carbon tetrachloride	56-23-5	ND	5.0	ND	5.0
1,2-Dichloropropane	78-87-5	ND	5.0	ND	5.0
Dibromomethane	106-93-4	ND	5.0	ND	5.0
Trichloroethene	79-01-6	ND	5.0	ND	5.0
2-Chloroethyl vinyl ether	110-75-8	ND	10	ND	10
Bromodichloromethane	75-27-4	ND	5.0	ND	5.0
2-Hexanone	591-78-6	ND	5.0	ND	5.0
trans-1,3-Dichloropropene	10061-02-6	ND	5.0	ND	5.0
cis-1,3-Dichloropropene	10061-01-5	ND	5.0	ND	5.0
Toluene	108-88-3	BQL	5.0	ND	5.0
1,1,2-Trichloroethane	79-00-5	ND	5.0	ND	5.0
Ethylmethacrylate	97-63-2	ND	10	ND	10
4-Methyl-2-pentanone (MIBK)	108-10-1	31	5.0	ND	5.0
Dibromochloromethane	124-48-1	ND	5.0	ND	5.0
Tetrachloroethene	127-18-4	ND	5.0	ND	5.0
Chlorobenzene	108-90-7	ND	5.0	ND	5.0
Ethylbenzene	100-41-4	ND	5.0	ND	5.0
Total xylenes	1330-20-7	ND	5.0	ND	5.0
Bromoform	75-25-2	ND	5.0	ND	5.0
Styrene	500-42-5	ND	5.0	ND	5.0
1,1,2,2-Tetrachloroethane	79-34-5	ND	5.0	ND	5.0
1,2,3-Trichloropropane	96-18-4	ND	5.0	ND	5.0
1,3-Dichlorobenzene	541-73-1	ND	5.0	ND	5.0
1,4-Dichlorobenzene	106-46-7	ND	5.0	ND	5.0
1,2-Dichlorobenzene	95-50-1	ND	5.0	ND	5.0

TEST RESULTS BY SAMPLE

Sample Description: Duplicate Water Lab No: 01A
Test Description: Volatile Organics, PATGCMS Method: SW846_8260 Test Code: VOC_44
Collected: 07/13/95 Category: WATER

SURROGATE	%RECOVERY	LIMITS
1,2-Dichloroethane-d4	95	79 - 114
Toluene-d8	108	75 - 126
p-Bromofluorobenzene	102	71 - 114

Analytical Run Information:

EXTRACTED	
DATE RUN	07/14/95
ANALYST	JM
INSTRUMENT	5971MS
FILE ID	0901003.D
CONC FACTOR	1.0
UNITS	ug/L

ATC BLATTERT INC.

CHAIN OF CUSTODY RECORD

Sheet _____ of _____

Geological & Environmental Engineering Services

5214 S East Street • Indianapolis, IN 46227 • (317) 787-9167 • Fax (317) 788-0683

9507277 9507258

Project No.
1408 Griffith

Samplers: (signature)
Dale Mac

Station No.	Date	Time	Comp	Grab	Station Location	No. of Containers	Phase II	Phase I	BTEX	LEAD	VOCs		REMARKS
MW-4S	7/13	8:10		✓		6	✓						
MW-4D		8:45		✓		6	✓						
Duplicate				✓		6	✓						
MW-5S		9:35		✓		6		✓					
MW-5D		9:41		✓		6		✓					
MW-3S		10:15		✓		6		✓					
MW-3D		10:40		✓		6		✓					
MW-2S		11:20		✓		6		✓					
MW-2D		11:40		✓		6		✓					
MW-1S		12:25		✓		6		✓					
MW-1D		12:40		✓		4		✓					
Trip Blank	↓			✓			✓						

Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time	Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time
Dale Mac 4:05 7/13	7/13 4:05		
Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time	Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time
Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time	Remarks:	
Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time		

CERTIFICATE OF ANALYSIS

ATC Blattert Inc.
5214 South East Street
Suite 1, Park 31 South
Indianapolis, Indiana 46227
Attn: David Norris
Invoice Number:

Order #: 95-07-288
Date: 07/31/95 15:04
Work ID: 1408 Griffith Trip Blank
Date Received: 07/13/95
Date Completed: 07/31/95
Client Code: BLATTERT

SAMPLE IDENTIFICATION

Sample Number	Sample Description	Sample Number	Sample Description
01	Trip Blank Water		

This report may not be reproduced except in full, without the written approval of the laboratory. All results relate only to the items tested.

Certified By

Environmental Service Group
A2LA ACCREDITED
5933 WEST 71ST STREET INDIANAPOLIS, INDIANA 46278
(317) 290-1471
FAX (317) 290-1670

TEST RESULTS BY SAMPLE

Sample: 01BW Trip Blank Water **Collected: 07/13/95** **Category: WATER**

Test Description	Result	Limit	Units	Analyzed	By
Chlorides, Titrimetric	<10.0	10.0	mg/L	07/27/95	MB
Fluoride	<0.020	0.020	mg/L	07/18/95	TLO
N-Nitrate, Cd Reduct. Col.	<0.50	0.500	mg/L N-NO3	07/14/95	TLO
Sulfate, Turbidimetric	<5.0	5.0	mg/L SO4	07/26/95	TLO
Total Diss Solids at 180°C	<1.0	1.0	mg/L	07/26/95	TLO

Sample: 01CW Trip Blank Water **Collected: 07/13/95** **Category: WATER**

Test Description	Result	Limit	Units	Analyzed	By
Phenols, Manual 4AAP	<0.005	0.0050	mg/L	07/28/95	TLO

Sample: 01DW Trip Blank Water **Collected: 07/13/95** **Category: WATER**

Test Description	Result	Limit	Units	Analyzed	By
Ammonia-N	<5.0	5.00	mg/L	07/28/95	SS
Chemical Oxygen Demand	<10.0	10.0	mg/L O2	07/28/95	TLO

Sample: 01EW Trip Blank Water **Collected: 07/13/95** **Category: WATER**

Test Description	Result	Limit	Units	Analyzed	By
Dissolved Arsenic, GFAAS	<0.010	0.010	mg/L	07/18/95	KAK
Dissolved Barium, ICAPES	<0.050	0.050	mg/L	07/20/95	CPV
Dissolved Boron, ICAPES	<0.020	0.020	mg/L	07/21/95	SEC
Dissolved Cadmium, GFAAS	<0.0010	0.0010	mg/L	07/19/95	KAK
Dissolved Chromium, ICAPES	<0.020	0.020	mg/L	07/20/95	CPV
Dissolved Copper, ICAPES	<0.020	0.020	mg/L	07/20/95	CPV
Dissolved Iron, ICAPES	<0.010	0.010	mg/L	07/20/95	CPV
Dissolved Lead, GFAAS	<0.0050	0.0050	mg/L	07/17/95	KAK
Dissolved Manganese, ICAPES	<0.010	0.010	mg/L	07/20/95	CPV
Dissolved Mercury, CVAAS	<0.00050	0.0005	mg/L	07/18/95	KAK
Dissolved Selenium, GFAAS	<0.010	0.010	mg/L	07/18/95	KAK
Dissolved Silver, ICAPES	<0.010	0.010	mg/L	07/20/95	CPV
Dissolved Sodium, ICAPES	<1.00	1.00	mg/L	07/19/95	SEC
Dissolved Zinc, ICAPES	<0.010	0.010	mg/L	07/20/95	CPV

TEST RESULTS BY SAMPLE

Sample Description: Trip Blank Water Lab No: 01A
Test Description: Volatile Organics, PATGCMS Method: SW846_8260 Test Code: VOC_44
Collected: 07/13/95 Category: WATER

PARAMETER	CAS NUMBER	RESULT	LIMIT	BLANK	BLANK LIMIT
Dichlorodifluoromethane	75-71-8	ND	10	ND	10
Chloromethane	74-87-3	ND	10	ND	10
Vinyl chloride	75-01-4	ND	10	ND	10
Bromomethane	74-83-9	BQL	10	BQL	10
Chloroethane	75-00-3	ND	10	ND	10
Trichlorofluoromethane	75-69-4	ND	10	ND	10
Acrolein	107-02-8	ND	25	ND	25
Acetone	67-64-1	BQL	25	BQL	25
1,1-Dichloroethene	75-35-4	ND	5.0	ND	5.0
Iodomethane	74-88-4	ND	5.0	ND	5.0
Acrylonitrile	107-13-1	ND	5.0	ND	5.0
Methylene chloride	75-09-2	ND	5.0	BQL	5.0
Carbon disulfide	75-15-0	ND	5.0	ND	5.0
trans-1,2-Dichloroethene	156-60-5	ND	5.0	ND	5.0
1,1-Dichloroethane	75-34-3	ND	5.0	ND	5.0
Vinyl acetate	108-05-4	ND	25	ND	25
2-Butanone (MEK)	78-93-3	BQL	10	BQL	10
cis-1,2-Dichloroethene	159-59-2	ND	5.0	ND	5.0
Chloroform	67-66-3	ND	5.0	ND	5.0
1,1,1-Trichloroethane	71-55-6	ND	5.0	ND	5.0
1,2-Dichloroethane	107-06-2	ND	5.0	ND	5.0
Benzene	71-43-2	ND	5.0	ND	5.0

TEST RESULTS BY SAMPLE

Sample Description: Trip Blank Water Lab No: 01A
Test Description: Volatile Organics, PATGCMS Method: SW846_8260 Test Code: VOC_44
Collected: 07/13/95 Category: WATER

Carbon tetrachloride	56-23-5	ND	5.0	ND	5.0
1,2-Dichloropropane	78-87-5	ND	5.0	ND	5.0
Dibromomethane	106-93-4	ND	5.0	ND	5.0
Trichloroethene	79-01-6	ND	5.0	ND	5.0
2-Chloroethyl vinyl ether	110-75-8	ND	10	ND	10
Bromodichloromethane	75-27-4	ND	5.0	ND	5.0
2-Hexanone	591-78-6	ND	5.0	ND	5.0
trans-1,3-Dichloropropene	10061-02-6	ND	5.0	ND	5.0
cis-1,3-Dichloropropene	10061-01-5	ND	5.0	ND	5.0
Toluene	108-88-3	ND	5.0	ND	5.0
1,1,2-Trichloroethane	79-00-5	ND	5.0	ND	5.0
Ethylmethacrylate	97-63-2	ND	10	ND	10
4-Methyl-2-pentanone (MIBK)	108-10-1	ND	5.0	ND	5.0
Dibromochloromethane	124-48-1	ND	5.0	ND	5.0
Tetrachloroethene	127-18-4	ND	5.0	ND	5.0
Chlorobenzene	108-90-7	ND	5.0	ND	5.0
Ethylbenzene	100-41-4	ND	5.0	ND	5.0
Total xylenes	1330-20-7	ND	5.0	ND	5.0
Bromoform	75-25-2	ND	5.0	ND	5.0
Styrene	500-42-5	ND	5.0	ND	5.0
1,1,2,2-Tetrachloroethane	79-34-5	ND	5.0	ND	5.0
1,2,3-Trichloropropane	96-18-4	ND	5.0	ND	5.0
1,3-Dichlorobenzene	541-73-1	ND	5.0	ND	5.0
1,4-Dichlorobenzene	106-46-7	ND	5.0	ND	5.0
1,2-Dichlorobenzene	95-50-1	ND	5.0	ND	5.0

TEST RESULTS BY SAMPLE

Sample Description: Trip Blank Water Lab No: 01A
Test Description: Volatile Organics, PATGCMS Method: SW846_8260 Test Code: VOC_44
Collected: 07/13/95 Category: WATER

SURROGATE	%RECOVERY	LIMITS
1,2-Dichloroethane-d4	90	79 - 114
Toluene-d8	103	75 - 126
p-Bromofluorobenzene	101	71 - 114

Analytical Run Information:

EXTRACTED	
DATE RUN	07/14/95
ANALYST	JM
INSTRUMENT	5971MS
FILE ID	0714A.D
CONC FACTOR	1.0
UNITS	ug/L

ATC BLATTERT INC.

CHAIN OF CUSTODY RECORD

Sheet _____ of _____

Geological & Environmental Engineering Services

5214 S East Street • Indianapolis, IN 46227 • (317) 787-9167 • Fax (317) 788-0683

Project No.
1408 Griffith

Samplers: (signature)

Station No.	Date	Time	Comp	Grab	Station Location	No. of Containers	Phase II	Phase I	BTEX	LEAD	VOCs		REMARKS
MW-45	7/13	8:10		✓		6	✓						
MW-40		8:45		✓		6	✓						
Duplicate				✓		6	✓						
MW-55		9:35		✓		6		✓					
MW-50		9:41		✓		6		✓					
MW-35		10:05		✓		6		✓					
MW-30		10:40		✓		6		✓					
MW-25		11:20		✓		6		✓					
MW-20		11:50		✓		6		✓					
MW-15		12:25		✓		4		✓					
MW-10		12:50		✓		4		✓					
Trip Blank				✓			✓						

Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time	Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time
4:05 7/13	7/13 Post		
Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time	Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time
Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time	Remarks:	
Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time		

CERTIFICATE OF ANALYSIS

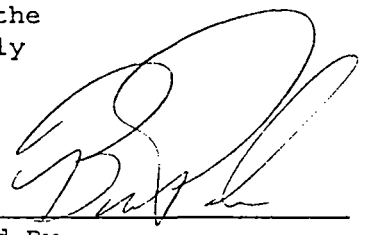
ATC Blattert Inc.
5214 South East Street
Suite 1, Park 31 South
Indianapolis, Indiana 46227
Attn: David Norris
Invoice Number:

Order #: 95-07-277
Date: 07/31/95 14:58
Work ID: 1408 Griffith MW-4S
Date Received: 07/13/95
Date Completed: 07/31/95
Client Code: BLATTERT

SAMPLE IDENTIFICATION

Sample Number	Sample Description	Sample Number	Sample Description
01	MW-4S Water		

This report may not be reproduced except in full, without the written approval of the laboratory. All results relate only to the items tested.



Certified By

Environmental Service Group
A2LA ACCREDITED
5933 WEST 71ST STREET INDIANAPOLIS, INDIANA 46278
(317) 290-1471
FAX (317) 290-1670

TEST RESULTS BY SAMPLE

Sample: 01BW MW-4S Water **Collected: 07/13/95** **Category: WATER**

Test Description	Result	Limit	Units	Analyzed	By
Chlorides, Titrimetric	649.0	10.0	mg/L	07/27/95	MB
Fluoride	0.093	0.020	mg/L	07/18/95	TLO
N-Nitrate, Cd Reduct. Col.	<0.50	0.500	mg/L N-NO3	07/14/95	TLO
Sulfate, Turbidimetric	31.0	5.0	mg/L SO4	07/26/95	TLO
Total Diss Solids at 180°C	2300.0	1.0	mg/L	07/26/95	TLO

Sample: 01CW MW-4S Water **Collected: 07/13/95** **Category: WATER**

Test Description	Result	Limit	Units	Analyzed	By
Phenols, Manual 4AAP	<0.005	0.0050	mg/L	07/28/95	TLO

Sample: 01DW MW-4S Water **Collected: 07/13/95** **Category: WATER**

Test Description	Result	Limit	Units	Analyzed	By
Ammonia-N	<5.0	5.00	mg/L	07/26/95	TLO
Chemical Oxygen Demand	148.0	10.0	mg/L O2	07/28/95	TLO

Sample: 01EW MW-4S Water **Collected: 07/13/95** **Category: WATER**

Test Description	Result	Limit	Units	Analyzed	By
Dissolved Arsenic, GFAAS	<0.010	0.010	mg/L	07/18/95	KAK
Dissolved Barium, ICAPES	0.707	0.050	mg/L	07/20/95	CPV
Dissolved Boron, ICAPES	0.539	0.020	mg/L	07/21/95	SEC
Dissolved Cadmium, GFAAS	<0.0010	0.0010	mg/L	07/19/95	KAK
Dissolved Chromium, ICAPES	<0.020	0.020	mg/L	07/20/95	CPV
Dissolved Copper, ICAPES	<0.020	0.020	mg/L	07/20/95	CPV
Dissolved Iron, ICAPES	18.900	0.100	mg/L	07/20/95	CPV
Dissolved Lead, GFAAS	<0.0050	0.0050	mg/L	07/17/95	KAK
Dissolved Manganese, ICAPES	0.649	0.010	mg/L	07/20/95	CPV
Dissolved Mercury, CVAAS	<0.00050	0.0005	mg/L	07/18/95	KAK
Dissolved Selenium, GFAAS	<0.010	0.010	mg/L	07/18/95	KAK
Dissolved Silver, ICAPES	<0.010	0.010	mg/L	07/20/95	CPV
Dissolved Sodium, ICAPES	112.00	5.00	mg/L	07/19/95	SEC
Dissolved Zinc, ICAPES	<0.010	0.010	mg/L	07/20/95	CPV

TEST RESULTS BY SAMPLE

Sample Description: MW-4S Water Lab No: 01A
Test Description: Volatile Organics, PATGCMS Method: SW846_8260 Test Code: VOC_44
Collected: 07/13/95 Category: WATER

PARAMETER	CAS NUMBER	RESULT	LIMIT	BLANK	BLANK LIMIT
Dichlorodifluoromethane	75-71-8	ND	10	ND	10
Chloromethane	74-87-3	BQL	10	ND	10
Vinyl chloride	75-01-4	BQL	10	ND	10
Bromomethane	74-83-9	BQL	10	BQL	10
Chloroethane	75-00-3	320	250	ND	10
Trichlorofluoromethane	75-69-4	ND	10	ND	10
Acrolein	107-02-8	ND	25	ND	25
Acetone	67-64-1	BQL	25	BQL	25
1,1-Dichloroethene	75-35-4	ND	5.0	ND	5.0
Iodomethane	74-88-4	ND	5.0	ND	5.0
Acrylonitrile	107-13-1	ND	5.0	ND	5.0
Methylene chloride	75-09-2	17	5.0	BQL	5.0
Carbon disulfide	75-15-0	ND	5.0	ND	5.0
trans-1,2-Dichloroethene	156-60-5	23	5.0	ND	5.0
1,1-Dichloroethane	75-34-3	ND	5.0	ND	5.0
Vinyl acetate	108-05-4	ND	25	ND	25
2-Butanone (MEK)	78-93-3	ND	10	BQL	10
cis-1,2-Dichloroethene	159-59-2	ND	5.0	ND	5.0
Chloroform	67-66-3	ND	5.0	ND	5.0
1,1,1-Trichloroethane	71-55-6	ND	5.0	ND	5.0
1,2-Dichloroethane	107-06-2	ND	5.0	ND	5.0
Benzene	71-43-2	400	120	ND	5.0

TEST RESULTS BY SAMPLE

Sample Description: MW-4S Water Lab No: 01A
Test Description: Volatile Organics, PATGCMS Method: SW846_8260 Test Code: VOC_44
Collected: 07/13/95 Category: WATER

Carbon tetrachloride	56-23-5	ND	5.0	ND	5.0
1,2-Dichloropropane	78-87-5	ND	5.0	ND	5.0
Dibromomethane	106-93-4	ND	5.0	ND	5.0
Trichloroethene	79-01-6	ND	5.0	ND	5.0
2-Chloroethyl vinyl ether	110-75-8	ND	10	ND	10
Bromodichloromethane	75-27-4	ND	5.0	ND	5.0
2-Hexanone	591-78-6	ND	5.0	ND	5.0
trans-1,3-Dichloropropene	10061-02-6	ND	5.0	ND	5.0
cis-1,3-Dichloropropene	10061-01-5	ND	5.0	ND	5.0
Toluene	108-88-3	BQL	5.0	ND	5.0
1,1,2-Trichloroethane	79-00-5	ND	5.0	ND	5.0
Ethylmethacrylate	97-63-2	ND	10	ND	10
4-Methyl-2-pentanone (MIBK)	108-10-1	33	5.0	ND	5.0
Dibromochloromethane	124-48-1	ND	5.0	ND	5.0
Tetrachloroethene	127-18-4	ND	5.0	ND	5.0
Chlorobenzene	108-90-7	ND	5.0	ND	5.0
Ethylbenzene	100-41-4	ND	5.0	ND	5.0
Total xylenes	1330-20-7	ND	5.0	ND	5.0
Bromoform	75-25-2	ND	5.0	ND	5.0
Styrene	500-42-5	ND	5.0	ND	5.0
1,1,2,2-Tetrachloroethane	79-34-5	ND	5.0	ND	5.0
1,2,3-Trichloropropane	96-18-4	ND	5.0	ND	5.0
1,3-Dichlorobenzene	541-73-1	ND	5.0	ND	5.0
1,4-Dichlorobenzene	106-46-7	ND	5.0	ND	5.0
1,2-Dichlorobenzene	95-50-1	ND	5.0	ND	5.0

TEST RESULTS BY SAMPLE

Sample Description: MW-4S Water Lab No: 01A
Test Description: Volatile Organics, PATGCMS Method: SW846_8260 Test Code: VOC_44
Collected: 07/13/95 Category: WATER

SURROGATE	%RECOVERY	LIMITS
1,2-Dichloroethane-d4	95	79 - 114
Toluene-d8	107	75 - 126
p-Bromofluorobenzene	100	71 - 114

Analytical Run Information:

EXTRACTED	
DATE RUN	07/14/95
ANALYST	JM
INSTRUMENT	5971MS
FILE ID	0701001.D
CONC FACTOR	1.0
UNITS	ug/L

ATC BLATTERT INC.

CHAIN OF CUSTODY RECORD

Sheet _____ of _____

Geological & Environmental Engineering Services

5214 S East Street • Indianapolis, IN 46227 • (317) 787-9167 • Fax (317) 788-0683

9507274 9507288

Project No.
1408 Griffith

Samplers: (signature)
Dale Mac

Station No.	Date	Time	Comp	Grab	Station Location	No. of Containers	Phase II	Phase I	BTEX	LEAD	VOCs		REMARKS
MW-45	7/13	8:10		✓		6	✓						
MW-40		8:45		✓		6	✓						
Duplicate				✓		6	✓						
MW-55		9:25		✓		6		✓					
MW-50		9:40		✓		6		✓					
MW-35		10:15		✓		6		✓					
MW-30		10:40		✓		6		✓					
MW-25		11:20		✓		6		✓					
MW-20		11:40		✓		6		✓					
MW-15		12:25		✓		6		✓					
MW-10		12:40		✓		6		✓					
Trip Blank	↓			✓		4	✓						

Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time	Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time
Dale Mac 4:05 7/13	7/13 Host		
Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time	Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time
Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time	Remarks:	
Relinquished by: Sign/Date/Time	Rec'd by: Sign/Date/Time		

ESG ENVIRONMENTAL SERVICE GROUP
A DIVISION OF ASTRUM GABRIEL CORPORATION

Rev: 3.12/94.kg

CHAIN OF CUSTODY RECORD

ENVIRONMENTAL SERVICE GROUP
5933 WEST 71 ST. STREET
INDIANAPOLIS, IN. 46278
Phone # (317) 290-1471
Fax # (317) 290-1670

CLIENT: MARATHON OIL ESG Work Order #: 9507532

PROJECT NO.: T-1201-SP+D

PROJECT NAME:

SAMPLERS:(SIGNATURE): [signature]

STA. NO.	DATE	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONTAINERS	O+G	AMEYN	CYN	PHENOL	CHROME	NH3	BOD	COD	TSS	PH	REMARKS
1	7/24/95	0710		X	EAST Thermal Unit Cooling H2O	3											
2	7/24/95	0710		X	WEST THERMA Unit Cooling H2O	3											

RELINQUISHED BY:(SIGNATURE)	DATE	TIME	RECEIVED BY:(SIGNATURE)
[signature]	7/24/95	0912	
RELINQUISHED BY:(SIGNATURE)	DATE	TIME	RECEIVED BY:(SIGNATURE)
RELINQUISHED BY:(SIGNATURE)	DATE	TIME	RECEIVED BY LABORATORY:(SIGNATURE)
			[signature]

REMARKS: Per Contract

November 1997 Production Well Data Evaluation Report American Chemical Services, Inc. Griffith, Indiana

EPA Work Assignment 029-ROBE-05J7
BVSPC Project No. 46517

March 17, 1998

Prepared By

Black & Veatch Special Projects Corp.
101 North Wacker Drive, Suite 1100
Chicago, Illinois 60606

November 1997 Production Well
Data Evaluation Report
American Chemical Services, Inc.

Introduction

Black & Veatch Special Projects Corp. (BVSPC), under the Response Action Contract, has been tasked by the U.S. Environmental Protection Agency (EPA) to provide field oversight during the remedial design and expedited remedial action to EPA Region V in their endeavor to complete remediation of the American Chemical Services (ACS) site. The Respondents are the ACS Technical Committee, and their contractor is Montgomery Watson (MW).

Purpose

The purpose of this document is to present BVSPC's evaluation and comparison of groundwater split sample analytical results with MW's data. BVSPC is tasked to provide this data evaluation report under it's work plan with the EPA.

Sampling Effort

During the week of November 3, 1997, BVSPC collected four split samples from three production wells (IW-1, IW-4, and IW-6) during the field oversight. Two split samples were collected from production well IW-4. Sampling was performed in accordance with the EPA-approved Mini-Quality Assurance Project Plan.

Laboratory

The EPA split samples were analyzed by Contract Laboratory Program (CLP) analytical services in accordance with the procedures outlined in the User's Guide to the CLP, EPA, February 1995. Mitkem Corporation, Warwick, Rhode Island, analyzed the organic samples. EPA Region V Central Regional Laboratory (CRL), Chicago, Illinois, analyzed the inorganic samples. BVSPC assumes that MW's samples were analyzed by IEA for organic and inorganic analyses; however, the data sheets were not provided with the summary table that showed their results.

Data Validation

EPA Region V CRL and/or its ESAT contractor, Lockheed Martin, validated the split sample data and BVSPC reviewed the validated data using the EPA CLP

National Functional Guidelines for Organic Data Review (EPA 540/R-94/012, February 1994) and EPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (EPA 540/R-94/013, February 1994). The MW analytical data used for comparison were provided in the February 1998 Monthly Progress Report dated March 10, 1998. The report does not state if the MW data were validated using the same functional guidelines referenced above.

The EPA split sample analytical results were acceptable; however, due to minor analytical quality control problems, some of the compounds/analytes were qualified. Appendix A contains a copy of the chain-of-custody records, the data validation narratives, and the raw data sheets from EPA for split samples. Qualifiers are fully explained in the narratives.

Data Comparison

BVSPC compared the validated split sample data to MW's data. Summary comparison tables of the data were produced for each of the following analyses:

- Volatile Organic Compounds (Table 1).
- Semivolatile Organic Compounds (Table 2).
- Pesticides/PCBs (Table 3).
- Inorganic Analytes (Table 4).

Generally, both data sets were consistent.

Precision

Precision of the laboratory analyses was assessed by comparing the detected concentrations for each sample for organic and inorganic analysis. The relative percent difference (RPD) was calculated for each pair of results using the following equation:

$$RPD = \frac{Pc - Dc}{(Pc + Dc) / 2} \times 100$$

where:

P_c = Primary Concentration (assumed EPA's data)
D_c = Duplicate Concentration (assumed MW's data)

Sample variation comparison RPD values for compounds/analytes that exceeded the 30% RPD criteria are highlighted in bold and italics in each table. All

other compounds/analytes were consistent, comparable, and within the 30% RPD range between EPA and MW's data.

Conclusions

The overall sample analytical results between EPA and MW's data were comparable; however, differences in concentrations for some compounds/analytes between EPA and MW's data were noted. These compounds/analytes should be viewed carefully in future sampling events.

The following issues were noted during the data evaluation:

- MW did not provide the analytical data sheets for their results, including the Tentatively Identified Compounds.
- It should be noted that high levels of lead, cadmium, and zinc were detected in the EPA and MW samples collected from IW-6, which had apparently been screened to draw water from the Lower Aquifer.
- It should be noted that high levels of vinyl chloride, cis-1,2-dichloroethene, trichloroethene, and tetrachloroethene were detected at concentrations above the groundwater remediation levels in the EPA split sample collected from IW-1.
- It should be noted that a high level of bis(2-ethylhexyl)phthalate was detected at a concentration above the groundwater remediation level in the EPA split sample collected from IW-4.

Compound/Analyte	Table 1 November 1997 Production Well Abandonment Sample Data Comparison American Chemical Services, Inc. Sample Location/Concentration (µg/l)			
	IW1		IW6	
	EADS0 USEPA	ACS-GW-IW1 PRP	EADS2 USEPA	ACS-GW-IW6 PRP
Volatile Organic Compounds				
Chloromethane	1 U	2 U	1 U	1 U
Bromomethane	1 U	2 U	1 U	1 U
Vinyl chloride	7	8	1 U	1 U
Chloroethane	1 U	2 U	1 U	1 U
Methylene chloride	2 U	5 U	2 U	2 U
Acetone	5 U	12 U	5 U	5 U
Carbon disulfide	1 U	2 U	1 U	0.1 J
1,1-Dichloroethene	1 U	2 U	1 U	1 U
1,1-Dichloroethane	9	8	1 U	1 U
cis-1,2-Dichloroethene	60 E	47	1 U	1 U
trans-1,2-Dichloroethene	0.7 J	0.6 J	1 U	1 U
Chloroform	1 U	2 U	1 U	1 U
1,2-Dichloroethane	1 U	2 U	1 U	1 U
2-Butanone	5 U	12 U	5 U	5 U
Bromochloromethane	1 U	2 U	1 U	1 U
1,1,1-trichloroethane	1 U	2 U	1 U	1 U
Carbon tetrachloride	1 U	2 U	1 U	1 U
Bromodichloromethane	1 U	2 U	1 U	1 U
1,2-Dichloropropane	1 U	2 U	1 U	1 U
cis-1,3-dichloropropene	1 U	2 U	1 U	1 U
Trichloroethene	***10***	*7*	1 U	1 U
Dibromochloromethane	1 U	2 U	1 U	1 U
1,1,2-Trichloroethane	1 U	2 U	1 U	1 U
Benzene	0.8 J	0.7 J	1 U	1 U
trans-1,3-Dichloropropene	1 U	2 U	1 U	1 U
Bromoform	1 U	2 U	1 U	1 U
4-Methyl-2-pentanone	5 U	12 U	5 U	5 U
2-Hexanone	5 U	12 U	5 U	5 U
Tetrachloroethene	***18***	***12***	1 U	1 U
1,1,2,2-Tetrachloroethane	1 U	2 U	1 U	1 U
1,2-Dibromoethane	1 U	2 U	1 U	1 U
Toluene	5	4	1 U	1 U
Chlorobenzene	1 U	2 U	1 U	1 U
Ethylbenzene	*3*	*2 J*	1 U	0.1 J
Styrene	1 U	2 U	1 U	1 U
Xylene (total)	*11*	*8*	1 U	0.2 J
1,3-Dichlorobenzene	1 U	2 U	1 U	1 U
1,4-Dichlorobenzene	1 U	2 U	1 U	1 U
1,2-Dichlorobenzene	1 U	2 U	1 U	1 U
1,2-Dibromo-3-chloropropane	1 U	2 U	1 U	1 U
1,2,4-Trichlorobenzene	1 U	--	1 U	--
VOA TICs	0	--	2	--

Bold and italicized results have %RPD > 30%.

t:\projects\acs\data\prod-wel\voa.wk4

Compound/Analyte	Table 1 November 1997 Production Well Abandonment Sample Data Comparison *American Chemical Services, Inc.* Sample Location/Concentration (µg/l)			
	IW4		IW4D	
	EADS1 USEPA	ACS-GW-IW4 PRP	EADQ8 USEPA	ACS-GW-IW4D PRP
Volatile Organic Compounds				
Chloromethane	1 U	1 U	1 U	1 U
Bromomethane	1 U	1 U	1 U	1 U
Vinyl chloride	1 U	1 U	1 U	1 U
Chloroethane	1 U	1 U	1 U	1 U
Methylene chloride	2 U	2 U	2 U	2 U
Acetone	5 U	5 U	5 U	5 U
Carbon disulfide	1 U	0.2 J	1 U	0.1 J
1,1-Dichloroethene	1 U	1 U	1 U	1 U
1,1-Dichloroethane	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	1 U	0.4 J	1 U	0.4 J
trans-1,2-Dichloroethene	1 U	1 U	1 U	1 U
Chloroform	1 U	0.2 J	1 U	1 U
1,2-Dichloroethane	1 U	1 U	1 U	1 U
2-Butanone	5 U	5 U	5 U	5 U
Bromochloromethane	1 U	1 U	1 U	1 U
1,1,1-trichloroethane	1 U	1 U	1 U	1 U
Carbon tetrachloride	1 U	1 U	1 U	1 U
Bromodichloromethane	1 U	0.2 J	1 U	1 U
1,2-Dichloropropane	1 U	1 U	1 U	1 U
cis-1,3-dichloropropene	1 U	1 U	1 U	1 U
Trichloroethene	1 U	0.4 J	1 U	0.2 J
Dibromochloromethane	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	1 U	1 U	1 U	1 U
Benzene	1 U	1 U	1 U	1 U
trans-1,3-Dichloropropene	1 U	1 U	1 U	1 U
Bromoform	1 U	1 U	1 U	1 U
4-Methyl-2-pentanone	5 U	5 U	5 U	5 U
2-Hexanone	5 U	5 U	5 U	5 U
Tetrachloroethene	0.5 J	0.4 J	1 U	0.3 J
1,1,2,2-Tetrachloroethane	1 U	1 U	1 U	1 U
1,2-Dibromoethane	1 U	1 U	1 U	1 U
Toluene	1 U	0.5 J	1 U	0.2 J
Chlorobenzene	1 U	1 U	1 U	1 U
Ethylbenzene	1 U	0.2 J	1 U	0.1 J
Styrene	1 U	1 U	1 U	1 U
Xylene (total)	***0.6 J***	***0.9 J***	1 U	0.6 J
1,3-Dichlorobenzene	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	1 U	1 U	1 U	1 U
1,2-Dibromo-3-chloropropane	1 U	1 U	1 U	1 U
1,2,4-Trichlorobenzene	1 U	--	1 U	--
VOA TICs	0	--	0	--

Bold and italicized results have %RPD > 30%.

Compound/Analyte	Table 2a November 1997 Production Well Abandonment Sample Data Comparison American Chemical Services, Inc. Sample Location/Concentration (µg/l)			
	IW1		IW6	
	EADS0 USEPA	ACS-GW-IW1 PRP	EADS2 USEPA	ACS-GW-IW6 PRP
Semivolatile Organic Compounds				
Phenol	5 U	5 U	5 U	5 U
bis(2-Chloroethyl)ether	5 U	5 U	5 U	5 U
2-Chlorophenol	5 U	5 U	5 U	5 U
1,3-Dichlorobenzene	--	5 U	--	5 U
1,4-Dichlorobenzene	--	5 U	--	5 U
1,2-Dichlorobenzene	--	5 U	--	5 U
2-Methylphenol	5 U	5 U	5 U	5 U
2,2'-oxybis-(1-Chloropropane)	5 U	5 U	5 U	5 U
4-Methylphenol	5 U	5 U	5 U	5 U
N-Nitroso-di-n-propylamine	5 U	5 U	5 U	5 U
Hexachloroethane	5 U	5 U	5 U	5 U
Nitrobenzene	5 U	5 U	5 U	5 U
Isophorone	5 U	5 U	5 U	5 U
2-Nitrophenol	5 U	5 U	5 U	5 U
2,4-Dimethylphenol	5 U	5 U	5 U	5 U
bis(2-Chloroethoxy)methane	5 U	5 U	5 U	5 U
2,4-Dichlorophenol	5 U	5 U	5 U	5 U
1,2,4-Trichlorobenzene	--	5 U	--	5 U
Naphthalene	5 U	5 U	5 U	5 U
4-Chloroaniline	5 U	5 U	5 U	5 U
Hexachlorobutadiene	5 U	5 U	5 U	5 U
4-Chloro-3-methylphenol	5 U	5 U	5 U	5 U
2-Methylnaphthalene	5 U	5 U	5 U	5 U
Hexachlorocyclopentadiene	5 U	5 U	5 U	5 U
2,4,6-Trichlorophenol	5 U	5 U	5 U	5 U
2,4,5-Trichlorophenol	20 U	20 U	20 U	20 U
2-Chloronaphthalene	5 U	5 U	5 U	5 U
2-Nitroaniline	20 U	20 U	20 U	20 U
Dimethylphthalate	5 U	5 U	5 U	5 U
Acenaphthylene	5 U	5 U	5 U	5 U
2,6-Dinitrotoluene	5 U	5 U	5 U	5 U
3-Nitroaniline	20 U	20 U	20 U	20 U
Acenaphthene	5 U	5 U	5 U	5 U
2,4-Dinitrophenol	20 U	20 U	20 U	20 U
4-Nitrophenol	20 U	20 U	20 U	20 U
Dibenzofuran	5 U	5 U	5 U	5 U
2,4-Dinitrotoluene	5 U	5 U	5 U	5 U
Diethylphthalate	5 U	5 U	5 U	5 U
4-Chlorophenyl-phenylether	5 U	5 U	5 U	5 U

Compound/Analyte	Table 2a November 1997 Production Well Abandonment Sample Data Comparison American Chemical Services, Inc. Sample Location/Concentration (µg/l)			
	IW4		IW4D	
	EADS1 USEPA	ACS-GW-IW4 PRP	EADQ8 USEPA	ACS-GW-IW4D PRP
Semivolatile Organic Compounds				
Phenol	*6*	*12*	5 U	0.8 J
bis(2-Chloroethyl)ether	5 U	5 U	5 U	5 U
2-Chlorophenol	5 U	5 U	5 U	5 U
1,3-Dichlorobenzene	--	5 U	--	5 U
1,4-Dichlorobenzene	--	5 U	--	5 U
1,2-Dichlorobenzene	--	5 U	--	5 U
2-Methylphenol	5 U	5 U	5 U	5 U
2,2'-oxybis-(1-Chloropropane)	5 U	5 U	5 U	5 U
4-Methylphenol	5 U	5 U	5 U	5 U
N-Nitroso-di-n-propylamine	5 U	5 U	5 U	5 U
Hexachloroethane	5 U	5 U	5 U	5 U
Nitrobenzene	5 U	5 U	5 U	5 U
Isophorone	5 U	5 U	5 U	5 U
2-Nitrophenol	5 U	5 U	5 U	5 U
2,4-Dimethylphenol	5 U	5 U	5 U	5 U
bis(2-Chloroethoxy)methane	5 U	5 U	5 U	5 U
2,4-Dichlorophenol	5 U	5 U	5 U	5 U
1,2,4-Trichlorobenzene	--	5 U	--	5 U
Naphthalene	5 U	5 U	5 U	5 U
4-Chloroaniline	5 U	5 U	5 U	5 U
Hexachlorobutadiene	5 U	5 U	5 U	5 U
4-Chloro-3-methylphenol	5 U	5 U	5 U	5 U
2-Methylnaphthalene	5 U	5 U	5 U	5 U
Hexachlorocyclopentadiene	5 U	5 U	5 U	5 U
2,4,6-Trichlorophenol	5 U	5 U	5 U	5 U
2,4,5-Trichlorophenol	20 U	20 U	20 U	20 U
2-Chloronaphthalene	5 U	5 U	5 U	5 U
2-Nitroaniline	20 U	20 U	20 U	20 U
Dimethylphthalate	5 U	5 U	5 U	5 U
Acenaphthylene	5 U	5 U	5 U	5 U
2,6-Dinitrotoluene	5 U	5 U	5 U	5 U
3-Nitroaniline	20 U	20 U	20 U	20 U
Acenaphthene	5 U	5 U	5 U	5 U
2,4-Dinitrophenol	20 U	20 U	20 U	20 U
4-Nitrophenol	20 U	20 U	20 U	20 U
Dibenzofuran	5 U	5 U	5 U	5 U
2,4-Dinitrotoluene	5 U	5 U	5 U	5 U
Diethylphthalate	5 U	0.8 J	5 U	5 U
4-Chlorophenyl-phenylether	5 U	5 U	5 U	5 U

Compound/Analyte	Table 2b November 1997 Production Well Abandonment Sample Data Comparison American Chemical Services, Inc. Sample Location/Concentration (µg/l)			
	IW1		IW6	
	EADS0 USEPA	ACS-GW-IW1 PRP	EADS2 USEPA	ACS-GW-IW6 PRP
Semivolatile Organic Compounds				
Fluorene	5 U	5 U	5 U	5 U
4-Nitroaniline	20 U	20 U	20 U	20 U
4,6-Dinitro-2-methylphenol	20 U	20 U	20 U	20 U
N-Nitrosodiphenylamine	5 U	5 U	5 U	5 U
4-Bromophenyl-phenylether	5 U	5 U	5 U	5 U
Hexachlorobenzene	5 U	5 U	5 U	5 U
Pentachlorophenol	20 U	20 U	20 U	20 U
Phenanthrene	5 U	5 U	5 U	5 U
Anthracene	5 U	5 U	5 U	5 U
Carbazole	--	5 U	--	5 U
Di-n-butylphthalate	5 U	5 U	5 U	5 U
Fluoranthene	5 U	5 U	5 U	5 U
Pyrene	5 U	5 U	5 U	5 U
Butylbenzylphthalate	5 U	5 U	5 U	5 U
3,3'-Dichlorobenzidine	5 U	5 U	5 U	5 U
Benzo(a)anthracene	5 U	5 U	5 U	5 U
Chrysene	5 U	5 U	5 U	5 U
bis(2-Ethylhexyl)phthalate	5	5 J	2 J	5 U
Di-n-octylphthalate	5 U	5 U	5 U	5 U
Benzo(b)fluoranthene	5 U	5 U	5 U	5 U
Benzo(k)fluoranthene	5 U	5 U	5 U	5 U
Benzo(a)pyrene	5 U	5 U	5 U	5 U
Indeno(1,2,3-cd)pyrene	5 U	5 U	5 U	5 U
Dibenzo(a,h)anthracene	5 U	5 U	5 U	5 U
Benzo(g,h,i)perylene	5 U	5 U	5 U	5 U
SVOA TICs	0	--	1	--

Compound/Analyte	Table 2b November 1997 Production Well Abandonment Sample Data Comparison American Chemical Services, Inc. Sample Location/Concentration (µg/l)			
	IW4		IW4D	
	EADS1 USEPA	ACS-GW-IW4 PRP	EADQ8 USEPA	ACS-GW-IW4D PRP
Semivolatile Organic Compounds				
Fluorene	5 U	5 U	5 U	5 U
4-Nitroaniline	20 U	20 U	20 U	20 U
4,6-Dinitro-2-methylphenol	20 U	20 U	20 U	20 U
N-Nitrosodiphenylamine	5 U	5 U	5 U	5 U
4-Bromophenyl-phenylether	5 U	5 U	5 U	5 U
Hexachlorobenzene	5 U	5 U	5 U	5 U
Pentachlorophenol	20 U	20 U	20 U	20 U
Phenanthrene	5 U	5 U	5 U	5 U
Anthracene	5 U	5 U	5 U	5 U
Carbazole	--	5 U	--	5 U
Di-n-butylphthalate	5 U	5 U	5 U	5 U
Fluoranthene	5 U	5 U	5 U	5 U
Pyrene	5 U	5 U	5 U	5 U
Butylbenzylphthalate	5 U	5 U	5 U	5 U
3,3'-Dichlorobenzidine	5 U	5 U	5 U	5 U
Benzo(a)anthracene	5 U	5 U	5 U	5 U
Chrysene	5 U	5 U	5 U	5 U
bis(2-Ethylhexyl)phthalate	***230 E***	***23***	5 U	5 U
Di-n-octylphthalate	5 U	5 U	5 U	5 U
Benzo(b)fluoranthene	5 U	5 U	5 U	5 U
Benzo(k)fluoranthene	5 U	5 U	5 U	5 U
Benzo(a)pyrene	5 U	5 U	5 U	5 U
Indeno(1,2,3-cd)pyrene	5 U	5 U	5 U	5 U
Dibenzo(a,h)anthracene	5 U	5 U	5 U	5 U
Benzo(g,h,i)perylene	5 U	5 U	5 U	5 U
SVOA TICs	1	--	0	--

Bold and italicized results have %RPD > 30%.

t:\projects\acs\data\prod-wel\svoa2.wk4

Compound/Analyte	Table 3 November 1997 Production Well Abandonment Sample Data Comparison American Chemical Services, Inc. Sample Location/Concentration (µg/l)			
	IW1		IW6	
	EADS0 USEPA	ACS-GW-IW1 PRP	EADS2 USEPA	ACS-GW-IW6 PRP
Pesticides/PCBs				
Alpha-BHC	0.010 U	0.002 U	0.010 U	0.002 U
Beta-BHC	0.010 U	0.002 U	0.010 U	0.002 U
Delta-BHC	0.010 U	0.002 U	0.010 U	0.002 U
Lindane	0.010 U	0.002 U	0.010 U	0.002 U
Heptachlor	0.010 U	0.002 U	0.010 U	0.002 U
Aldrin	0.010 U	0.002 U	0.010 U	0.006 P
Heptachlor Epoxide	0.010 U	0.002 U	0.010 U	0.002 U
Endosulfan I	0.010 U	0.002 U	0.010 U	0.002 U
Dieldrin	0.020 U	0.004 U	0.020 U	0.004 U
p,p'-DDE	0.020 U	0.004 U	0.020 U	0.004 U
Endrin	0.020 U	0.004 U	0.020 U	0.004 U
Endosulfan II	0.020 U	0.004 U	0.020 U	0.004 U
p,p'-DDD	0.020 U	0.004 U	0.020 U	0.002 JP
Endosulfan Sulfate	0.020 U	0.004 U	0.020 U	0.004 U
p,p'-DDT	0.020 U	0.004 U	0.020 U	0.004 U
Methoxychlor	0.10 U	0.02 U	0.10 U	0.02 U
Endrin Ketone	0.020 U	0.004 U	0.020 U	0.004 U
Endrin Aldehyde	0.020 U	0.004 U	0.020 U	0.004 U
Alpha-chlordane	0.010 U	0.002 U	0.010 U	0.002 U
Gamma-chlordane	0.010 U	0.002 U	0.010 U	0.002 U
Toxaphene	1.0 U	0.2 U	1.0 U	0.2 U
Aroclor 1016	0.20 U	0.04 U	0.20 U	0.04 U
Aroclor 1221	0.40 U	0.08 U	0.40 U	0.08 U
Aroclor 1232	0.20 U	0.04 U	0.20 U	0.04 U
Aroclor 1242	0.20 U	0.04 U	0.20 U	0.04 U
Aroclor 1248	0.20 U	0.04 U	0.20 U	0.19
Aroclor 1254	0.20 U	0.04 U	0.20 U	0.04 U
Aroclor 1260	0.20 U	0.04 U	0.20 U	0.04 U

Compound/Analyte	Table 3 November 1997 Production Well Abandonment Sample Data Comparison American Chemical Services, Inc. Sample Location/Concentration (µg/l)			
	IW4		IW4D	
	EADS1 USEPA	ACS-GW-IW4 PRP	EADQ8 USEPA	ACS-GW-IW4D PRP
Pesticides/PCBs				
Alpha-BHC	0.010 U	0.002 U	0.010 U	0.002 U
Beta-BHC	0.010 U	0.002 U	0.010 U	0.002 U
Delta-BHC	0.010 U	0.002 U	0.010 U	0.002 U
Lindane	0.010 U	0.002 U	0.010 U	0.002 U
Heptachlor	0.010 U	0.002 U	0.010 U	0.002 U
Aldrin	0.010 U	0.002 U	0.010 U	0.002 U
Heptachlor Epoxide	0.010 U	0.002 U	0.010 U	0.002 U
Endosulfan I	0.010 U	0.002 U	0.010 U	0.002 U
Dieldrin	0.020 U	0.004 U	0.020 U	0.004 U
p,p'-DDE	0.020 U	0.004 U	0.020 U	0.004 U
Endrin	0.020 U	0.004 U	0.020 U	0.004 U
Endosulfan II	0.020 U	0.004 U	0.020 U	0.004 U
p,p'-DDD	0.020 U	0.004 U	0.020 U	0.004 U
Endosulfan Sulfate	0.020 U	0.004 U	0.020 U	0.004 U
p,p'-DDT	0.020 U	0.004 U	0.020 U	0.004 U
Methoxychlor	0.10 U	0.02 U	0.10 U	0.02 U
Endrin Ketone	0.020 U	0.004 U	0.020 U	0.004 U
Endrin Aldehyde	0.020 U	0.004 U	0.020 U	0.004 U
Alpha-chlordane	0.010 U	0.002 U	0.010 U	0.002 U
Gamma-chlordane	0.010 U	0.002 U	0.010 U	0.002 U
Toxaphene	1.0 U	0.2 U	1.0 U	0.2 U
Aroclor 1016	0.20 U	0.04 U	0.20 U	0.04 U
Aroclor 1221	0.40 U	0.08 U	0.40 U	0.08 U
Aroclor 1232	0.20 U	0.04 U	0.20 U	0.04 U
Aroclor 1242	0.20 U	0.04 U	0.20 U	0.04 U
Aroclor 1248	0.20 U	0.04 U	0.20 U	0.04 U
Aroclor 1254	0.20 U	0.04 U	0.20 U	0.04 U
Aroclor 1260	0.20 U	0.04 U	0.20 U	0.04 U

Compound/Analyte	Table 4 November 1997 Production Well Abandonment Sample Data Comparison American Chemical Services, Inc. Sample Location/Concentration (µg/l)			
	IW1		IW6	
	98ZB03S02 USEPA	ACS-GW-IW1 PRP	98ZB03S01 USEPA	ACS-GW-IW6 PRP
Inorganic Analytes				
Aluminum	80 U	120 UJB	***169***	***272***
Antimony	1 U	1 U	1 U	1 U
Arsenic	0.8 U	2 U	4.3	5.6 B
Barium	62.3	60.3 B	144	140 B
Beryllium	2 U	1 U	2 U	1 U
Cadmium	2.4	2.4 B	31	35.8
Calcium	77,100	74,200	82,900	76,300
Chromium	10 U	7.7 B	10 U	6.7 B
Cobalt	6 U	1 U	6 U	1 U
Copper	***19.8***	***32.4***	***7.8***	***26***
Iron	1,850	1,810	2,750	2,640
Lead	62	76.6	242	304
Magnesium	52,700	52,400	37,800	36,400
Manganese	***16.7***	***11.5***	60.1	53.6
Mercury	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	20 U	8.2 B	20 U	4.2 B
Potassium	5,480	7,350	***2,140***	***3,120***
Selenium	1 U	2 U	1 U	2 U
Silver	6 U	1 U	6 U	1 U
Sodium	49,500	49,200	46,100	47,000
Thallium	2 U	2 U	2 U	2 U
Vanadium	5 U	1 U	5 U	1 U
Zinc	2,130	2,020	30,600	33,300
Cyanide	8 U	10 UJN	8 U	10 UJN

Compound/Analyte	Table 4 November 1997 Production Well Abandonment Sample Data Comparison American Chemical Services, Inc. Sample Location/Concentration (µg/l)			
	IW4		IW4D	
	98ZB03S03 USEPA	ACS-GW-IW4 PRP	98ZB03S04 USEPA	ACS-GW-IW4D PRP
Inorganic Analytes				
Aluminum	80 U	135 UJB	80 U	53.8 UJB
Antimony	1 U	1 U	1 U	1 U
Arsenic	0.8 U	2 U	0.8 U	2 U
Barium	68.4	65.6 B	76.8	73 B
Beryllium	2 U	1 U	2 U	1 U
Cadmium	6.7	8.3	1.3	1 U
Calcium	60,800	56,600	64,200	58,000
Chromium	***29.6***	***40.6***	10 U	2.1 B
Cobalt	6 U	1.7 B	6 U	1 U
Copper	***6 U***	***17.8 B***	6 U	3.9 B
Iron	***3,580***	***5,210***	***939***	***584***
Lead	***70***	***122***	***17***	***8.2***
Magnesium	39,700	38,000	40,700	38,400
Manganese	43.9	43.4	***13.6***	***7.2 B***
Mercury	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	33.3	36.5 B	20 U	2 B
Potassium	6,700	8,910 E	5,840	7,680 E
Selenium	1 U	2 U	1 U	2 U
Silver	6 U	1 U	6 U	1 U
Sodium	68,500	63,800	64,200	60,600
Thallium	2 U	2 U	2 U	2 U
Vanadium	5 U	1 U	5 U	1 U
Zinc	9,820	11,200	***1,580***	***818***
Cyanide	8 U	10 UJN	8 U	10 UJN

Bold and italicized results have %RPD > 30%. Table 4-2 t:\projects\acs\data\prod-wel\metals.wk4

APPENDIX

Appendix A

Chain-of-Custody Records
Data Validation Narratives
Analytical Data Sheets
for
USEPA Split Samples

Regional Transmittal Form

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION V

DATE:

SUBJECT: Review of Data
Received for Review on Dec 9, 1997

FROM: Stephen L. Ostrodka, Chief (HSRL-5J)
Superfund Technical Support Section
for Stephen Ostrodka
Richard L Bynish
12/29/97

TO: Data User: B+V

We have reviewed the data for the following case:

SITE NAME: American Chem SVCS (IN)

CASE NUMBER: 25832 SDG NUMBER: EADQ8

Number and Type of Samples: 5 (Water)

Sample Numbers: EADQ8-9 EADS0-2

Laboratory: Mitkem Hrs. for Review: 8.0 ± 0.5 wh

Following are our findings:

the data is usable and acceptable with the qualifications described in the attached narrative.

Richard L Bynish

CC: Cecilia Moore
Acting Region 5 TPO
Mail Code: SM-5J

NARRATIVE

Laboratory: MITKEM CORP Case: 25832
Site: American Chemical Services (IN) SDG: EADQ8

Below is a summary of the out-of-control audits and possible effects on the data for this Case/SDG:

Five (5) low level water samples, numbered EADQ8, EADQ9, EADS0, EADS1, and EADS2 were collected on November 5, 1997. The lab received the samples on November 6, 1997 in good condition. All samples were analyzed for the full list of organic analytes, with the exception of EADQ9 which was only analyzed for VOAs. All were analyzed according to CLP SOW OLCO2.1.

The VOA analyses were performed within the technical holding times of seven (7) days after sample collection for unpreserved samples; therefore the results are acceptable. All pesticides and semivolatile sample extraction were performed within seven (7) days and all analyses were performed within forty (40) days after extraction; therefore the results are acceptable.

Sample EADQ9 was the trip blank.

The Chain-of-Custody list all VOA samples as being preserved with HCl, but the aliquot sent in for sample EADS1 was not preserved. The lab measured the pH of that aliquot to be seven (7).

Reviewed by: Thomas Sedlacek Lockheed Martin/ESAT
Date: December 18, 1997

Laboratory: MITKEM CORP Case: 25832
Site: American Chemical Services (IN) SDG: EADQ8

1. HOLDING TIME

Five (5) low level water samples, numbered EADQ8, EADQ9, EADS0, EADS1, and EADS2 were collected on November 5, 1997. The lab received the samples on November 6, 1997 in good condition. All samples were analyzed for the full list of organic analytes, with the exception of EADQ9 which was only analyzed for VOAs. All were analyzed according to CLP SOW OLCO2.1.

The VOA analyses were performed within the technical holding times of seven (7) days after sample collection for unpreserved samples; therefore the results are acceptable. All pesticides and semivolatile sample extraction were performed within seven (7) days and all analyses were performed within forty (40) days after extraction; therefore the results are acceptable.

2. GC/MS TUNING AND GC INSTRUMENT PERFORMANCE

All GC/MS tuning complied with mass list and ion abundance criteria for BFB, and all samples were analyzed within the twelve (12) hour periods for instrument performance checks.

All GC/MS tuning complied with mass list and ion abundance criteria for DFTPP, and all samples were analyzed within the twelve (12) hour periods for instrument performance checks.

GC resolution Check Mixtures met the 60% resolution criteria. Endrin and DDT degradation checks using the PEM Mix on DB-1701 and DB-608 columns were <20% and the combined total <30%; Therefore the results are acceptable.

The Florisil Cartridge Check met the QC criteria; therefore the results are acceptable.

3. CALIBRATION

Initial and continuing calibrations of the Volatile, Semivolatile and Pest/PCB standards were evaluated for target compound list and outliers are recorded on the forms included as part of this narrative.

4. BLANKS

VOA: VBLK2L was the low level matrix volatile method blanks. VBLK2L contained Acetone at 2 μg/L and no TICs. Acetone is a common laboratory contaminant and it's presence in any samples

associated with VBLK2L is flagged as non-detected (U), when the sample result is less than (<) ten (10) times the blank results. The Volatile method blank summary (FORM IV VOA) lists the samples associated with each blank.

SVOA: SBLK01 is the low level water matrix semivolatile method blank. SBLK01 contained no target list compounds or tentatively identified compounds. The semivolatile method blank summary (FORM IV SVOA) lists the samples associated with each blank.

Pesticide\PCB:
PBLK01 is the low level pesticide matrix method blanks. PBLK01 contained no contaminants. The pesticide method blank summary (FORM IV PEST) lists the samples associated with each blank. There are 8 Pesticide instrument blanks, none of which contained any target compounds. No samples are associated with the instrument blanks.

5. SYSTEM MONITORING COMPOUND AND SURROGATE RECOVERY

VOA: The volatile system monitoring compounds were within QC required limits for recovery; therefore the results are acceptable.

SVOA: The semivolatile surrogate compounds were within QC required limits for recovery; therefore the results are acceptable.

Pesticide\PCB:
The pesticide surrogate compounds were within QC required limits for recovery; the results are acceptable.

6. LABORATORY CONTROL SAMPLES

VOA: All spike recoveries in sample VLCS21 were within QC limits.

SVOA: All spike recoveries in sample SLCS01 were within QC limits.

Pest: All spike recoveries in sample PLCS01, were within QC limits, with the exception of Endrin which exceeded the upper QC limit.

Reviewed by: Thomas Sedlacek Lockheed Martin/ESAT
Date: December 18, 1997

Laboratory: MITKEM CORP Case: 25832
Site: American Chemical Services (IN) SDG: EADQ8

7. FIELD BLANK AND FIELD DUPLICATE

Sample EADQ9 was a trip blank. There was no designated field duplicate pair associated with this data set.

8. INTERNAL STANDARDS

VOA: The internal standards retention times and area counts for the VOA fraction were all within the required QC limits: therefore the results are acceptable.

SVOA: The internal standards retention times and area counts for the SVOA fraction were all within the required QC limits: therefore the results are acceptable.

9. COMPOUND IDENTIFICATION

Target compounds (TCLs) and Tentatively Identified Compounds (TICs) were identified using a "best fit" library search method.

10. COMPOUND QUANTITATION AND REPORTED DETECTION LIMITS

All samples were waters. All VOAs, SVOAs and Pesticides target CRQLs were properly reported. All target compound quantitation was properly reported. The CRQLs for all dilutions were properly reported.

11. SYSTEM PERFORMANCE

GC/MS baseline indicated acceptable performance. The GC baseline for pesticide analysis was acceptable.

12. ADDITIONAL INFORMATION

The Chain-of-Custody list all VOA samples as being preserved with HCl, but the aliquot sent in for sample EADS1 was not preserved. The lab measured the pH of that aliquot to be seven (7).

In the VOA fraction; the result for cis 1,2-Dichloroethene exceeded the calibration range in sample EADS0, therefore the result for cis 1,2-Dichloroethene from sample EADS0DL should be used.

Reviewed by: Thomas Sedlacek Lockheed Martin/ESAT
Date: December 18, 1997

Laboratory: MITKEM CORP Case: 25832
Site: American Chemical Services (IN) SDG: EADQ8

In the SVOA fraction; the result for Bis(2-Ethylhexyl)-phthalate exceeded the calibration range in sample EADS1, therefore the result for Bis(2-Ethylhexyl)phthalate form sample EADS1DL should be used.

In the Pest/PCB fraction, the raw chromatograms displayed numerous peaks, that did not appear on the data system printout. Comparison of the sample and standard chromatographic traces displayed possible retention time matches with analytes of interest.

Reviewed by: Thomas Sedlacek Lockheed Martin/ESAT
Date: December 18, 1997

CALIBRATION OUTLIERS
LOW CONCENTRATION WATER VOLATILE TCL COMPOUNDS
(Page 1 of 1)

CASE\SAS#: 25832
COLUMN: DB-624
HEATED PURGE (Y/N): _____

LABORATORY: MITKEM CORP
SITENAME: American Chemical Service

Instrument# V2		Initial Cal.			Contin. Cal.			Contin. Cal.			Contin. Cal.			Contin. Cal.		
Date/Time:		10/24/97 1025			11/06/97 0406											
	#	rf	%rsd	*	rf	%d	*	rf	%d	*	rf	%d	*	rf	%d	*
Chloromethane	0.01															
Bromomethane	0.10															
Vinyl chloride	0.10															
Chloroethane	0.01															
Methylene chloride	0.01															
Acetone	0.01	0.019	46.0	J												
Carbon disulfide	0.01															
1,1-Dichloroethene	0.10															
1,1-Dichloroethane	0.20															
cis-1,2-Dichloroethene	0.10															
trans-1,2-Dichloroethene	0.10															
Chloroform	0.20															
1,2-Dichloroethane	0.10															
2-Butanone	0.01															
Bromochloromethane	0.10															
1,1,1-Trichloroethane	0.10															
Carbon tetrachloride	0.10															
Bromodichloromethane	0.20															
1,2-Dichloropropane	0.01															
cis-1,3-Dichloropropene	0.20															
Trichloroethene	0.30															
Dibromochloromethane	0.10															
1,1,2-Trichloroethane	0.10															
Benzene	0.50															
an-1,3-Dichloropropene	0.10															
Bromoform	0.10															
4-Methyl-2-pentanone	0.01															
2-Hexanone	0.01															
Tetrachloroethene	0.20															
1,1,2,2-Tetrachloroethane	0.50															
1,2-Dibromoethane	0.10															
Toluene	0.40															
Chlorobenzene	0.50															
Ethylbenzene	0.10															
Styrene	0.30															
Xylene (total)	0.30															
1,2-Dibromo-3-chloropropane	0.10	0.046	10.3	J/R												
1,3-Dichlorobenzene	0.60															
1,4-Dichlorobenzene	0.50															
1,2-Dichlorobenzene	0.40															
Bromofluorobenzene	0.40															

Samples affected:	
	VBLK2L VBLK3L
	VLCS2L
	EA050
	EA051
	EA048
	EA049
	EA052
	EA050D

Reviewer's Init/Date: RS 1/14/98

J/R = All positive results are estimated "J" and non-detected results are unusable "R"

* = These flags should be applied to the analytes on the sample data sheets.
\# = Minimum Relative Response Factor

CALIBRATION OUTLIER
LOW CONCENTRATION WATER SEMIVOLATILE TCL COMPOUNDS
(Page 1 of 2)

CASE\SAS#: 25832
COLUMN:

LABORATORY: MITKEM CORP
SITE NAME: American Chemical Service

Instrument# S1		Initial Cal.			Contin. Cal.			Contin. Cal.			Contin. Cal.			Contin. Cal.		
Date/Time:		11/16/97 1315			11/16/97 1656			11/19/97 1352								
	#	rf	%rsd	*	rf	%d	*	rf	%d	*	rf	%d	*	rf	%d	*
Phenol	0.80															
bis(2-chloroethyl) Ether	0.70															
2-Chlorophenol	0.70															
2-Methylphenol	0.70															
2,2'-Oxybis(1-chl-propane)	0.01															
4-Methylphenol	0.60															
N-nitroso-di-n-propylamine	0.50															
Hexachloroethane	0.30															
Nitrobenzene	0.20															
Isophorone	0.40															
2-Nitrophenol	0.10															
2,4-Dimethylphenol	0.20															
bis-(2-chloroethoxyl)methane	0.30															
2,4-Dichlorophenol	0.20															
1,2,4-Trichlorobenzene	0.20															
Naphthalene	0.70															
4-Chloroaniline	0.01															
Hexachlorobutadiene	0.01															
4-Chloro-3-methylphenol	0.20															
2-Methylnaphthalene	0.40															
Hexachlorocyclopentadiene	0.01															
2,4,6-Trichlorophenol	0.20															
2,4,5-Trichlorophenol	0.20															
2-Chloronaphthalene	0.80															
2-Nitroaniline	0.01															
Dimethyl phthlate	0.01															
Acenaphthylene	1.30															
2,6-Dinitrotoluene	0.20															
3-Nitroaniline	0.01															
Acenaphthene	0.30															
2,4-Dinitrophenol	0.01	0.174			0.227	30.4	J	0.227	30.4	J						
4-Nitrophenol	0.01															
Dibenzofuran	0.80															
2,4-Dinitrotoluene	0.20															

Affected samples:

	SLCSS01	EADS1DL	
	SBLK01		
	EADS2		
	EADS0		
	EADS1		
	EADQ8		

Reviewer's Init/Date: JRS 12/18/97

J/R = All positive results are estimated "J" and non-detected results are unusable "R"

* = These flags should be applied to the analytes on the sample data sheets.
\# = Minimum Relative Response Factor

CALIBRATION OUTLIER
LOW CONCENTRATION WATER SEMIVOLATILE TCL COMPOUNDS
(Page 2 of 2)

CASE\SAS#: 25832
COLUMN:

LABORATORY: MITKEM Corp
SITE NAME: American Chemical Service

Instrument# 21		Initial Cal.			Contin. Cal.			Contin. Cal.			Contin. Cal.			Contin. Cal.		
Date/Time:		11/6/97 1315			11/8/97 1653			11/14/97 1350								
	#	rf	%rsd	*	rf	%d	*	rf	%d	*	rf	%d	*	rf	%d	*
Diethylphthalate	0.01															
4-Chlorophenyl-phenylether	0.40															
Fluorene	0.90															
4-Nitroaniline	0.01															
4,6-Dinitro-2-methylphenol	0.01															
N-nitrosodiphenylamine	0.01															
4-Bromophenyl-phenylether	0.10															
Hexachlorobenzene	0.10															
Pentachlorophenol	0.05	0.145						0.148	25.4	J						
Phenanthrene	0.70															
Anthracene	0.70															
Di-n-butylphthalate	0.01															
Fluoranthene	0.60															
Pyrene	0.60															
Butylbenzylphthalate	0.01															
3,3'-Dichlorobenzidine	0.01	0.114	33.7	J				0.106	-50.7	J						
Benzo(a)anthracene	0.80															
Chrysene	0.70															
bis(2-Ethylhexyl)phthalate	0.01															
Di-n-octyl phthalate	0.01															
Benzo(b)fluoranthene	0.70															
Benzo(k)fluoranthene	0.70															
Benzo(a)pyrene	0.70															
Indeno(1,2,3-cd)pyrene	0.50															
Dibenz(a,h)anthrancene	0.40															
Benzo(g,h,i)perylene	0.50															
Nitrobenzene-d5	0.01															
2-Fluorobiphenyl	0.70															
Terphenyl-d14	0.50															
Phenol-d5	0.80															
2-Fluorophenol	0.60															
2,4,6-Tribromophenol	0.01															

Reviewer's Init/Date: DLS 12/11/97

J/R = All positive results are estimated "J" and non-detected results are unusable "R"

* = These flags should be applied to the analytes on the sample data sheets.
# = Minimum Relative Response Factor

Pesticide/PCB TCL
(Page 1 of 1)

CASE/SAS #: 25832
COLUMN: DB608

LABORATORY: MITKEM CORP
SITE NAME: American Chemical Service

Instrument Number	Initial Cal.		Cont. Cal.		Cont. Cal.		Cont. Cal.		Cont. Cal.	
Date E2	11/16/90									
Time	1904									
	%RSD	*	%D	*	%D	*	%D	*	%D	*
alpha-BHC										
beta-BHC										
delta-BHC										
gamma-BHC										
Hepachlor										
Aldrin										
Heptachlor Epoxide										
Endosulfan I										
Dieldrin										
4,4'-DDE										
Endrin										
Endosulfan II										
4,4'-DDD										
Endosulfan Sulfate										
4,4'-DDT										
Methoxychlor										
Endrin Ketone										
Endrin Aldehyde										
alpha-Chlordane										
gamma-Chlordane										
Arolcor 1016										
Aroclor 1221										
Aroclor 1232										
Arolcor 1242										
Aroclor 1248										
Aroclor 1254										
Aroclor 1260										

Affected Samples:

PBLK01				
PLE501				
ENDS2				
ENDS0				
ENDS1				
ENDG8				

* These flags should be applied to the analytes on the sample data sheets.
J/R = All positive results are estimated "J" and non-detected results are unusable "R".

Reviewer's Init/Date: DAS 12/18/90

CALIBRATION OUTLIER
Pesticide/PCB TCL

CASE/SAS #: 25631
COLUMN: DB 1701

LABORATORY: MITKEM Corp
SITE NAME: American Chemical Service

Instrument Number / Date E2	Initial Cal. 11/15/97		Cont. Cal.		Cont. Cal.		Cont. Cal.		Cont. Cal.	
Time	1909									
	%RSD	*	%D	*	%D	*	%D	*	%D	*
alpha-BHC										
beta-BHC										
delta-BHC										
gamma-BHC										
Heptachlor										
Aldrin										
Heptachlor Epoxide										
Endosulfan I										
Dieldrin										
4,4'-DDE										
Endrin										
Endosulfan II										
4,4'-DDD										
Endosulfan Sulfate										
4,4'-DDT										
Methoxychlor										
Endrin Ketone										
Endrin Aldehyde										
alpha-Chlordane										
gamma-Chlordane										
Aroicor 1016										
Aroclor 1221										
Aroclor 1232										
Aroicor 1242										
Aroclor 1248										
Aroclor 1254										
Aroclor 1260										

Affected Samples:

PBLK01				
PLCS01				
E1H032				
E1H050				
E1A051				
E1A048				

* These flags should be applied to the analytes on the sample data sheets.
J/R = All positive results are estimated "J" and non-detected results are unusable "R".

Reviewer's Init/Date: DJS 12/4/97

ORGANIC DATA QUALIFIER DEFINITIONS

For the purpose of defining the flagging nomenclature used in this document, the following code letters and associated definitions are provided:

VALUE - when/if the result of a value is greater than or equal to the Contract Required Quantitation Limit (CRQL).

U Indicates that the compound was analyzed for, but not detected. The sample quantitation limit corrected for dilution and percent moisture is reported.

J Indicates an estimated value. This flag is used either when estimating a concentration for a tentatively identified compound or when the data indicates the presence of a compound where the result is less than the sample quantitation limit, but greater than zero. The flag is also used to indicate a reported result having an associated QC problem.

R Indicates the data are unusable. (NOTE: The analyte may or may not be present.)

N Indicates presumptive evidence of a compound. This flag is only used for a tentatively identified compound, where the identification is based on a mass spectral library search.

P Indicates a pesticide/Aroclor target analyte when there is greater than 25% difference for the detected concentrations between the two GC columns. The lower of the two results is reported.

C Indicates pesticide results that have been confirmed by GC/MS.

B Indicates the analyte is detected in the associated blank as well as in the sample.

E Indicates compounds whose concentrations exceed the calibration range of the instrument.

D Indicates an identified compound in an analysis has been diluted. This flag alerts the data user to any differences between the concentrations reported in the two analysis.

A Indicates tentatively identified compounds that are suspected to be aldol condensation products.

G Indicates the TCLP Matrix Spike Recovery was greater than the upper limit of the analytical method.

L Indicates the TCLP Matrix Spike Recovery was less than the lower limit of the analytical method.

T Indicates the analyte is found in the associated TCLP extraction blank as well as in the sample.

X,Y,Z are reserved for laboratory defined flags.

SDG Narrative

Mitkem Corporation submits the enclosed data package in response to twelve aqueous samples that were received from USEPA on November 6, 1997. The project was assigned Case # 25832 and SDG # EADQ8. The analysis was performed under USEPA Contract # 68-D6-0063.

The following samples are submitted in this data package:

Client ID	Analysis	VOA pH
EADS2	V, S, P	< 2
EADS0	V, S, P	< 2
EADS1	V, S, P	7
EADQ8	V, S, P	< 2
EADQ9	V	< 2

V = Volatile Organics
S = semivolatile organic
P = pesticides/PCB

The analyses were performed using USEPA CLP Low Concentration Water (OLC02.1) protocols.

The analyses were performed with strict adherence to the SOW with the following exceptions and observations:

1. Overall Observation:

Where needed, manual integrations were performed to improve data quality. The corrections were reviewed and associated hardcopies generated and reported as required.

2. Volatile Analysis:

EADS0 was re-analyzed at dilution to ensure that all of the target analytes were determined within the instrument calibration range.

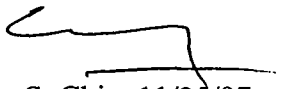
3. Semivolatile Analysis:

EADS1 was re-analyzed at dilution to ensure that all of the target analytes were determined within the instrument calibration range.

4. Pesticides/PCB Analysis:

Endrin was determined out of the QC limit in the lab control sample. The lab did not re-extract the associated samples.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on diskette (diskette not submitted here) has been authorized by the laboratory manager or his designee, as verified by the following signature.



Kin S. Chiu, 11/25/97
Technical Director

EPA — Organic Traffic Report & Chain of Custody Record

United States Environmental Protection Agency
Contract Laboratory Program

(For Organic CLP Analysis)

SAS No. (if applicable):

Case No.: 25832

SDG # EAD28

1. Matrix (Enter in Column A)
   1. Surface Water
   2. Ground Water
   3. Leachate
   4. Field QC
   5. Soil/Sediment
   6. Oil (High only)
   7. Waste (High only)
   8. Other (Specify in Column A)

2. Preservative (Enter in Column D)
   1. HCl
   2. HNO_3
   3. $NaHSO_4$
   4. H_2SO_4
   5. Ice only
   6. Other (Specify in Column D)
   N. Not preserved

2. Region No.: 5 | Sampling Co.: BVSPC

4. Date Shipped: 11-5-97 | Carrier: Federal Express

6. Date Received -- Received by: 11/6/97 AMY Stockhouse

Sampler (Name): Steve Mrkvicka

Airbill Number: 565419115

Laboratory Contract Number: 68-D6-0063 | Unit Price: 498.75

Sampler Signature: [signature]

5. Ship To: Mitkem Corporation, 175 Metro Center Blvd., Warwick, RI 02886, ATTN: Kim Chu

7. Transfer to: | Date Received

Received by

Contract Number | Price

3. Purpose*
   - Lead: SF, PRP (X), ST (X), FED
   - Early Action: CLEM, PA, REM, RI, SI, ESI
   - Long-Term Action: FS, RD (X), RA (X), O&M, NPLD

CLP Sample Numbers (from labels)	A Matrix (from Box 1) / Other:	B Conc.: Low Med High	C Sample Type: Comp./ Grab	D Preservative (from Box 2) / Other:	E RAS Analysis: VOA	BNA	Pest/PCB	High only	ARO/TOX	F Regional Specific Tracking Number or Tag Numbers	G Station Location Identifier	H Mo/Day/ Year/Time Sample Collection	I Corresponding CLP Inorganic Sample No.	J Sampler Initials	K High Phases: Solids	Water-Miscible Liq.	Water-Immis. Liq.
EADS2	2	L	G	1	X					5-129574,5	ACS-GW01-001	11-5-97 0750	-	SRM			
EADS2	2	L	G	5		X	X			5-129576,7	↓	↓	-	SRM			
EADS0	2	L	G	1	X					5-129580,1	ACS-GW02-001	11-4-97 1735	-	SRM			
EADS0	2	L	G	5		X	X			5-129582,3	↓	↓	-	SRM			
EADS1	2	L	G	1	X					5-129586,7	ACS-GW03-001	11-4-97 0910	-	SRM			
EADS1	2	L	G	5		X	X			5-129588-90	↓	↓	-	SRM			
EADQ8	2	L	G	1	X					5-129593,4	ACS-GW04-001	11-5-97 1040	-	SRM			
EADQ8	2	L	G	5		X	X			5-129595,6	↓	↓	-	SRM			
EADQ9	2	L	G	1	X					5-129599,600	ACS-TB01-201	11-5-97 1340	-	SRM			

Shipment for Case Complete? (Y/N): (Y)

Page: 1 of 1

Sample(s) to be Used for Laboratory QC:

Additional Sampler Signatures:

Chain of Custody Seal Number(s): 153283, 153284

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
[signature]	11-5-97 1415				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks: Is custody seal intact? Y/N/none	
		[signature]	11/6/97 1000	2°C	

DISTRIBUTION: Blue - Region Copy; White - Lab Copy for Return to Region; Pink - SMO Copy; Yellow - Lab Copy for Return to

EPA Form 9110-2

SEE REVERSE FOR ADDITIONAL STANDARD INSTRUCTIONS
*SEE REVERSE FOR PURPOSE CODE DEFINITIONS

A21-012-4 REV. 3/93

250291

2LCA
LOW CONC. WATER VOLATILE SYSTEM MONITORING COMPOUND RECOVERY

Lab Name: MITKEM CORP. Contract: 68-D6-0063

Lab Code: MITKEM Case No.: 25832 SAS No.: SDG No.: EADQ8

	EPA SAMPLE NO.	BFB %REC #	OTHER	TOT OUT
01	VBLK2L	98		0
02	VLCS2L	99		0
03	EADS0	97		0
04	EADS1	97		0
05	EADQ8	98		0
06	EADQ9	96		0
07	EADS2	90		0
08	EADS0DL	100		0
09	VHBLK2L	96		0
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				

QC LIMITS
%REC

BFB = Bromofluorobenzene (80-120)

Column to be used to flag recovery values.
* Values outside of contract required QC limits.

3LCA

LOW CONC. WATER VOLATILE LAB CONTROL SAMPLE RECOVERY

EPA SAMPLE NO.

VLCS2L

Lab Name: MITKEM CORP. Contract: 68-D6-0063

Lab Code: MITKEM Case No.: 25832 SAS No.: SDG No.: EADQ8

Lab Sample ID: V2L1108A LCS Lot No.:

Lab File ID: V2B1326 Date Analyzed: 11/08/97

Purge Volume: 25 (mL) Dilution Factor: 1.0

LCS Aliquot: 10 (ul)

COMPOUND	AMOUNT ADDED (ng)	AMOUNT RECOVERED (ng)	%REC #	QC LIMITS
Vinyl chloride	125	152	122	60-140
1,2-Dichloroethane	125	130	104	60-140
Carbon tetrachloride	125	126	101	60-140
1,2-Dichloropropane	125	129	103	60-140
Trichloroethene	125	127	102	60-140
1,1,2-Trichloroethane	125	130	104	60-140
Benzene	125	126	101	60-140
cis-1,3-Dichloropropene	125	122	98	60-140
Bromoform	125	121	97	60-140
Tetrachloroethene	125	127	102	60-140
1,2-Dibromoethane	125	128	102	60-140
1,4-Dichlorobenzene	125	123	98	60-140

Column to be used to flag LCS recovery with an asterisk.
* Values outside of QC limits.

LCS Recovery: 0 outside limits out of 12 total.

COMMENTS:

4LCA

LOW CONC. WATER VOLATILE METHOD BLANK SUMMARY

EPA SAMPLE NO.

VBLK2L

Lab Name: MITKEM CORP. Contract: 68-D6-0063

Lab Code: MITKEM Case No.: 25832 SAS No.: SDG No.: EADQ8

Lab Sample ID: V2B1108A Date Analyzed: 11/08/97

Lab File ID: V2B1325 Time Analyzed: 0945

Instrument ID: V2

GC Column: DB-624 ID: 0.25 (mm) Length: 30 (m)

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES AND LCS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	VLCS2L	V2L1108A	V2B1326	1021
02	EADS0	D1807-02	V2B1335	1437
03	EADS1	D1807-03	V2B1336	1504
04	EADQ8	D1807-04	V2B1337	1531
05	EADQ9	D1807-05	V2B1338	1558
06	EADS2	D1807-01	V2B1339	1655
07	EADS0DL	D1807-02DL	V2B1340	1722
08	VHBLK2L	V2B1108C	V2B1342	1915
09				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				

COMMENTS: _____

1LCA

LOW CONC. WATER VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLK2L

Lab Name: MITKEM CORP. Contract: 68-D6-0063

Lab Code: MITKEM Case No.: 25832 SAS No.: SDG No.: EADQ8

Lab Sample ID: V2B1108A Date Received: _____

Lab File ID: V2B1325 Date Analyzed: 11/08/97

Purge Volume: 25 (mL) Dilution Factor: 1.0

GC Column: DB-624 ID: 0.25 (mm) Length: 30 (m)

CAS NO.	COMPOUND	CONCENTRATION (ug/L)	Q
74-87-3	Chloromethane	1	U
74-83-9	Bromomethane	1	U
75-01-4	Vinyl chloride	1	U
75-00-3	Chloroethane	1	U
75-09-2	Methylene chloride	2	U
67-64-1	Acetone	2	J
75-15-0	Carbon disulfide	1	U
75-35-4	1,1-Dichloroethene	1	U
75-34-3	1,1-Dichloroethane	1	U
156-59-2	cis-1,2-Dichloroethene	1	U
156-60-5	trans-1,2-Dichloroethene	1	U
67-66-3	Chloroform	1	U
107-06-2	1,2-Dichloroethane	1	U
78-93-3	2-Butanone	5	U
74-97-5	Bromochloromethane	1	U
71-55-6	1,1,1-Trichloroethane	1	U
56-23-5	Carbon tetrachloride	1	U
75-27-4	Bromodichloromethane	1	U
78-87-5	1,2-Dichloropropane	1	U
10061-01-5	cis-1,3-Dichloropropene	1	U
79-01-6	Trichloroethene	1	U
124-48-1	Dibromochloromethane	1	U
79-00-5	1,1,2-Trichloroethane	1	U
71-43-2	Benzene	1	U
10061-02-6	trans-1,3-Dichloropropene	1	U
75-25-2	Bromoform	1	U
108-10-1	4-Methyl-2-pentanone	5	U
591-78-6	2-Hexanone	5	U
127-18-4	Tetrachloroethene	1	U
79-34-5	1,1,2,2-Tetrachloroethane	1	U
106-93-4	1,2-Dibromoethane	1	U
108-88-3	Toluene	1	U
108-90-7	Chlorobenzene	1	U
100-41-4	Ethylbenzene	1	U
100-42-5	Styrene	1	U
1330-20-7	Xylenes (total)	1	U
541-73-1	1,3-Dichlorobenzene	1	U
106-46-7	1,4-Dichlorobenzene	1	U
95-50-1	1,2-Dichlorobenzene	1	U
96-12-8	1,2-Dibromo-3-chloropropane	1	U
120-82-1	1,2,4-Trichlorobenzene	1	U

1LCE

EPA SAMPLE NO.

LOW CONC. WATER VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

VBLK2L

Lab Name: MITKEM CORP. Contract: 68-D6-0063

Lab Code: MITKEM Case No.: 25832 SAS No.: SDG No.: EADQ8

Lab Sample ID: V2B1108A Date Received: _____

Lab File ID: V2B1325 Date Analyzed: 11/08/97

Purge Volume: 25 (mL) Dilution Factor: 1.0

GC Column: DB-624 ID: 0.25 (mm) Length: 30 (m)

Number TICs found: 0

	CAS NUMBER	COMPOUND NAME	RT	EST.CONC. (ug/L)	Q
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					
19.					
20.					
21.					
22.					
23.					
24.					
25.					
26.					
27.					
28.					
29.					
30.					

1LCA

LOW CONC. WATER VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

EADQ8

Lab Name: MITKEM CORP. Contract: 68-D6-0063

Lab Code: MITKEM Case No.: 25832 SAS No.: SDG No.: EADQ8

Lab Sample ID: D1807-04 Date Received: 11/06/97

Lab File ID: V2B1337 Date Analyzed: 11/08/97

Purge Volume: 25 (mL) Dilution Factor: 1.0

GC Column: DB-624 ID: 0.25 (mm) Length: 30 (m)

GW04
IW4
duplicate

CAS NO.	COMPOUND	CONCENTRATION (ug/L)	Q
74-87-3	Chloromethane	1	U
74-83-9	Bromomethane	1	U
75-01-4	Vinyl chloride	1	U
75-00-3	Chloroethane	1	U
75-09-2	Methylene chloride	2	U
67-64-1	Acetone	5	U
75-15-0	Carbon disulfide	1	U
75-35-4	1,1-Dichloroethene	1	U
75-34-3	1,1-Dichloroethane	1	U
156-59-2	cis-1,2-Dichloroethene	1	U
156-60-5	trans-1,2-Dichloroethene	1	U
67-66-3	Chloroform	1	U
107-06-2	1,2-Dichloroethane	1	U
78-93-3	2-Butanone	5	U
74-97-5	Bromochloromethane	1	U
71-55-6	1,1,1-Trichloroethane	1	U
56-23-5	Carbon tetrachloride	1	U
75-27-4	Bromodichloromethane	1	U
78-87-5	1,2-Dichloropropane	1	U
10061-01-5	cis-1,3-Dichloropropene	1	U
79-01-6	Trichloroethene	1	U
124-48-1	Dibromochloromethane	1	U
79-00-5	1,1,2-Trichloroethane	1	U
71-43-2	Benzene	1	U
10061-02-6	trans-1,3-Dichloropropene	1	U
75-25-2	Bromoform	1	U
108-10-1	4-Methyl-2-pentanone	5	U
591-78-6	2-Hexanone	5	U
127-18-4	Tetrachloroethene	1	U
79-34-5	1,1,2,2-Tetrachloroethane	1	U
106-93-4	1,2-Dibromoethane	1	U
108-88-3	Toluene	1	U
108-90-7	Chlorobenzene	1	U
100-41-4	Ethylbenzene	1	U
100-42-5	Styrene	1	U
1330-20-7	Xylenes (total)	1	U
541-73-1	1,3-Dichlorobenzene	1	U
106-46-7	1,4-Dichlorobenzene	1	U
95-50-1	1,2-Dichlorobenzene	1	U
96-12-8	1,2-Dibromo-3-chloropropane	1	U
120-82-1	1,2,4-Trichlorobenzene	1	U

1LCE

EPA SAMPLE NO.

LOW CONC. WATER VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EADQ8

Lab Name: MITKEM CORP. Contract: 68-D6-0063

Lab Code: MITKEM Case No.: 25832 SAS No.: SDG No.: EADQ8

Lab Sample ID: D1807-04 Date Received: 11/06/97

Lab File ID: V2B1337 Date Analyzed: 11/08/97

Purge Volume: 25 (mL) Dilution Factor: 1.0

GC Column: DB-624 ID: 0.25 (mm) Length: 30 (m)

Number TICs found: 0

	CAS NUMBER	COMPOUND NAME	RT	EST.CONC. (ug/L)	Q
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					
19.					
20.					
21.					
22.					
23.					
24.					
25.					
26.					
27.					
28.					
29.					
30.					

1LCA

LOW CONC. WATER VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

EADQ9

Lab Name: MITKEM CORP. Contract: 68-D6-0063

Lab Code: MITKEM Case No.: 25832 SAS No.: SDG No.: EADQ8 TB01

Lab Sample ID: D1807-05 Date Received: 11/06/97

Lab File ID: V2B1338 Date Analyzed: 11/08/97

Purge Volume: 25 (mL) Dilution Factor: 1.0

GC Column: DB-624 ID: 0.25 (mm) Length: 30 (m)

CAS NO.	COMPOUND	CONCENTRATION (ug/L)	Q
74-87-3	Chloromethane	1	U
74-83-9	Bromomethane	1	U
75-01-4	Vinyl chloride	1	U
75-00-3	Chloroethane	1	U
75-09-2	Methylene chloride	2	U
67-64-1	Acetone	5 1 JBU	DJS 12/15/97
75-15-0	Carbon disulfide	1	U
75-35-4	1,1-Dichloroethene	1	U
75-34-3	1,1-Dichloroethane	1	U
156-59-2	cis-1,2-Dichloroethene	1	U
156-60-5	trans-1,2-Dichloroethene	1	U
67-66-3	Chloroform	1	U
107-06-2	1,2-Dichloroethane	1	U
78-93-3	2-Butanone	5	U
74-97-5	Bromochloromethane	1	U
71-55-6	1,1,1-Trichloroethane	1	U
56-23-5	Carbon tetrachloride	1	U
75-27-4	Bromodichloromethane	1	U
78-87-5	1,2-Dichloropropane	1	U
10061-01-5	cis-1,3-Dichloropropene	1	U
79-01-6	Trichloroethene	1	U
124-48-1	Dibromochloromethane	1	U
79-00-5	1,1,2-Trichloroethane	1	U
71-43-2	Benzene	1	U
10061-02-6	trans-1,3-Dichloropropene	1	U
75-25-2	Bromoform	1	U
108-10-1	4-Methyl-2-pentanone	5	U
591-78-6	2-Hexanone	5	U
127-18-4	Tetrachloroethene	1	U
79-34-5	1,1,2,2-Tetrachloroethane	1	U
106-93-4	1,2-Dibromoethane	1	U
108-88-3	Toluene	1	U
108-90-7	Chlorobenzene	1	U
100-41-4	Ethylbenzene	1	U
100-42-5	Styrene	1	U
1330-20-7	Xylenes (total)	1	U
541-73-1	1,3-Dichlorobenzene	1	U
106-46-7	1,4-Dichlorobenzene	1	U
95-50-1	1,2-Dichlorobenzene	1	U
96-12-8	1,2-Dibromo-3-chloropropane	1	U
120-82-1	1,2,4-Trichlorobenzene	1	U

016

1LCE

EPA SAMPLE NO.

LOW CONC. WATER VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EADQ9

Lab Name: MITKEM CORP. Contract: 68-D6-0063

Lab Code: MITKEM Case No.: 25832 SAS No.: SDG No.: EADQ8

Lab Sample ID: D1807-05 Date Received: 11/06/97

Lab File ID: V2B1338 Date Analyzed: 11/08/97

Purge Volume: 25 (mL) Dilution Factor: 1.0

GC Column: DB-624 ID: 0.25 (mm) Length: 30 (m)

Number TICs found: 0

	CAS NUMBER	COMPOUND NAME	RT	EST.CONC. (ug/L)	Q
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					
19.					
20.					
21.					
22.					
23.					
24.					
25.					
26.					
27.					
28.					
29.					
30.					

1LCA

LOW CONC. WATER VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

EADS0

Lab Name: MITKEM CORP. Contract: 68-D6-0063

Lab Code: MITKEM Case No.: 25832 SAS No.: SDG No.: EADQ8

Lab Sample ID: D1807-02 Date Received: 11/06/97 IW1

Lab File ID: V2B1335 Date Analyzed: 11/08/97

Purge Volume: 25 (mL) Dilution Factor: 1.0

GC Column: DB-624 ID: 0.25 (mm) Length: 30 (m)

CAS NO.	COMPOUND	CONCENTRATION (ug/L)	Q
74-87-3	Chloromethane	1	U
74-83-9	Bromomethane	1	U
75-01-4	Vinyl chloride	7	
75-00-3	Chloroethane	1	U
75-09-2	Methylene chloride	2	U
67-64-1	Acetone	5	U
75-15-0	Carbon disulfide	1	U
75-35-4	1,1-Dichloroethene	1	U
75-34-3	1,1-Dichloroethane	9	
156-59-2	cis-1,2-Dichloroethene	60	E
156-60-5	trans-1,2-Dichloroethene	0.7	J
67-66-3	Chloroform	1	U
107-06-2	1,2-Dichloroethane	1	U
78-93-3	2-Butanone	5	U
74-97-5	Bromochloromethane	1	U
71-55-6	1,1,1-Trichloroethane	1	U
56-23-5	Carbon tetrachloride	1	U
75-27-4	Bromodichloromethane	1	U
78-87-5	1,2-Dichloropropane	1	U
10061-01-5	cis-1,3-Dichloropropene	1	U
79-01-6	Trichloroethene	10	
124-48-1	Dibromochloromethane	1	U
79-00-5	1,1,2-Trichloroethane	1	U
71-43-2	Benzene	0.8	J
10061-02-6	trans-1,3-Dichloropropene	1	U
75-25-2	Bromoform	1	U
108-10-1	4-Methyl-2-pentanone	5	U
591-78-6	2-Hexanone	5	U
127-18-4	Tetrachloroethene	18	
79-34-5	1,1,2,2-Tetrachloroethane	1	U
106-93-4	1,2-Dibromoethane	1	U
108-88-3	Toluene	5	
108-90-7	Chlorobenzene	1	U
100-41-4	Ethylbenzene	3	
100-42-5	Styrene	1	U
1330-20-7	Xylenes (total)	11	
541-73-1	1,3-Dichlorobenzene	1	U
106-46-7	1,4-Dichlorobenzene	1	U
95-50-1	1,2-Dichlorobenzene	1	U
96-12-8	1,2-Dibromo-3-chloropropane	1	U
120-82-1	1,2,4-Trichlorobenzene	1	U

1LCE

EPA SAMPLE NO.

LOW CONC. WATER VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EADS0

Lab Name: MITKEM CORP. Contract: 68-D6-0063

Lab Code: MITKEM Case No.: 25832 SAS No.: SDG No.: EADQ8

Lab Sample ID: D1807-02 Date Received: 11/06/97

Lab File ID: V2B1335 Date Analyzed: 11/08/97

Purge Volume: 25 (mL) Dilution Factor: 1.0

GC Column: DB-624 ID: 0.25 (mm) Length: 30 (m)

Number TICs found: 0

	CAS NUMBER	COMPOUND NAME	RT	EST.CONC. (ug/L)	Q
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					
19.					
20.					
21.					
22.					
23.					
24.					
25.					
26.					
27.					
28.					
29.					
30.					

1LCA

LOW CONC. WATER VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

EADS0DL

Lab Name: MITKEM CORP. Contract: 68-D6-0063

Lab Code: MITKEM Case No.: 25832 SAS No.: SDG No.: EADQ8

Lab Sample ID: D1807-02DL Date Received: 11/06/97

Lab File ID: V2B1340 Date Analyzed: 11/08/97

Purge Volume: 25 (mL) Dilution Factor: 5.0

GC Column: DB-624 ID: 0.25 (mm) Length: 30 (m)

IW1 dilution

CAS NO.	COMPOUND	CONCENTRATION (ug/L)	Q
74-87-3	Chloromethane	5	U
74-83-9	Bromomethane	5	U
75-01-4	Vinyl chloride	7	D
75-00-3	Chloroethane	5	U
75-09-2	Methylene chloride	10	U
67-64-1	Acetone	25	U
75-15-0	Carbon disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	10	D
156-59-2	cis-1,2-Dichloroethene	62	D
156-60-5	trans-1,2-Dichloroethene	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	25	U
74-97-5	Bromochloromethane	5	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon tetrachloride	5	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	9	D
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	25	U
591-78-6	2-Hexanone	25	U
127-18-4	Tetrachloroethene	17	D
79-34-5	1,1,2,2-Tetrachloroethane	5	U
106-93-4	1,2-Dibromoethane	5	U
108-88-3	Toluene	5	D
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	2	DJ
100-42-5	Styrene	5	U
1330-20-7	Xylenes (total)	8	D
541-73-1	1,3-Dichlorobenzene	5	U
106-46-7	1,4-Dichlorobenzene	5	U
95-50-1	1,2-Dichlorobenzene	5	U
96-12-8	1,2-Dibromo-3-chloropropane	5	U
120-82-1	1,2,4-Trichlorobenzene	5	U

1LCE

EPA SAMPLE NO.

LOW CONC. WATER VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EADS0DL

Lab Name: MITKEM CORP. Contract: 68-D6-0063

Lab Code: MITKEM Case No.: 25832 SAS No.: SDG No.: EADQ8

Lab Sample ID: D1807-02DL Date Received: 11/06/97

Lab File ID: V2B1340 Date Analyzed: 11/08/97

Purge Volume: 25 (mL) Dilution Factor: 5.0

GC Column: DB-624 ID: 0.25 (mm) Length: 30 (m)

Number TICs found: 0

	CAS NUMBER	COMPOUND NAME	RT	EST.CONC. (ug/L)	Q
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					
19.					
20.					
21.					
22.					
23.					
24.					
25.					
26.					
27.					
28.					
29.					
30.					

1LCA

LOW CONC. WATER VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

EADS1

Lab Name: MITKEM CORP. Contract: 68-D6-0063

Lab Code: MITKEM Case No.: 25832 SAS No.: SDG No.: EADQ8

Lab Sample ID: D1807-03 Date Received: 11/06/97

Lab File ID: V2B1336 Date Analyzed: 11/08/97 IW4

Purge Volume: 25 (mL) Dilution Factor: 1.0

GC Column: DB-624 ID: 0.25 (mm) Length: 30 (m)

CAS NO.	COMPOUND	CONCENTRATION (ug/L)	Q
74-87-3	Chloromethane	1	U
74-83-9	Bromomethane	1	U
75-01-4	Vinyl chloride	1	U
75-00-3	Chloroethane	1	U
75-09-2	Methylene chloride	2	U
67-64-1	Acetone	5 2 ~~5~~ BU	DLS 1/14/98
75-15-0	Carbon disulfide	1	U
75-35-4	1,1-Dichloroethene	1	U
75-34-3	1,1-Dichloroethane	1	U
156-59-2	cis-1,2-Dichloroethene	1	U
156-60-5	trans-1,2-Dichloroethene	1	U
67-66-3	Chloroform	1	U
107-06-2	1,2-Dichloroethane	1	U
78-93-3	2-Butanone	5	U
74-97-5	Bromochloromethane	1	U
71-55-6	1,1,1-Trichloroethane	1	U
56-23-5	Carbon tetrachloride	1	U
75-27-4	Bromodichloromethane	1	U
78-87-5	1,2-Dichloropropane	1	U
10061-01-5	cis-1,3-Dichloropropene	1	U
79-01-6	Trichloroethene	1	U
124-48-1	Dibromochloromethane	1	U
79-00-5	1,1,2-Trichloroethane	1	U
71-43-2	Benzene	1	U
10061-02-6	trans-1,3-Dichloropropene	1	U
75-25-2	Bromoform	1	U
108-10-1	4-Methyl-2-pentanone	5	U
591-78-6	2-Hexanone	5	U
127-18-4	Tetrachloroethene	0.5	J
79-34-5	1,1,2,2-Tetrachloroethane	1	U
106-93-4	1,2-Dibromoethane	1	U
108-88-3	Toluene	1	U
108-90-7	Chlorobenzene	1	U
100-41-4	Ethylbenzene	1	U
100-42-5	Styrene	1	U
1330-20-7	Xylenes (total)	0.6	J
541-73-1	1,3-Dichlorobenzene	1	U
106-46-7	1,4-Dichlorobenzene	1	U
95-50-1	1,2-Dichlorobenzene	1	U
96-12-8	1,2-Dibromo-3-chloropropane	1	U
120-82-1	1,2,4-Trichlorobenzene	1	U

1LCE

EPA SAMPLE NO.

LOW CONC. WATER VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EADS1

Lab Name: MITKEM CORP. Contract: 68-D6-0063

Lab Code: MITKEM Case No.: 25832 SAS No.: SDG No.: EADQ8

Lab Sample ID: D1807-03 Date Received: 11/06/97

Lab File ID: V2B1336 Date Analyzed: 11/08/97

Purge Volume: 25 (mL) Dilution Factor: 1.0

GC Column: DB-624 ID: 0.25 (mm) Length: 30 (m)

Number TICs found: 0

	CAS NUMBER	COMPOUND NAME	RT	EST.CONC. (ug/L)	Q
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					
19.					
20.					
21.					
22.					
23.					
24.					
25.					
26.					
27.					
28.					
29.					
30.					

1LCA

LOW CONC. WATER VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

EADS2

Lab Name: MITKEM CORP. Contract: 68-D6-0063

Lab Code: MITKEM Case No.: 25832 SAS No.: SDG No.: EADQ8

Lab Sample ID: D1807-01 Date Received: 11/06/97 IW6

Lab File ID: V2B1339 Date Analyzed: 11/08/97

Purge Volume: 25 (mL) Dilution Factor: 1.0

GC Column: DB-624 ID: 0.25 (mm) Length: 30 (m)

CAS NO.	COMPOUND	CONCENTRATION (ug/L)	Q
74-87-3	Chloromethane	1	U
74-83-9	Bromomethane	1	U
75-01-4	Vinyl chloride	1	U
75-00-3	Chloroethane	1	U
75-09-2	Methylene chloride	2	U
67-64-1	Acetone	5 ~~2~~ ~~JB~~ U	DLS 11/18/97
75-15-0	Carbon disulfide	1	U
75-35-4	1,1-Dichloroethene	1	U
75-34-3	1,1-Dichloroethane	1	U
156-59-2	cis-1,2-Dichloroethene	1	U
156-60-5	trans-1,2-Dichloroethene	1	U
67-66-3	Chloroform	1	U
107-06-2	1,2-Dichloroethane	1	U
78-93-3	2-Butanone	5	U
74-97-5	Bromochloromethane	1	U
71-55-6	1,1,1-Trichloroethane	1	U
56-23-5	Carbon tetrachloride	1	U
75-27-4	Bromodichloromethane	1	U
78-87-5	1,2-Dichloropropane	1	U
10061-01-5	cis-1,3-Dichloropropene	1	U
79-01-6	Trichloroethene	1	U
124-48-1	Dibromochloromethane	1	U
79-00-5	1,1,2-Trichloroethane	1	U
71-43-2	Benzene	1	U
10061-02-6	trans-1,3-Dichloropropene	1	U
75-25-2	Bromoform	1	U
108-10-1	4-Methyl-2-pentanone	5	U
591-78-6	2-Hexanone	5	U
127-18-4	Tetrachloroethene	1	U
79-34-5	1,1,2,2-Tetrachloroethane	1	U
106-93-4	1,2-Dibromoethane	1	U
108-88-3	Toluene	1	U
108-90-7	Chlorobenzene	1	U
100-41-4	Ethylbenzene	1	U
100-42-5	Styrene	1	U
1330-20-7	Xylenes (total)	1	U
541-73-1	1,3-Dichlorobenzene	1	U
106-46-7	1,4-Dichlorobenzene	1	U
95-50-1	1,2-Dichlorobenzene	1	U
96-12-8	1,2-Dibromo-3-chloropropane	1	U
120-82-1	1,2,4-Trichlorobenzene	1	U

1LCE

LOW CONC. WATER VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

EADS2

Lab Name: MITKEM CORP. Contract: 68-D6-0063

Lab Code: MITKEM Case No.: 25832 SAS No.: SDG No.: EADQ8

Lab Sample ID: D1807-01 Date Received: 11/06/97

Lab File ID: V2B1339 Date Analyzed: 11/08/97

Purge Volume: 25 (mL) Dilution Factor: 1.0

GC Column: DB-624 ID: 0.25 (mm) Length: 30 (m)

Number TICs found: 2

	CAS NUMBER	COMPOUND NAME	RT	EST.CONC. (ug/L)	Q
1.		C3-BENZENE	13.35	3	J
2.		UNKNOWN	15.19	2	J
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					
19.					
20.					
21.					
22.					
23.					
24.					
25.					
26.					
27.					
28.					
29.					
30.					

1LCA

LOW CONC. WATER VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VHBLK2L

Lab Name: MITKEM CORP. Contract: 68-D6-0063

Lab Code: MITKEM Case No.: 25832 SAS No.: SDG No.: EADQ8

Lab Sample ID: V2B1108C Date Received: 11/06/97

Lab File ID: V2B1342 Date Analyzed: 11/08/97

Purge Volume: 25 (mL) Dilution Factor: 1.0

GC Column: DB-624 ID: 0.25 (mm) Length: 30 (m)

CAS NO.	COMPOUND	CONCENTRATION (ug/L)	Q
74-87-3	Chloromethane	1	U
74-83-9	Bromomethane	1	U
75-01-4	Vinyl chloride	1	U
75-00-3	Chloroethane	1	U
75-09-2	Methylene chloride	2	U
67-64-1	Acetone	5	U
75-15-0	Carbon disulfide	1	U
75-35-4	1,1-Dichloroethene	1	U
75-34-3	1,1-Dichloroethane	1	U
156-59-2	cis-1,2-Dichloroethene	1	U
156-60-5	trans-1,2-Dichloroethene	1	U
67-66-3	Chloroform	1	U
107-06-2	1,2-Dichloroethane	1	U
78-93-3	2-Butanone	5	U
74-97-5	Bromochloromethane	1	U
71-55-6	1,1,1-Trichloroethane	1	U
56-23-5	Carbon tetrachloride	1	U
75-27-4	Bromodichloromethane	1	U
78-87-5	1,2-Dichloropropane	1	U
10061-01-5	cis-1,3-Dichloropropene	1	U
79-01-6	Trichloroethene	1	U
124-48-1	Dibromochloromethane	1	U
79-00-5	1,1,2-Trichloroethane	1	U
71-43-2	Benzene	1	U
10061-02-6	trans-1,3-Dichloropropene	1	U
75-25-2	Bromoform	1	U
108-10-1	4-Methyl-2-pentanone	5	U
591-78-6	2-Hexanone	5	U
127-18-4	Tetrachloroethene	1	U
79-34-5	1,1,2,2-Tetrachloroethane	1	U
106-93-4	1,2-Dibromoethane	1	U
108-88-3	Toluene	1	U
108-90-7	Chlorobenzene	1	U
100-41-4	Ethylbenzene	1	U
100-42-5	Styrene	1	U
1330-20-7	Xylenes (total)	1	U
541-73-1	1,3-Dichlorobenzene	1	U
106-46-7	1,4-Dichlorobenzene	1	U
95-50-1	1,2-Dichlorobenzene	1	U
96-12-8	1,2-Dibromo-3-chloropropane	1	U
120-82-1	1,2,4-Trichlorobenzene	1	U

1LCE

EPA SAMPLE NO.

LOW CONC. WATER VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

VHBLK2L

Lab Name: MITKEM CORP. Contract: 68-D6-0063

Lab Code: MITKEM Case No.: 25832 SAS No.: SDG No.: EADQ8

Lab Sample ID: V2B1108C Date Received: 11/06/97

Lab File ID: V2B1342 Date Analyzed: 11/08/97

Purge Volume: 25 (mL) Dilution Factor: 1.0

GC Column: DB-624 ID: 0.25 (mm) Length: 30 (m)

Number TICs found: 0

	CAS NUMBER	COMPOUND NAME	RT	EST.CONC. (ug/L)	Q
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					
19.					
20.					
21.					
22.					
23.					
24.					
25.					
26.					
27.					
28.					
29.					
30.					

1LCA

LOW CONC. WATER VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VLCS2L

Lab Name: MITKEM CORP. Contract: 68-D6-0063

Lab Code: MITKEM Case No.: 25832 SAS No.: SDG No.: EADQ8

Lab Sample ID: V2L1108A Date Received: _____

Lab File ID: V2B1326 Date Analyzed: 11/08/97

Purge Volume: 25 (mL) Dilution Factor: 1.0

GC Column: DB-624 ID: 0.25 (mm) Length: 30 (m)

CAS NO.	COMPOUND	CONCENTRATION (ug/L)	Q
74-87-3	Chloromethane	1	U
74-83-9	Bromomethane	1	U
75-01-4	Vinyl chloride	6	
75-00-3	Chloroethane	1	U
75-09-2	Methylene chloride	2	U
67-64-1	Acetone	5	U
75-15-0	Carbon disulfide	1	U
75-35-4	1,1-Dichloroethene	1	U
75-34-3	1,1-Dichloroethane	1	U
156-59-2	cis-1,2-Dichloroethene	1	U
156-60-5	trans-1,2-Dichloroethene	1	U
67-66-3	Chloroform	1	U
107-06-2	1,2-Dichloroethane	5	
78-93-3	2-Butanone	5	U
74-97-5	Bromochloromethane	1	U
71-55-6	1,1,1-Trichloroethane	1	U
56-23-5	Carbon tetrachloride	5	
75-27-4	Bromodichloromethane	1	U
78-87-5	1,2-Dichloropropane	5	
10061-01-5	cis-1,3-Dichloropropene	5	
79-01-6	Trichloroethene	5	
124-48-1	Dibromochloromethane	1	U
79-00-5	1,1,2-Trichloroethane	5	
71-43-2	Benzene	5	
10061-02-6	trans-1,3-Dichloropropene	1	U
75-25-2	Bromoform	5	
108-10-1	4-Methyl-2-pentanone	5	U
591-78-6	2-Hexanone	5	U
127-18-4	Tetrachloroethene	5	
79-34-5	1,1,2,2-Tetrachloroethane	1	U
106-93-4	1,2-Dibromoethane	5	
108-88-3	Toluene	1	U
108-90-7	Chlorobenzene	1	U
100-41-4	Ethylbenzene	1	U
100-42-5	Styrene	1	U
1330-20-7	Xylenes (total)	1	U
541-73-1	1,3-Dichlorobenzene	1	U
106-46-7	1,4-Dichlorobenzene	5	
95-50-1	1,2-Dichlorobenzene	1	U
96-12-8	1,2-Dibromo-3-chloropropane	1	U
120-82-1	1,2,4-Trichlorobenzene	110 1	U

2LCB
LOW CONC. WATER SEMIVOLATILE SURROGATE RECOVERY

Lab Name: MITKEM CORPORATION Contract: 68-D6-0063

Lab Code: MITKEM Case No.: 25832 SAS No.: SDG No.: EADQ8

	EPA SAMPLE NO.	NBZ %REC #	FBP %REC #	TPH %REC #	PHL %REC #	2FP %REC #	TBP %REC #	OTHER	TOT OUT
01	SLCS01	85	91	99	88	89	92		0
02	SBLK01	72	81	90	71	70	81		0
03	EADS2	68	79	90	70	69	79		0
04	EADS0	70	83	89	71	72	77		0
05	EADS1	66	81	94	64	64	74		0
06	EADQ8	73	84	97	78	79	81		0
07	EADS1DL	67	76	81	60	59	72		0
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 %REC
NBZ	= Nitrobenzene-d5	(23-120)
FBP	= 2-Fluorobiphenyl	(30-115)
TPH	= Terphenyl-d14	(18-140)
PHL	= Phenol-d5	(15-115)
2FP	= 2-Fluorophenol	(15-121)
TBP	= 2,4,6-Tribromophenol	(15-130)

Column to be used to flag recovery values.
* Values outside of contract required QC limits.
D Surrogate diluted out.

3LCB

LOW CONC. WATER SEMIVOLATILE LAB CONTROL SAMPLE RECOVERY

EPA SAMPLE NO.

SLCS01

Lab Name: MITKEM CORPORATION Contract: 68-D6-0063

Lab Code: MITKEM Case No.: 25832 SAS No.: SDG No.: EADQ8

Lab Sample ID: S1107-LCS2 LCS Lot No.:

Lab File ID: S1A1731 Date Extracted: 11/07/97

LCS Aliquot: 1000 (ul) Date Analyzed: 11/18/97

Concentrated Extract Volume: 1000(uL) Dilution Factor: 1.0

Injection Volume: 1 (uL)

COMPOUND	AMOUNT ADDED (ng)	AMOUNT RECOVERED (ng)	%REC #	QC LIMITS
Phenol	40	35	88	40-120
bis(-2-Chloroethyl)Ether	20	18	90	50-110
2-Chlorophenol	40	35	88	50-110
N-Nitroso-di-n-propylamine	20	18	90	30-110
Hexachloroethane	20	16	80	20-110
Isophorone	20	16	80	50-110
Naphthalene	20	16	80	30-110
4-Chloroaniline	40	21	52	10-120
2,4,6-Trichlorophenol	40	35	88	40-120
2,4-Dinitrotoluene	20	16	80	30-120
Diethylphthalate	20	18	90	50-120
N-nitrosodiphenylamine (1)	20	12	60	30-110
Hexachlorobenzene	20	18	90	40-120
Benzo(a)pyrene	20	18	90	50-120

Column to be used to flag LCS recovery with an asterisk.
* Values outside of QC limits.

LCS Recovery: 0 outside limits out of 14 total.

COMMENTS:

4LCB

LOW CONC. WATER SEMIVOLATILE METHOD BLANK SUMMARY

EPA SAMPLE NO.

SBLK01

Lab Name: MITKEM CORPORATION Contract: 68-D6-0063

Lab Code: MITKEM Case No.: 25832 SAS No.: SDG No.: EADQ8

Lab Sample ID: S1107-B2 Date Extracted: 11/07/97

Lab File ID: S1A1732 Date Analyzed: 11/18/97

Instrument ID: S1 Time Analyzed : 1817

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES and LCS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
01	SLCS01	S1107-LCS2	S1A1731	11/18/97
02	EADS2	D1807-01	S1A1738	11/18/97
03	EADS0	D1807-02	S1A1739	11/18/97
04	EADS1	D1807-03	S1A1740	11/18/97
05	EADQ8	D1807-04	S1A1741	11/19/97
06	EADS1DL	D1807-03DL	S1A1748	11/19/97
07				
08				
09				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				

COMMENTS: _____

LOW CONC. WATER SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SBLK01

Lab Name: MITKEM CORPORATION Contract: 68-D6-0063

Lab Code: MITKEM Case No.: 25832 SAS No.: SDG No.: EADQ8

Lab Sample ID: S1107-B2 Date Received: _____

Lab File ID: S1A1732 Date Extracted: 11/07/97

Sample Volume: 1000.00 (mL) Date Analyzed: 11/18/97

Concentrated Extract Volume: 1000(uL) Dilution Factor: 1.0

Injection Volume: 1 (uL)

CAS NO.	COMPOUND	CONCENTRATION (ug/L)	Q
108-95-2	Phenol	5	U
111-44-4	bis(-2-Chloroethyl)Ether	5	U
95-57-8	2-Chlorophenol	5	U
95-48-7	2-Methylphenol	5	U
108-60-1	2,2'-oxybis(1-Chloropropane)	5	U
106-44-5	4-Methylphenol	5	U
621-64-7	N-Nitroso-di-n-propylamine	5	U
67-72-1	Hexachloroethane	5	U
98-95-3	Nitrobenzene	5	U
78-59-1	Isophorone	5	U
88-75-5	2-Nitrophenol	5	U
105-67-9	2,4-Dimethyphenol	5	U
111-91-1	bis(-2-Chloroethoxy)methane	5	U
120-83-2	2,4-Dichlorophenol	5	U
91-20-3	Naphthalene	5	U
106-47-8	4-Chloroaniline	5	U
87-68-3	Hexachlorobutadiene	5	U
59-50-7	4-Chloro-3-Methylphenol	5	U
91-57-6	2-Methylnaphthalene	5	U
77-47-4	Hexachlorocyclopentadiene	5	U
88-06-2	2,4,6-Trichlorophenol	5	U
95-95-4	2,4,5-Trichlorphenol	20	U
91-58-7	2-Chloronaphthalene	5	U
88-74-4	2-Nitroaniline	20	U
131-11-3	Dimethylphthalate	5	U
208-96-8	Acenaphthylene	5	U
606-20-2	2,6-Dinitrotoluene	5	U
99-09-2	3-Nitroaniline	20	U
83-32-9	Acenaphthene	5	U

1LCC

LOW CONC. WATER SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SBLK01

Lab Name: MITKEM CORPORATION Contract: 68-D6-0063

Lab Code: MITKEM Case No.: 25832 SAS No.: SDG No.: EADQ8

Lab Sample ID: S1107-B2 Date Received: _____

Lab File ID: S1A1732 Date Extracted: 11/07/97

Sample Volume: 1000.00 (mL) Date Analyzed: 11/18/97

Concentrated Extract Volume: 1000(uL) Dilution Factor: 1.0

Injection Volume: 1 (uL)

CAS NO.	COMPOUND	CONCENTRATION (ug/L)	Q
51-28-5	2,4-Dinitrophenol	20	U
100-02-7	4-Nitrophenol	20	U
132-64-9	Dibenzofuran	5	U
121-14-2	2,4-Dinitrotoluene	5	U
84-66-2	Diethylphthalate	5	U
7005-72-3	4-Chlorophenyl-phenylether	5	U
86-73-7	Fluorene	5	U
100-01-6	4-Nitroaniline	20	U
534-52-1	4,6-Dinitro-2-methylphenol	20	U
86-30-6	N-nitrosodiphenylamine (1)	5	U
101-55-3	4-Bromophenyl-phenylether	5	U
118-74-1	Hexachlorobenzene	5	U
87-86-5	Pentachlorophenol	20	U
85-01-8	Phenanthrene	5	U
120-12-7	Anthracene	5	U
84-74-2	Di-n-butylphthalate	5	U
206-44-0	Fluoranthene	5	U
129-00-0	Pyrene	5	U
85-68-7	Butylbenzylphthalate	5	U
91-94-1	3,3'-Dichlorobenzidine	5	U
56-55-3	Benzo(a)anthracene	5	U
218-01-9	Chrysene	5	U
117-81-7	bis(2-Ethylhexyl)phthalate	5	U
117-84-0	Di-n-octylphthalate	5	U
205-99-2	Benzo(b)fluoranthene	5	U
207-08-9	Benzo(k)fluoranthene	5	U
50-32-8	Benzo(a)pyrene	5	U
193-39-5	Indeno(1,2,3-cd)pyrene	5	U
53-70-3	Dibenzo(a,h)anthracene	5	U
191-24-2	Benzo(g,h,i)perylene	5	U

(1) - Cannot be separated from Diphenylamine

1LCF

EPA SAMPLE NO.

LOW CONC. WATER SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

SBLK01

Lab Name: MITKEM CORPORATION Contract: 68-D6-0063

Lab Code: MITKEM Case No.: 25832 SAS No.: SDG No.: EADQ8

Lab Sample ID: S1107-B2 Date Received: _____

Lab File ID: S1A1732 Date Extracted: 11/07/97

Sample Volume: 1000.00 (mL) Date Analyzed: 11/18/97

Concentrated Extract Volume: 1000(uL) Dilution Factor: 1.0

Injection Volume: 1 (uL)

Number TICs found: 0

	CAS NUMBER	COMPOUND NAME	RT	EST.CONC. (ug/L)	Q
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					
19.					
20.					
21.					
22.					
23.					
24.					
25.					
26.					
27.					
28.					
29.					
30.					

LOW CONC. WATER SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

EADQ8

Lab Name: MITKEM CORPORATION Contract: 68-D6-0063

Lab Code: MITKEM Case No.: 25832 SAS No.: SDG No.: EADQ8

Lab Sample ID: D1807-04 Date Received: 11/06/97

Lab File ID: S1A1741 Date Extracted: 11/07/97

Sample Volume: 1000.00 (mL) Date Analyzed: 11/19/97

Concentrated Extract Volume: 1000(uL) Dilution Factor: 1.0

Injection Volume: 1 (uL)

IW4 duplicate

CAS NO.	COMPOUND	CONCENTRATION (ug/L)	Q
108-95-2	Phenol	5	U
111-44-4	bis(-2-Chloroethyl)Ether	5	U
95-57-8	2-Chlorophenol	5	U
95-48-7	2-Methylphenol	5	U
108-60-1	2,2'-oxybis(1-Chloropropane)	5	U
106-44-5	4-Methylphenol	5	U
621-64-7	N-Nitroso-di-n-propylamine	5	U
67-72-1	Hexachloroethane	5	U
98-95-3	Nitrobenzene	5	U
78-59-1	Isophorone	5	U
88-75-5	2-Nitrophenol	5	U
105-67-9	2,4-Dimethyphenol	5	U
111-91-1	bis(-2-Chloroethoxy)methane	5	U
120-83-2	2,4-Dichlorophenol	5	U
91-20-3	Naphthalene	5	U
106-47-8	4-Chloroaniline	5	U
87-68-3	Hexachlorobutadiene	5	U
59-50-7	4-Chloro-3-Methylphenol	5	U
91-57-6	2-Methylnaphthalene	5	U
77-47-4	Hexachlorocyclopentadiene	5	U
88-06-2	2,4,6-Trichlorophenol	5	U
95-95-4	2,4,5-Trichlorphenol	20	U
91-58-7	2-Chloronaphthalene	5	U
88-74-4	2-Nitroaniline	20	U
131-11-3	Dimethylphthalate	5	U
208-96-8	Acenaphthylene	5	U
606-20-2	2,6-Dinitrotoluene	5	U
99-09-2	3-Nitroaniline	20	U
83-32-9	Acenaphthene	5	U

1LCC

EPA SAMPLE NO.

LOW CONC. WATER SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EADQ8

Lab Name: MITKEM CORPORATION Contract: 68-D6-0063

Lab Code: MITKEM Case No.: 25832 SAS No.: SDG No.: EADQ8

Lab Sample ID: D1807-04 Date Received: 11/06/97

Lab File ID: S1A1741 Date Extracted: 11/07/97

Sample Volume: 1000.00 (mL) Date Analyzed: 11/19/97

Concentrated Extract Volume: 1000(uL) Dilution Factor: 1.0

Injection Volume: 1 (uL)

CAS NO.	COMPOUND	CONCENTRATION (ug/L)	Q
51-28-5	2,4-Dinitrophenol	20	U
100-02-7	4-Nitrophenol	20	U
132-64-9	Dibenzofuran	5	U
121-14-2	2,4-Dinitrotoluene	5	U
84-66-2	Diethylphthalate	5	U
7005-72-3	4-Chlorophenyl-phenylether	5	U
86-73-7	Fluorene	5	U
100-01-6	4-Nitroaniline	20	U
534-52-1	4,6-Dinitro-2-methylphenol	20	U
86-30-6	N-nitrosodiphenylamine (1)	5	U
101-55-3	4-Bromophenyl-phenylether	5	U
118-74-1	Hexachlorobenzene	5	U
87-86-5	Pentachlorophenol	20	U
85-01-8	Phenanthrene	5	U
120-12-7	Anthracene	5	U
84-74-2	Di-n-butylphthalate	5	U
206-44-0	Fluoranthene	5	U
129-00-0	Pyrene	5	U
85-68-7	Butylbenzylphthalate	5	U
91-94-1	3,3'-Dichlorobenzidine	5	U
56-55-3	Benzo(a)anthracene	5	U
218-01-9	Chrysene	5	U
117-81-7	bis(2-Ethylhexyl)phthalate	5	U
117-84-0	Di-n-octylphthalate	5	U
205-99-2	Benzo(b)fluoranthene	5	U
207-08-9	Benzo(k)fluoranthene	5	U
50-32-8	Benzo(a)pyrene	5	U
193-39-5	Indeno(1,2,3-cd)pyrene	5	U
53-70-3	Dibenzo(a,h)anthracene	5	U
191-24-2	Benzo(g,h,i)perylene	5	U

(1) - Cannot be separated from Diphenylamine

1LCF

EPA SAMPLE NO.

LOW CONC. WATER SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EADQ8

Lab Name: MITKEM CORPORATION Contract: 68-D6-0063

Lab Code: MITKEM Case No.: 25832 SAS No.: SDG No.: EADQ8

Lab Sample ID: D1807-04 Date Received: 11/06/97

Lab File ID: S1A1741 Date Extracted: 11/07/97

Sample Volume: 1000.00 (mL) Date Analyzed: 11/19/97

Concentrated Extract Volume: 1000(uL) Dilution Factor: 1.0

Injection Volume: 1 (uL)

Number TICs found: 0

	CAS NUMBER	COMPOUND NAME	RT	EST.CONC. (ug/L)	Q
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					
19.					
20.					
21.					
22.					
23.					
24.					
25.					
26.					
27.					
28.					
29.					
30.					

1LCB

LOW CONC. WATER SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

EADS0

Lab Name: MITKEM CORPORATION Contract: 68-D6-0063

Lab Code: MITKEM Case No.: 25832 SAS No.: SDG No.: EADQ8

Lab Sample ID: D1807-02 Date Received: 11/06/97

Lab File ID: S1A1739 Date Extracted: 11/07/97

Sample Volume: 1000.00 (mL) Date Analyzed: 11/18/97

Concentrated Extract Volume: 1000(uL) Dilution Factor: 1.0

Injection Volume: 1 (uL)

IW1

CAS NO.	COMPOUND	CONCENTRATION (ug/L)	Q
108-95-2	Phenol	5	U
111-44-4	bis(-2-Chloroethyl)Ether	5	U
95-57-8	2-Chlorophenol	5	U
95-48-7	2-Methylphenol	5	U
108-60-1	2,2'-oxybis(1-Chloropropane)	5	U
106-44-5	4-Methylphenol	5	U
621-64-7	N-Nitroso-di-n-propylamine	5	U
67-72-1	Hexachloroethane	5	U
98-95-3	Nitrobenzene	5	U
78-59-1	Isophorone	5	U
88-75-5	2-Nitrophenol	5	U
105-67-9	2,4-Dimethyphenol	5	U
111-91-1	bis(-2-Chloroethoxy)methane	5	U
120-83-2	2,4-Dichlorophenol	5	U
91-20-3	Naphthalene	5	U
106-47-8	4-Chloroaniline	5	U
87-68-3	Hexachlorobutadiene	5	U
59-50-7	4-Chloro-3-Methylphenol	5	U
91-57-6	2-Methylnaphthalene	5	U
77-47-4	Hexachlorocyclopentadiene	5	U
88-06-2	2,4,6-Trichlorophenol	5	U
95-95-4	2,4,5-Trichlorphenol	20	U
91-58-7	2-Chloronaphthalene	5	U
88-74-4	2-Nitroaniline	20	U
131-11-3	Dimethylphthalate	5	U
208-96-8	Acenaphthylene	5	U
606-20-2	2,6-Dinitrotoluene	5	U
99-09-2	3-Nitroaniline	20	U
83-32-9	Acenaphthene	5	U

LOW CONC. WATER SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

EADS0

Lab Name: MITKEM CORPORATION Contract: 68-D6-0063

Lab Code: MITKEM Case No.: 25832 SAS No.: SDG No.: EADQ8

Lab Sample ID: D1807-02 Date Received: 11/06/97

Lab File ID: S1A1739 Date Extracted: 11/07/97

Sample Volume: 1000.00 (mL) Date Analyzed: 11/18/97

Concentrated Extract Volume: 1000(uL) Dilution Factor: 1.0

Injection Volume: 1 (uL)

CAS NO.	COMPOUND	CONCENTRATION (ug/L)	Q
51-28-5	2,4-Dinitrophenol	20	U
100-02-7	4-Nitrophenol	20	U
132-64-9	Dibenzofuran	5	U
121-14-2	2,4-Dinitrotoluene	5	U
84-66-2	Diethylphthalate	5	U
7005-72-3	4-Chlorophenyl-phenylether	5	U
86-73-7	Fluorene	5	U
100-01-6	4-Nitroaniline	20	U
534-52-1	4,6-Dinitro-2-methylphenol	20	U
86-30-6	N-nitrosodiphenylamine (1)	5	U
101-55-3	4-Bromophenyl-phenylether	5	U
118-74-1	Hexachlorobenzene	5	U
87-86-5	Pentachlorophenol	20	U
85-01-8	Phenanthrene	5	U
120-12-7	Anthracene	5	U
84-74-2	Di-n-butylphthalate	5	U
206-44-0	Fluoranthene	5	U
129-00-0	Pyrene	5	U
85-68-7	Butylbenzylphthalate	5	U
91-94-1	3,3'-Dichlorobenzidine	5	U
56-55-3	Benzo(a)anthracene	5	U
218-01-9	Chrysene	5	U
117-81-7	bis(2-Ethylhexyl)phthalate	5	
117-84-0	Di-n-octylphthalate	5	U
205-99-2	Benzo(b)fluoranthene	5	U
207-08-9	Benzo(k)fluoranthene	5	U
50-32-8	Benzo(a)pyrene	5	U
193-39-5	Indeno(1,2,3-cd)pyrene	5	U
53-70-3	Dibenzo(a,h)anthracene	5	U
191-24-2	Benzo(g,h,i)perylene	5	U

(1) - Cannot be separated from Diphenylamine

1LCF

EPA SAMPLE NO.

LOW CONC. WATER SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EADS0

Lab Name: MITKEM CORPORATION Contract: 68-D6-0063

Lab Code: MITKEM Case No.: 25832 SAS No.: SDG No.: EADQ8

Lab Sample ID: D1807-02 Date Received: 11/06/97

Lab File ID: S1A1739 Date Extracted: 11/07/97

Sample Volume: 1000.00 (mL) Date Analyzed: 11/18/97

Concentrated Extract Volume: 1000(uL) Dilution Factor: 1.0

Injection Volume: 1 (uL)

Number TICs found: 0

	CAS NUMBER	COMPOUND NAME	RT	EST.CONC. (ug/L)	Q
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					
19.					
20.					
21.					
22.					
23.					
24.					
25.					
26.					
27.					
28.					
29.					
30.					

LOW CONC. WATER SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

EADS1

Lab Name: MITKEM CORPORATION Contract: 68-D6-0063

Lab Code: MITKEM Case No.: 25832 SAS No.: SDG No.: EADQ8

IW4

Lab Sample ID: D1807-03 Date Received: 11/06/97

Lab File ID: S1A1740 Date Extracted: 11/07/97

Sample Volume: 1000.00 (mL) Date Analyzed: 11/18/97

Concentrated Extract Volume: 1000(uL) Dilution Factor: 1.0

Injection Volume: 1 (uL)

CAS NO.	COMPOUND	CONCENTRATION (ug/L)	Q
108-95-2	Phenol	6	
111-44-4	bis(-2-Chloroethyl)Ether	5	U
95-57-8	2-Chlorophenol	5	U
95-48-7	2-Methylphenol	5	U
108-60-1	2,2'-oxybis(1-Chloropropane)	5	U
106-44-5	4-Methylphenol	5	U
621-64-7	N-Nitroso-di-n-propylamine	5	U
67-72-1	Hexachloroethane	5	U
98-95-3	Nitrobenzene	5	U
78-59-1	Isophorone	5	U
88-75-5	2-Nitrophenol	5	U
105-67-9	2,4-Dimethyphenol	5	U
111-91-1	bis(-2-Chloroethoxy)methane	5	U
120-83-2	2,4-Dichlorophenol	5	U
91-20-3	Naphthalene	5	U
106-47-8	4-Chloroaniline	5	U
87-68-3	Hexachlorobutadiene	5	U
59-50-7	4-Chloro-3-Methylphenol	5	U
91-57-6	2-Methylnaphthalene	5	U
77-47-4	Hexachlorocyclopentadiene	5	U
88-06-2	2,4,6-Trichlorophenol	5	U
95-95-4	2,4,5-Trichlorphenol	20	U
91-58-7	2-Chloronaphthalene	5	U
88-74-4	2-Nitroaniline	20	U
131-11-3	Dimethylphthalate	5	U
208-96-8	Acenaphthylene	5	U
606-20-2	2,6-Dinitrotoluene	5	U
99-09-2	3-Nitroaniline	20	U
83-32-9	Acenaphthene	5	U

LOW CONC. WATER SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

EADS1

Lab Name: MITKEM CORPORATION Contract: 68-D6-0063

Lab Code: MITKEM Case No.: 25832 SAS No.: SDG No.: EADQ8

Lab Sample ID: D1807-03 Date Received: 11/06/97

Lab File ID: S1A1740 Date Extracted: 11/07/97

Sample Volume: 1000.00 (mL) Date Analyzed: 11/18/97

Concentrated Extract Volume: 1000(uL) Dilution Factor: 1.0

Injection Volume: 1 (uL)

CAS NO.	COMPOUND	CONCENTRATION (ug/L)	Q
51-28-5	2,4-Dinitrophenol	20	U
100-02-7	4-Nitrophenol	20	U
132-64-9	Dibenzofuran	5	U
121-14-2	2,4-Dinitrotoluene	5	U
84-66-2	Diethylphthalate	5	U
7005-72-3	4-Chlorophenyl-phenylether	5	U
86-73-7	Fluorene	5	U
100-01-6	4-Nitroaniline	20	U
534-52-1	4,6-Dinitro-2-methylphenol	20	U
86-30-6	N-nitrosodiphenylamine (1)	5	U
101-55-3	4-Bromophenyl-phenylether	5	U
118-74-1	Hexachlorobenzene	5	U
87-86-5	Pentachlorophenol	20	U
85-01-8	Phenanthrene	5	U
120-12-7	Anthracene	5	U
84-74-2	Di-n-butylphthalate	5	U
206-44-0	Fluoranthene	5	U
129-00-0	Pyrene	5	U
85-68-7	Butylbenzylphthalate	5	U
91-94-1	3,3'-Dichlorobenzidine	5	U
56-55-3	Benzo(a)anthracene	5	U
218-01-9	Chrysene	5	U
117-81-7	bis(2-Ethylhexyl)phthalate	230	E
117-84-0	Di-n-octylphthalate	5	U
205-99-2	Benzo(b)fluoranthene	5	U
207-08-9	Benzo(k)fluoranthene	5	U
50-32-8	Benzo(a)pyrene	5	U
193-39-5	Indeno(1,2,3-cd)pyrene	5	U
53-70-3	Dibenzo(a,h)anthracene	5	U
191-24-2	Benzo(g,h,i)perylene	5	U

(1) - Cannot be separated from Diphenylamine

1LCF

EPA SAMPLE NO.

LOW CONC. WATER SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EADS1

Lab Name: MITKEM CORPORATION Contract: 68-D6-0063

Lab Code: MITKEM Case No.: 25832 SAS No.: SDG No.: EADQ8

Lab Sample ID: D1807-03 Date Received: 11/06/97

Lab File ID: S1A1740 Date Extracted: 11/07/97

Sample Volume: 1000.00 (mL) Date Analyzed: 11/18/97

Concentrated Extract Volume: 1000(uL) Dilution Factor: 1.0

Injection Volume: 1 (uL)

Number TICs found: 1

	CAS NUMBER	COMPOUND NAME	RT	EST.CONC. (ug/L)	Q
1.		UNKNOWN	15.24	19	J
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					
19.					
20.					
21.					
22.					
23.					
24.					
25.					
26.					
27.					
28.					
29.					
30.					

1LCB

LOW CONC. WATER SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

EADS1DL

Lab Name: MITKEM CORPORATION Contract: 68-D6-0063

Lab Code: MITKEM Case No.: 25832 SAS No.: SDG No.: EADQ8

Lab Sample ID: D1807-03DL Date Received: 11/06/97

Lab File ID: S1A1748 Date Extracted: 11/07/97 IW4

Sample Volume: 1000.00 (mL) Date Analyzed: 11/19/97

Concentrated Extract Volume: 1000(uL) Dilution Factor: 4.0

Injection Volume: 1 (uL)

CAS NO.	COMPOUND	CONCENTRATION (ug/L)	Q
108-95-2	Phenol	5	DJ
111-44-4	bis(-2-Chloroethyl)Ether	20	U
95-57-8	2-Chlorophenol	20	U
95-48-7	2-Methylphenol	20	U
108-60-1	2,2'-oxybis(1-Chloropropane)	20	U
106-44-5	4-Methylphenol	20	U
621-64-7	N-Nitroso-di-n-propylamine	20	U
67-72-1	Hexachloroethane	20	U
98-95-3	Nitrobenzene	20	U
78-59-1	Isophorone	20	U
88-75-5	2-Nitrophenol	20	U
105-67-9	2,4-Dimethyphenol	20	U
111-91-1	bis(-2-Chloroethoxy)methane	20	U
120-83-2	2,4-Dichlorophenol	20	U
91-20-3	Naphthalene	20	U
106-47-8	4-Chloroaniline	20	U
87-68-3	Hexachlorobutadiene	20	U
59-50-7	4-Chloro-3-Methylphenol	20	U
91-57-6	2-Methylnaphthalene	20	U
77-47-4	Hexachlorocyclopentadiene	20	U
88-06-2	2,4,6-Trichlorophenol	20	U
95-95-4	2,4,5-Trichlorphenol	80	U
91-58-7	2-Chloronaphthalene	20	U
88-74-4	2-Nitroaniline	80	U
131-11-3	Dimethylphthalate	20	U
208-96-8	Acenaphthylene	20	U
606-20-2	2,6-Dinitrotoluene	20	U
99-09-2	3-Nitroaniline	80	U
83-32-9	Acenaphthene	20	U

LOW CONC. WATER SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

EADS1DL

Lab Name: MITKEM CORPORATION Contract: 68-D6-0063

Lab Code: MITKEM Case No.: 25832 SAS No.: SDG No.: EADQ8

Lab Sample ID: D1807-03DL Date Received: 11/06/97

Lab File ID: S1A1748 Date Extracted: 11/07/97

Sample Volume: 1000.00 (mL) Date Analyzed: 11/19/97

Concentrated Extract Volume: 1000(uL) Dilution Factor: 4.0

Injection Volume: 1 (uL)

CAS NO.	COMPOUND	CONCENTRATION (ug/L)	Q
51-28-5	2,4-Dinitrophenol	80	U
100-02-7	4-Nitrophenol	80	U
132-64-9	Dibenzofuran	20	U
121-14-2	2,4-Dinitrotoluene	20	U
84-66-2	Diethylphthalate	20	U
7005-72-3	4-Chlorophenyl-phenylether	20	U
86-73-7	Fluorene	20	U
100-01-6	4-Nitroaniline	80	U
534-52-1	4,6-Dinitro-2-methylphenol	80	U
86-30-6	N-nitrosodiphenylamine (1)	20	U
101-55-3	4-Bromophenyl-phenylether	20	U
118-74-1	Hexachlorobenzene	20	U
87-86-5	Pentachlorophenol	80	U
85-01-8	Phenanthrene	20	U
120-12-7	Anthracene	20	U
84-74-2	Di-n-butylphthalate	20	U
206-44-0	Fluoranthene	20	U
129-00-0	Pyrene	20	U
85-68-7	Butylbenzylphthalate	20	U
91-94-1	3,3'-Dichlorobenzidine	20	U
56-55-3	Benzo(a)anthracene	20	U
218-01-9	Chrysene	20	U
117-81-7	bis(2-Ethylhexyl)phthalate	220	D
117-84-0	Di-n-octylphthalate	20	U
205-99-2	Benzo(b)fluoranthene	20	U
207-08-9	Benzo(k)fluoranthene	20	U
50-32-8	Benzo(a)pyrene	20	U
193-39-5	Indeno(1,2,3-cd)pyrene	20	U
53-70-3	Dibenzo(a,h)anthracene	20	U
191-24-2	Benzo(g,h,i)perylene	20	U

(1) - Cannot be separated from Diphenylamine

1LCF

EPA SAMPLE NO.

LOW CONC. WATER SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EADS1DL

Lab Name: MITKEM CORPORATION Contract: 68-D6-0063

Lab Code: MITKEM Case No.: 25832 SAS No.: SDG No.: EADQ8

Lab Sample ID: D1807-03DL Date Received: 11/06/97

Lab File ID: S1A1748 Date Extracted: 11/07/97

Sample Volume: 1000.00 (mL) Date Analyzed: 11/19/97

Concentrated Extract Volume: 1000(uL) Dilution Factor: 4.0

Injection Volume: 1 (uL)

Number TICs found: 0

	CAS NUMBER	COMPOUND NAME	RT	EST.CONC. (ug/L)	Q
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					
19.					
20.					
21.					
22.					
23.					
24.					
25.					
26.					
27.					
28.					
29.					
30.					

1LCB

LOW CONC. WATER SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

EADS2

Lab Name: MITKEM CORPORATION Contract: 68-D6-0063

Lab Code: MITKEM Case No.: 25832 SAS No.: SDG No.: EADQ8

Lab Sample ID: D1807-01 Date Received: 11/06/97 IW6

Lab File ID: S1A1738 Date Extracted: 11/07/97

Sample Volume: 1000.00 (mL) Date Analyzed: 11/18/97

Concentrated Extract Volume: 1000(uL) Dilution Factor: 1.0

Injection Volume: 1 (uL)

CAS NO.	COMPOUND	CONCENTRATION (ug/L)	Q
108-95-2	Phenol	5	U
111-44-4	bis(-2-Chloroethyl)Ether	5	U
95-57-8	2-Chlorophenol	5	U
95-48-7	2-Methylphenol	5	U
108-60-1	2,2'-oxybis(1-Chloropropane)	5	U
106-44-5	4-Methylphenol	5	U
621-64-7	N-Nitroso-di-n-propylamine	5	U
67-72-1	Hexachloroethane	5	U
98-95-3	Nitrobenzene	5	U
78-59-1	Isophorone	5	U
88-75-5	2-Nitrophenol	5	U
105-67-9	2,4-Dimethyphenol	5	U
111-91-1	bis(-2-Chloroethoxy)methane	5	U
120-83-2	2,4-Dichlorophenol	5	U
91-20-3	Naphthalene	5	U
106-47-8	4-Chloroaniline	5	U
87-68-3	Hexachlorobutadiene	5	U
59-50-7	4-Chloro-3-Methylphenol	5	U
91-57-6	2-Methylnaphthalene	5	U
77-47-4	Hexachlorocyclopentadiene	5	U
88-06-2	2,4,6-Trichlorophenol	5	U
95-95-4	2,4,5-Trichlorphenol	20	U
91-58-7	2-Chloronaphthalene	5	U
88-74-4	2-Nitroaniline	20	U
131-11-3	Dimethylphthalate	5	U
208-96-8	Acenaphthylene	5	U
606-20-2	2,6-Dinitrotoluene	5	U
99-09-2	3-Nitroaniline	20	U
83-32-9	Acenaphthene	5	U

LOW CONC. WATER SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

EADS2

Lab Name: MITKEM CORPORATION Contract: 68-D6-0063

Lab Code: MITKEM Case No.: 25832 SAS No.: SDG No.: EADQ8

Lab Sample ID: D1807-01 Date Received: 11/06/97

Lab File ID: S1A1738 Date Extracted: 11/07/97

Sample Volume: 1000.00 (mL) Date Analyzed: 11/18/97

Concentrated Extract Volume: 1000(uL) Dilution Factor: 1.0

Injection Volume: 1 (uL)

CAS NO.	COMPOUND	CONCENTRATION (ug/L)	Q
51-28-5	2,4-Dinitrophenol	20	U
100-02-7	4-Nitrophenol	20	U
132-64-9	Dibenzofuran	5	U
121-14-2	2,4-Dinitrotoluene	5	U
84-66-2	Diethylphthalate	5	U
7005-72-3	4-Chlorophenyl-phenylether	5	U
86-73-7	Fluorene	5	U
100-01-6	4-Nitroaniline	20	U
534-52-1	4,6-Dinitro-2-methylphenol	20	U
86-30-6	N-nitrosodiphenylamine (1)	5	U
101-55-3	4-Bromophenyl-phenylether	5	U
118-74-1	Hexachlorobenzene	5	U
87-86-5	Pentachlorophenol	20	U
85-01-8	Phenanthrene	5	U
120-12-7	Anthracene	5	U
84-74-2	Di-n-butylphthalate	5	U
206-44-0	Fluoranthene	5	U
129-00-0	Pyrene	5	U
85-68-7	Butylbenzylphthalate	5	U
91-94-1	3,3'-Dichlorobenzidine	5	U
56-55-3	Benzo(a)anthracene	5	U
218-01-9	Chrysene	5	U
117-81-7	bis(2-Ethylhexyl)phthalate	2	J
117-84-0	Di-n-octylphthalate	5	U
205-99-2	Benzo(b)fluoranthene	5	U
207-08-9	Benzo(k)fluoranthene	5	U
50-32-8	Benzo(a)pyrene	5	U
193-39-5	Indeno(1,2,3-cd)pyrene	5	U
53-70-3	Dibenzo(a,h)anthracene	5	U
191-24-2	Benzo(g,h,i)perylene	5	U

(1) - Cannot be separated from Diphenylamine

1LCF

EPA SAMPLE NO.

LOW CONC. WATER SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EADS2

Lab Name: MITKEM CORPORATION Contract: 68-D6-0063

Lab Code: MITKEM Case No.: 25832 SAS No.: SDG No.: EADQ8

Lab Sample ID: D1807-01 Date Received: 11/06/97

Lab File ID: S1A1738 Date Extracted: 11/07/97

Sample Volume: 1000.00 (mL) Date Analyzed: 11/18/97

Concentrated Extract Volume: 1000(uL) Dilution Factor: 1.0

Injection Volume: 1 (uL)

Number TICs found: 1

	CAS NUMBER	COMPOUND NAME	RT	EST.CONC. (ug/L)	Q
1.		UNKNOWN	14.17	18	J
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					
19.					
20.					
21.					
22.					
23.					
24.					
25.					
26.					
27.					
28.					
29.					
30.					

1LCB

LOW CONC. WATER SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SLCS01

Lab Name: MITKEM CORPORATION Contract: 68-D6-0063

Lab Code: MITKEM Case No.: 25832 SAS No.: SDG No.: EADQ8

Lab Sample ID: S1107-LCS2 Date Received: _____

Lab File ID: S1A1731 Date Extracted: 11/07/97

Sample Volume: 1000.00 (mL) Date Analyzed: 11/18/97

Concentrated Extract Volume: 1000(uL) Dilution Factor: 1.0

Injection Volume: 1 (uL)

CAS NO.	COMPOUND	CONCENTRATION (ug/L)	Q
108-95-2	Phenol	35	
111-44-4	bis(-2-Chloroethyl)Ether	18	
95-57-8	2-Chlorophenol	35	
95-48-7	2-Methylphenol	5	U
108-60-1	2,2'-oxybis(1-Chloropropane)	5	U
106-44-5	4-Methylphenol	5	U
621-64-7	N-Nitroso-di-n-propylamine	18	
67-72-1	Hexachloroethane	16	
98-95-3	Nitrobenzene	5	U
78-59-1	Isophorone	16	
88-75-5	2-Nitrophenol	5	U
105-67-9	2,4-Dimethyphenol	5	U
111-91-1	bis(-2-Chloroethoxy)methane	5	U
120-83-2	2,4-Dichlorophenol	5	U
91-20-3	Naphthalene	16	
106-47-8	4-Chloroaniline	21	
87-68-3	Hexachlorobutadiene	5	U
59-50-7	4-Chloro-3-Methylphenol	5	U
91-57-6	2-Methylnaphthalene	5	U
77-47-4	Hexachlorocyclopentadiene	5	U
88-06-2	2,4,6-Trichlorophenol	35	
95-95-4	2,4,5-Trichlorphenol	20	U
91-58-7	2-Chloronaphthalene	5	U
88-74-4	2-Nitroaniline	20	U
131-11-3	Dimethylphthalate	5	U
208-96-8	Acenaphthylene	5	U
606-20-2	2,6-Dinitrotoluene	5	U
99-09-2	3-Nitroaniline	20	U
83-32-9	Acenaphthene	5	U

1LCC

LOW CONC. WATER SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SLCS01

Lab Name: MITKEM CORPORATION Contract: 68-D6-0063

Lab Code: MITKEM Case No.: 25832 SAS No.: SDG No.: EADQ8

Lab Sample ID: S1107-LCS2 Date Received: _____

Lab File ID: S1A1731 Date Extracted: 11/07/97

Sample Volume: 1000.00 (mL) Date Analyzed: 11/18/97

Concentrated Extract Volume: 1000(uL) Dilution Factor: 1.0

Injection Volume: 1 (uL)

CAS NO.	COMPOUND	CONCENTRATION (ug/L)	Q
51-28-5	2,4-Dinitrophenol	20	U
100-02-7	4-Nitrophenol	20	U
132-64-9	Dibenzofuran	5	U
121-14-2	2,4-Dinitrotoluene	16	
84-66-2	Diethylphthalate	18	
7005-72-3	4-Chlorophenyl-phenylether	5	U
86-73-7	Fluorene	5	U
100-01-6	4-Nitroaniline	20	U
534-52-1	4,6-Dinitro-2-methylphenol	20	U
86-30-6	N-nitrosodiphenylamine (1)	12	
101-55-3	4-Bromophenyl-phenylether	5	U
118-74-1	Hexachlorobenzene	18	
87-86-5	Pentachlorophenol	20	U
85-01-8	Phenanthrene	5	U
120-12-7	Anthracene	5	U
84-74-2	Di-n-butylphthalate	5	U
206-44-0	Fluoranthene	5	U
129-00-0	Pyrene	5	U
85-68-7	Butylbenzylphthalate	5	U
91-94-1	3,3'-Dichlorobenzidine	5	U
56-55-3	Benzo(a)anthracene	5	U
218-01-9	Chrysene	5	U
117-81-7	bis(2-Ethylhexyl)phthalate	5	U
117-84-0	Di-n-octylphthalate	5	U
205-99-2	Benzo(b)fluoranthene	5	U
207-08-9	Benzo(k)fluoranthene	5	U
50-32-8	Benzo(a)pyrene	18	
193-39-5	Indeno(1,2,3-cd)pyrene	5	U
53-70-3	Dibenzo(a,h)anthracene	5	U
191-24-2	Benzo(g,h,i)perylene	5	U

(1) - Cannot be separated from Diphenylamine

2LCC
LOW CONC. WATER PESTICIDE SURROGATE RECOVERY

Lab Name: MITKEM CORP. Contract: 68-D6-0063

Lab Code: MITKEM Case No.: 25832 SAS No.: SDG No.: EADQ8

GC Column(1): DB-1701 ID: 0.53 (mm) GC Column(2): DB-608 ID: 0.53 (mm)

	EPA SAMPLE NO.	TCX(1) %REC #	TCX(2) %REC #	DCB(1) %REC #	DCB(2) %REC #	OTHER (1)	OTHER (2)	TOT OUT
01	PBLK01	72	72	83	82			0
02	PLCS01	71	74	92	89			0
03	EADS2	83	77	63	62			0
04	EADS0	66	81	81	82			0
05	EADS1	120	103	80	70			0
06	EADQ8	128	70	70	69			0
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

		%REC
S1 TCX	= Tetrachloro-m-xylene	(30-150)
S2 DCB	= Decachlorobiphenyl	(30-150)

Column to be used to flag recovery values.
* Values outside of QC limits.
D Surrogate diluted out.

3LCC

LOW CONC. WATER PESTICIDE LAB CONTROL SAMPLE RECOVERY

EPA SAMPLE NO.

PLCS01

Lab Name: MITKEM CORP. Contract: 68-D6-0063

Lab Code: MITKEM Case No.: 25832 SAS No.: SDG No.: EADQ8

Lab Sample ID: P1110-LCS1 LCS Lot No.:

LCS Aliquot: 0 (uL) Date Extracted: 11/10/97

Concentrated Extract Volume: 2000(uL) Date Analyzed: 11/20/97

Injection Volume: 1 (uL) Dilution Factor: 1.0

Sulfur Cleanup: (Y/N) N

Instrument ID(1): E2 GC Column(1):DB-1701 ID:0.53 (mm)

COMPOUND	CONC ADDED (ug/L)	CONC RECOVERED (ug/L)	%REC #	QC LIMITS
gamma-BHC (Lindane)	0.100	0.0988	99	50-120
Heptachlor epoxide	0.100	0.0840	84	50-150
Dieldrin	0.200	0.184	92	30-130
4,4'-DDE	0.200	0.181	90	50-150
Endrin	0.200	0.271	136*	50-120
Endosulfan sulfate	0.200	0.166	83	50-120
gamma-Chlordane	0.100	0.0873	87	30-130

Instrument ID(2): E2 GC Column(2):DB-608 ID:0.53 (mm)

COMPOUND	CONC ADDED (ug/L)	CONC RECOVERED (ug/L)	%REC #	QC LIMITS
gamma-BHC (Lindane)	0.100	0.0983	98	50-120
Heptachlor epoxide	0.100	0.0797	80	50-150
Dieldrin	0.200	0.183	92	30-130
4,4'-DDE	0.200	0.177	88	50-150
Endrin	0.200	0.248	124*	50-120
Endosulfan sulfate	0.200	0.178	89	50-120
gamma-Chlordane	0.100	0.0858	86	30-130

Column to be used to flag LCS recovery with an asterisk.
* Values outside of QC limits.
LCS Recovery: 2 outside limits out of 14 total.

COMMENTS:

4LCC

LOW CONC. WATER PESTICIDE METHOD BLANK SUMMARY

EPA SAMPLE NO.

PBLK01

Lab Name: MITKEM CORP. Contract: 68-D6-0063

Lab Code: MITKEM Case No.: 25832 SAS No.: SDG No.: EADQ8

Date Extracted: 11/10/97 Lab Sample ID: P1110-B1

Date Analyzed (1): 11/20/97 Date Analyzed (2): 11/20/97

Time Analyzed (1): 1606 Time Analyzed (2): 1606

Instrument ID (1): E2 Instrument ID (2): E2

GC Column (1): DB-1701 ID: 0.53(mm) GC Column (2): DB-608 ID: 0.53(mm)

Sulfur Cleanup (Y/N) N Extraction: (SepF/Cont) SEPF

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES AND LCS:

	EPA SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED 1	DATE ANALYZED 2
01	PLCS01	P1110-LCS1	11/20/97	11/20/97
02	EADS2	D1807-01	11/20/97	11/20/97
03	EADS0	D1807-02	11/20/97	11/20/97
04	EADS1	D1807-03	11/20/97	11/20/97
05	EADQ8	D1807-04	11/20/97	11/20/97
06				
07				
08				
09				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				

COMMENTS: _____

1LCD

LOW CONC. WATER PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

PBLK01

Lab Name: MITKEM CORP. Contract: 68-D6-0063

Lab Code: MITKEM Case No.: 25832 SAS No.: SDG No.: EADQ8

Lab Sample ID: P1110-B1 Date Received: _____

Sample Volume: 1000.00 (mL) Date Extracted: 11/10/97

Concentrated Extract Volume: 2000(uL) Date Analyzed: 11/20/97

Injection Volume: 1 (uL) Dilution Factor: 1.0

Sulfur Cleanup: (Y/N) N Extraction: (SepF/Cont) SEPF

CAS NO.	COMPOUND	CONCENTRATION (ug/L)	Q
319-84-6	alpha-BHC	0.010	U
319-85-7	beta-BHC	0.010	U
319-86-8	delta-BHC	0.010	U
58-89-9	gamma-BHC (Lindane)	0.010	U
76-44-8	Heptachlor	0.010	U
309-00-2	Aldrin	0.010	U
1024-57-3	Heptachlor epoxide	0.010	U
959-98-8	Endosulfan I	0.010	U
60-57-1	Dieldrin	0.020	U
72-55-9	4,4'-DDE	0.020	U
72-20-8	Endrin	0.020	U
33213-65-9	Endosulfan II	0.020	U
72-54-8	4,4'-DDD	0.020	U
1031-07-8	Endosulfan sulfate	0.020	U
50-29-3	4,4'-DDT	0.020	U
72-43-5	Methoxychlor	0.10	U
53494-70-5	Endrin ketone	0.020	U
7421-36-3	Endrin aldehyde	0.020	U
5103-71-9	alpha-Chlordane	0.010	U
5103-74-2	gamma-Chlordane	0.010	U
8001-35-2	Toxaphene	1.0	U
12674-11-2	Aroclor-1016	0.20	U
11104-28-2	Aroclor-1221	0.40	U
1114-16-5	Aroclor-1232	0.20	U
53469-21-9	Aroclor-1242	0.20	U
12672-29-6	Aroclor-1248	0.20	U
11097-69-1	Aroclor-1254	0.20	U
11096-82-5	Aroclor-1260	0.20	U

1LCD

LOW CONC. WATER PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

EADQ8

Lab Name: MITKEM CORP. Contract: 68-D6-0063

Lab Code: MITKEM Case No.: 25832 SAS No.: SDG No.: EADQ8

Lab Sample ID: D1807-04 Date Received: 11/06/97

Sample Volume: 1000.00 (mL) Date Extracted: 11/10/97

Concentrated Extract Volume: 2000(uL) Date Analyzed: 11/20/97

Injection Volume: 1 (uL) Dilution Factor: 1.0

Sulfur Cleanup: (Y/N) N Extraction: (SepF/Cont) SEPF

IW4 duplicate

CAS NO.	COMPOUND	CONCENTRATION (ug/L)	Q
319-84-6	alpha-BHC	0.010	U
319-85-7	beta-BHC	0.010	U
319-86-8	delta-BHC	0.010	U
58-89-9	gamma-BHC (Lindane)	0.010	U
76-44-8	Heptachlor	0.010	U
309-00-2	Aldrin	0.010	U
1024-57-3	Heptachlor epoxide	0.010	U
959-98-8	Endosulfan I	0.010	U
60-57-1	Dieldrin	0.020	U
72-55-9	4,4'-DDE	0.020	U
72-20-8	Endrin	0.020	U
33213-65-9	Endosulfan II	0.020	U
72-54-8	4,4'-DDD	0.020	U
1031-07-8	Endosulfan sulfate	0.020	U
50-29-3	4,4'-DDT	0.020	U
72-43-5	Methoxychlor	0.10	U
53494-70-5	Endrin ketone	0.020	U
7421-36-3	Endrin aldehyde	0.020	U
5103-71-9	alpha-Chlordane	0.010	U
5103-74-2	gamma-Chlordane	0.010	U
8001-35-2	Toxaphene	1.0	U
12674-11-2	Aroclor-1016	0.20	U
11104-28-2	Aroclor-1221	0.40	U
1114-16-5	Aroclor-1232	0.20	U
53469-21-9	Aroclor-1242	0.20	U
12672-29-6	Aroclor-1248	0.20	U
11097-69-1	Aroclor-1254	0.20	U
11096-82-5	Aroclor-1260	0.20	U

1LCD

LOW CONC. WATER PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

EADS0

Lab Name: MITKEM CORP. Contract: 68-D6-0063

Lab Code: MITKEM Case No.: 25832 SAS No.: SDG No.: EADQ8

Lab Sample ID: D1807-02 Date Received: 11/06/97 IW1

Sample Volume: 1000.00 (mL) Date Extracted: 11/10/97

Concentrated Extract Volume: 2000(uL) Date Analyzed: 11/20/97

Injection Volume: 1 (uL) Dilution Factor: 1.0

Sulfur Cleanup: (Y/N) N Extraction: (SepF/Cont) SEPF

CAS NO.	COMPOUND	CONCENTRATION (ug/L)	Q
319-84-6	alpha-BHC	0.010	U
319-85-7	beta-BHC	0.010	U
319-86-8	delta-BHC	0.010	U
58-89-9	gamma-BHC (Lindane)	0.010	U
76-44-8	Heptachlor	0.010	U
309-00-2	Aldrin	0.010	U
1024-57-3	Heptachlor epoxide	0.010	U
959-98-8	Endosulfan I	0.010	U
60-57-1	Dieldrin	0.020	U
72-55-9	4,4'-DDE	0.020	U
72-20-8	Endrin	0.020	U
33213-65-9	Endosulfan II	0.020	U
72-54-8	4,4'-DDD	0.020	U
1031-07-8	Endosulfan sulfate	0.020	U
50-29-3	4,4'-DDT	0.020	U
72-43-5	Methoxychlor	0.10	U
53494-70-5	Endrin ketone	0.020	U
7421-36-3	Endrin aldehyde	0.020	U
5103-71-9	alpha-Chlordane	0.010	U
5103-74-2	gamma-Chlordane	0.010	U
8001-35-2	Toxaphene	1.0	U
12674-11-2	Aroclor-1016	0.20	U
11104-28-2	Aroclor-1221	0.40	U
1114-16-5	Aroclor-1232	0.20	U
53469-21-9	Aroclor-1242	0.20	U
12672-29-6	Aroclor-1248	0.20	U
11097-69-1	Aroclor-1254	0.20	U
11096-82-5	Aroclor-1260	0.20	U

1LCD

LOW CONC. WATER PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

EADS1

Lab Name: MITKEM CORP. Contract: 68-D6-0063

Lab Code: MITKEM Case No.: 25832 SAS No.: SDG No.: EADQ8

Lab Sample ID: D1807-03 Date Received: 11/06/97 IW4

Sample Volume: 1000.00 (mL) Date Extracted: 11/10/97

Concentrated Extract Volume: 2000(uL) Date Analyzed: 11/20/97

Injection Volume: 1 (uL) Dilution Factor: 1.0

Sulfur Cleanup: (Y/N) N Extraction: (SepF/Cont) SEPF

CAS NO.	COMPOUND	CONCENTRATION (ug/L)	Q
319-84-6	alpha-BHC	0.010	U
319-85-7	beta-BHC	0.010	U
319-86-8	delta-BHC	0.010	U
58-89-9	gamma-BHC (Lindane)	0.010	U
76-44-8	Heptachlor	0.010	U
309-00-2	Aldrin	0.010	U
1024-57-3	Heptachlor epoxide	0.010	U
959-98-8	Endosulfan I	0.010	U
60-57-1	Dieldrin	0.020	U
72-55-9	4,4'-DDE	0.020	U
72-20-8	Endrin	0.020	U
33213-65-9	Endosulfan II	0.020	U
72-54-8	4,4'-DDD	0.020	U
1031-07-8	Endosulfan sulfate	0.020	U
50-29-3	4,4'-DDT	0.020	U
72-43-5	Methoxychlor	0.10	U
53494-70-5	Endrin ketone	0.020	U
7421-36-3	Endrin aldehyde	0.020	U
5103-71-9	alpha-Chlordane	0.010	U
5103-74-2	gamma-Chlordane	0.010	U
8001-35-2	Toxaphene	1.0	U
12674-11-2	Aroclor-1016	0.20	U
11104-28-2	Aroclor-1221	0.40	U
1114-16-5	Aroclor-1232	0.20	U
53469-21-9	Aroclor-1242	0.20	U
12672-29-6	Aroclor-1248	0.20	U
11097-69-1	Aroclor-1254	0.20	U
11096-82-5	Aroclor-1260	0.20	U

1LCD

LOW CONC. WATER PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

EADS2

Lab Name: MITKEM CORP. Contract: 68-D6-0063

Lab Code: MITKEM Case No.: 25832 SAS No.: SDG No.: EADQ8

Lab Sample ID: D1807-01 Date Received: 11/06/97 JW6

Sample Volume: 1000.00 (mL) Date Extracted: 11/10/97

Concentrated Extract Volume: 2000(uL) Date Analyzed: 11/20/97

Injection Volume: 1 (uL) Dilution Factor: 1.0

Sulfur Cleanup: (Y/N) N Extraction: (SepF/Cont) SEPF

CAS NO.	COMPOUND	CONCENTRATION (ug/L)	Q
319-84-6	alpha-BHC	0.010	U
319-85-7	beta-BHC	0.010	U
319-86-8	delta-BHC	0.010	U
58-89-9	gamma-BHC (Lindane)	0.010	U
76-44-8	Heptachlor	0.010	U
309-00-2	Aldrin	0.010	U
1024-57-3	Heptachlor epoxide	0.010	U
959-98-8	Endosulfan I	0.010	U
60-57-1	Dieldrin	0.020	U
72-55-9	4,4'-DDE	0.020	U
72-20-8	Endrin	0.020	U
33213-65-9	Endosulfan II	0.020	U
72-54-8	4,4'-DDD	0.020	U
1031-07-8	Endosulfan sulfate	0.020	U
50-29-3	4,4'-DDT	0.020	U
72-43-5	Methoxychlor	0.10	U
53494-70-5	Endrin ketone	0.020	U
7421-36-3	Endrin aldehyde	0.020	U
5103-71-9	alpha-Chlordane	0.010	U
5103-74-2	gamma-Chlordane	0.010	U
8001-35-2	Toxaphene	1.0	U
12674-11-2	Aroclor-1016	0.20	U
11104-28-2	Aroclor-1221	0.40	U
1114-16-5	Aroclor-1232	0.20	U
53469-21-9	Aroclor-1242	0.20	U
12672-29-6	Aroclor-1248	0.20	U
11097-69-1	Aroclor-1254	0.20	U
11096-82-5	Aroclor-1260	0.20	U

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION V

ESD Central Regional Laboratory
Data Tracking Form for Contract Samples

Data Set No: _____ CERCLIS No: IN

Case No: 25832 Site Name Location: American Chem SVCS

Contractor or EPA Lab: Mitken Data User: B&V

No. of Samples: 5 Date Sampled or Data Received: 12-9-97

Have Chain-of-Custody records been received? Yes ✓ No ___
Have traffic reports or packing lists been received? Yes ✓ No ___
If no, are traffic report or packing list numbers written on the chain-of-custody record? Yes ✓ No ___
If no, which traffic report or packing list numbers are missing?

_____ _____ _____ _____

_____ _____ _____ _____

Are basic data forms in? Yes ✓ No ___
No of samples claimed: 5 No. of samples received: 5

Received by: Lynette Burnett Date: 12-9-97

Received by LSSB: Lynette Burnett Date: 12-9-97

Review started: 12/15/97 Reviewer Signature: [signature]

Total time spent on review: 8.0 Date review completed: 12/18/97

Copied by: Lynette Burnett Date: 1-9-98

Mailed to user by: Lynette Burnett Date: 1-9-98

DATA USER:
Please fill in the blanks below and return this form to:
Sylvia Griffen, Data mgmt. Coordinator, Region V, 5SCRL

Data received by: _____ Date: _____

Data review received by: _____ Date: _____

Inorganic Data Complete [ ] Suitable for Intended Purpose [ ] ✓ if OK
Organic Data Complete [ ] Suitable for Intended Purpose [ ] ✓ if OK
Dioxin Data Complete [ ] Suitable for Intended Purpose [ ] ✓ if OK
SAS Data Complete [ ] Suitable for Intended Purpose [ ] ✓ if OK

PROBLEMS: Please indicate reasons why data are not suitable for your uses.

_____

_____

Received by Data Mgmt. Coordinator for Files. Data: _____

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 5 CENTRAL REGIONAL LABORATORY

536 SOUTH CLARK STREET

CHICAGO, ILLINOIS 60605

Date: DEC 09 1997

Subject: Review of Region 5 Data for American Chemical Services Code:J7

From: Charles T. Elly, Director Chuck Elly
Region 5 Central Regional Laboratory

To: BE √

Attached are the results for American Chemical Services Code:J7
CRL request number 980088
for analyses for Antimony, Arsenic, Cadmium, Lead, Mercury, Selenium and Thallium
Results are reported for sample designations: 98ZB03S01, 98ZB03S02, 98ZB03S03 and 98ZB03S04

Results Status:
(x) Acceptable for Use
( ) Data Qualified, but Acceptable for use
( ) Data Unacceptable for Use

Comments on Data Quality by Reviewer

High concentrations of lead and cadmium were found in these samples. All QC measures were met.

Comments by Laboratory Director or Quality Control Coordinator

Review Record for American Chemical Services Code:J7

9 Dec 92

Peer/Task Monitor Review and Date (✓) Reviewed ( ) Unreviewed

9 Dec 97

Team Leader and Date (✓) Reviewed ( ) Unreviewed

Chuck Ellis 12/9/97

QC Coordinator and Date ( ) Reviewed (✓) Unreviewed
(position vacant)

Sylvia Griffin DEC 09 1997

Data Management Coordinator and Date Received

Date Transmitted DEC 09 1997

Please sign and date this form below and return it with any comments to:

Sylvia Griffin
Data Management Coordinator
Region 5 Central Regional Laboratory
ML - 10C

Received by and Date

Comments:

Method Number: GFAA Metals
Date Generated: November 25, 1997
Author: Bai Yuen

Site Name: American Chemical Service
Charge Number(s): ESE51158
TDF Number: 5104-144
WAD Number: 05-97-1-04

GFAA NARRATIVE for Data Set 980088

Four water samples, 98ZB03S01, S02, S03 and S04 were collected from the American Chemical Service site. All samples were submitted for the analysis of total arsenic, cadmium, lead, selenium and thallium by GFAA. The samples were collected on 11/04/97 and 11/05/97 and were received properly preserved by the CRL on 11/06/97. All samples were part of data set 980088.

All samples were digested following standard CRL GFAA digestion protocols. The samples were digested on 11/21/97. All analyses were performed within the six month holding time.

Analytical results were stored in .DAT files CDBY1125.DAT, PBBY1126.DAT, TLBY1125.DAT and SEBY1125.DAT and database file ASSE112497.

Arsenic

Data File ASSE112497

Arsenic was analyzed without incident.

All QC was within the specified control limits.

Cadmium

Data File CDBY1125.DAT

Cadmium was analyzed without incident.

All QC was within the specified control limits.

Lead

Data File PBBY1126.DAT

Lead was analyzed without incident.

All QC was within the specified control limits.

Narrative by: Bai Yuen ESAT
Date: 12-5-97

Thallium

Data File TLBY1125.DAT

Thallium was analyzed without incident.

All QC was within the specified control limits.

Selenium

Data File SEBY1125.DAT

Selenium was analyzed without incident.

All QC was within the specified control limits.

Acceptable results for arsenic, cadmium, lead, selenium and thallium were obtained for the samples.

Narrative by: _____ ESAT
Date: 12-5-97

DATA SET: 980088
METHOD: 3114
DATE: 11-16-97
AUTOR: L.LEONOVA

SITE NAME: AMER.CHEMICAL SERVICE

TDF NUMBER: 5104-144
CHARGE NUMBER: ESE51-158

ANTIMONY ANALYSES:

No difficulties were encountered in the analyses of 4 water samples from data set 980088 (98ZB03S01-S04) for Sb by FIAS.

The samples were received by the CRL on 11/04-05/97. The analyses for data set 980088 were assigned to ESAT on 11/07/97. All samples were digested on 11/13/97 and analyzed on 11/14/97. The data are stored on .DAT file SBLL1114.DAT.

The calibration curve correlation coefficient, QC check samples and method blanks were within the method control limits. All sample results are acceptable.

Reviewed by: L. Leonova Larisa Leonova,
Lockheed/ESAT Date: 11-16-97

DATA SET: 980088
METHOD: 3114
DATE: 11-16-97
AUTOR: L.LEONOVA

SITE NAME: AMER.CHEMICAL SERVICE

TDF NUMBER: 5104-144
CHARGE NUMBER: ESE51-158

MERCURY ANALYSES:

No difficulties were encountered in the analyses of 4 water samples from data set 980088 (98ZB03S01-S04) for Mercury by FIAS.

The samples were received by the CRL on 11/04-05/97. Mercury analyses for data set 980088 were assigned to ESAT on 11/07/97. All samples were digested on 11/13/97 and analyzed on 11/14/97, within the 28 day holding time limit for mercury analyses. The data are stored on .DAT file HGLL1114.DAT. At the end of the run some raw data was not printed because printer was out of paper. The printout from C:\AA_USER\AA_FILES\DATA\HGLL1114.DAT is included with the raw data.

The calibration curve correlation coefficient, QC check samples and method blanks were within the method control limits. All sample results are acceptable.

Reviewed by: L. Leonova Larisa Leonova,
Lockheed/ESAT Date: 11-16-97

SAMPLE RESULTS (ug/L) FOR DATA SET 980088(WATER)

Sample # 98ZB03	As	Sb	Cd	Pb	Se	Tl
S01	4.3	1U	31	242	1U	2U
S02	0.8U	1U	2.4	62	1U	2U
S03	0.8U	1U	6.7	70	1U	2U
S04	0.8U	1U	1.3	17	1U	2U
Date of Analysis	11-25-97	11-14-97	11-25-97	11-25-97	11-25-97	11-25-97
Analyst	B. Lyon	L. Leon	B. Lyon	B. Lyon	B. Lyon	B. Lyon
Date	12-2-97	12-2-97	12-2-97	12-2-97	12-2-97	12-2-97

Jm
9 Dec 97

MERCURY RESULTS (UG/L) FOR DATA SET 980088

Sample #	Analysis Date	Concentration	Analyst	Date
98ZB03S01	11-14-97	0.2 U	J. Lee	11-16-97
98ZB03S02	11-14-97	0.2 U	J. Lee	11-16-97
98ZB03S03	11-14-97	0.2 U	J. Lee	11-16-97
98ZB03S04	11-14-97	0.2 U	J. Lee	11-16-97

JLM
9 Dec 97

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 5 CENTRAL REGIONAL LABORATORY

536 SOUTH CLARK STREET

CHICAGO, ILLINOIS 60605

Date: DEC 09 1997

Subject: Review of Region 5 Data for American Chemical Services Code:J7

From: Charles T. Elly, Director Chuck Elly
Region 5 Central Regional Laboratory

To:

Attached are the results for American Chemical Services Code:J7
CRL request number 980088
for analyses for ICP
Results are reported for sample designations: 98ZB03S01, 98ZB03S02, 98ZB03S03 and 98ZB03S04

Results Status:
(x) Acceptable for Use
( ) Data Qualified, but Acceptable for use
( ) Data Unacceptable for Use

Comments on Data Quality by Reviewer

Beryllium baseline was drifting negative, with a blank reading at the end of the run of -1.5 µg/L. Because of the increased uncertainty, the detection limit was raised to 2 µg Be/L. No beryllium was detected in these samples. High zinc results on sample 98ZB03S01 were confirmed on a different analytical line.

Comments by Laboratory Director or Quality Control Coordinator

Review Record for American Chemical Services Code:J7

John C. Moore 9 Dec 97

Peer/Task Monitor Review and Date (X) Reviewed ( ) Unreviewed

John C. Moore 9 Dec 97

Team Leader and Date (X) Reviewed ( ) Unreviewed

Chuck Ebby 12/9/97

QC Coordinator and Date ( ) Reviewed (X) Unreviewed
(position vacant)

Sylvia Griffin DEC 09 1997

Data Management Coordinator and Date Received

Date Transmitted DEC 09 1997

Please sign and date this form below and return it with any comments to:

Sylvia Griffin
Data Management Coordinator
Region 5 Central Regional Laboratory
ML - 10C

Received by and Date

Comments:

LOCKHEED MARTIN ESAT CONTRACT
DATA SET CUSTODY TRANSFER FORM

DATA SET NUMBER 98088 PWO NUMBER ESE51158

SITE NAME: AMERICAN CHEMICAL SERVICES TDF NUMBER 5104-144

PARAMETER: ICP MATRIX: WATER

SF DU/ACT NO: TFA 301 Y ____ /C ____

SAMPLE NUMBERS: 98ZB03S01, S02, S03, S04

NUMBER OF SAMPLES: 4

ESAT APPROVALS:

[signature]	11-25-97	[signature]	11-26-97
Analyst	Date	Task Group Leader	Date
		[signature]	11-26-97
QA/QC Coordinator	Date	ESAT Team Manager	Date

COMMENTS: RLIMS UNAVAILABLE

The above identified data set was transferred from ESAT custody to the custody of the U.S. EPA Region V Central Regional Laboratory in its entirety on the indicated date relinquished.

[signature]	11-26-97	[signature]	11/26/97
Relinquished by	Date	Received by	Date

EPA APPROVALS:

[signature] 9Dec97
EPA WAM Date

[✓] Reviewed
[ ] Unreviewed
[✓] Accepted
[ ] Rejected
[ ] Returned: _____ Date

COMMENTS: _____

[signature] 9Dec97
Section Chief Date

[ ] Reviewed [ ] Unreviewed

_____ _____/_____/_____
ESAT RPO Date DATA COORDINATOR/RECD/TRANSMTD

A COPY OF THIS CUSTODY TRANSFER FORM WITH A RECEIVED BY EPA SIGNATURE IS TO BE FILED IN THE TDF FILE. THE ORIGINAL CUSTODY TRANSFER ACCOMPANIES THE DATA SET TO BE APPROVED BY THE EPA AND A COMPLETED COPY RETURNED TO ESAT.

11-25-97

Method Number: _200.7_____ Site Name: American Chemical Services _____
Date Generated: November 24,1997__ Work Unit Number: 05-97-1-04__
Author: _R.Dilg,Lockheed-ESAT_____ TDF Number: 5104-144_____
Charge Number: ESE-51-158_____

ICP NARRATIVE

This narrative covers the analysis of 4 water samples (980088) from the above named site sampled on November 4th and 5th for ICP metals analysis.

Data Set	Sample Nos.
980088	97ZB03S01, S02, S03, S04

Routine CRL microwave digestion procedures were used to prepare the samples for ICP analysis. The sample digests were analyzed using the 1160 ICP unit along with analysis run method SED5_AL; the ICP analysis run results were stored to RUN 869. The sample digests were also analyzed for K using the new JY ICP unit.

RUN 869

The following lists the out-of-control QC audit check results for that portion of analysis run 869 that applies ONLY to data case 980088:

(Note: Since the K channel was not usable, the K values indicated in the raw run data and in the QC reports are not included in the listir below.)

Blanks:	Instr blank 2:	Li6707	20.80	µg/L
	Instr blank 3:	Be2348	- 1.59	"
	Digestion blank:	Li6707	14.21	"

Original raw data printouts were submitted with case SF980084.

All As, Cd, and Pb sample results were too low to be reliably reported using ICP values. Refer to GFAA and / or FIAS analyses for reported As, Cd, and Pb sample results.

Li results were not of concern for this sample set.

Since the baseline for Be appeared to be drifting downward, a reporting detection limit of 2 µg/L was used to report Be sample results.

11-25-97

K results

Copies of the raw real time data printouts, a samplename run log file, and a run / QA/QC summary page were included to document the ICP analysis of K. The originals were submitted with case 980084.

All K sample results are usable.

EPA CRL - REGION V
FINAL RESULTS REPORT
REPORT PRODUCED ON: 20 NOVEMBER 97

SAMPLE OGANIZATION:BLACK & VEATCH — SAMPLE BATCH ID: 980088
SAMPLE REQUESTOR: STEVE MRKVICKA — ACCOUNT NO: TFA301
LABORATORY: ESAT — SAMPLE FACILITY: AMERICAN CHEMICAL SERVICES

SAMPLE: 98ZB03S01 FIELD: 98ZB03S01

COLLECTED: RECEIVED: 6 NOVEMBER 97 ANALYZED: 20 NOVEMBER 97

COMPOUND	AMOUNT	(Units)
Aluminum	169	(ug/L)
Barium	144	(ug/L)
Beryllium	2 U	(ug/L)
Calcium	82900	(ug/L)
Chromium	10 U	(ug/L)
Cobalt	6 U	(ug/L)
Copper	7.8	(ug/L)
Iron	2750	(ug/L)
Magnesium	37800	(ug/L)
Manganese	60.1	(ug/L)
Nickel	20 U	(ug/L)
Potassium	2140	(ug/L)
Silver	6 U	(ug/L)
Sodium	46100	(ug/L)
Vanadium	5 U	(ug/L)
Zinc	30600	(ug/L)

ANALYZED BY: RD 11-25-97

NM
9Dec97

EPA CRL - REGION V
FINAL RESULTS REPORT
REPORT PRODUCED ON: 20 NOVEMBER 97

SAMPLE OGANIZATION:BLACK & VEATCH SAMPLE BATCH ID: 980088
SAMPLE REQUESTOR: STEVE MRKVICKA ACCOUNT NO: TFA301
LABORATORY: ESAT SAMPLE FACILITY: AMERICAN CHEMICAL SERVICES

SAMPLE: 98ZB03S02 FIELD: 98ZB03S02

COLLECTED: RECEIVED: 6 NOVEMBER 97 ANALYZED: 20 NOVEMBER 97

COMPOUND	AMOUNT	(Units)
Aluminum	80 U	(ug/L)
Barium	62.3	(ug/L)
Beryllium	2 U	(ug/L)
Calcium	77100	(ug/L)
Chromium	10 U	(ug/L)
Cobalt	6 U	(ug/L)
Copper	19.8	(ug/L)
Iron	1850	(ug/L)
Magnesium	52700	(ug/L)
Manganese	16.7	(ug/L)
Nickel	20 U	(ug/L)
Potassium	5480	(ug/L)
Silver	6 U	(ug/L)
Sodium	49500	(ug/L)
Vanadium	5 U	(ug/L)
Zinc	2130	(ug/L)

ANALYZED BY: RD 11-25-97

1 vm 9 Dec 97

EPA CRL - REGION V
FINAL RESULTS REPORT
REPORT PRODUCED ON: 20 NOVEMBER 97

SAMPLE OGANIZATION:BLACK & VEATCH SAMPLE BATCH ID: 980088
SAMPLE REQUESTOR: STEVE MRKVICKA ACCOUNT NO: TFA301
LABORATORY: ESAT SAMPLE FACILITY: AMERICAN CHEMICAL SERVICES

SAMPLE: 98ZB03S03 FIELD: 98ZB03S03

COLLECTED: RECEIVED: 6 NOVEMBER 97 ANALYZED: 20 NOVEMBER 97

COMPOUND	AMOUNT	(Units)
Aluminum	80 U	(ug/L)
Barium	68.4	(ug/L)
Beryllium	2 U	(ug/L)
Calcium	60800	(ug/L)
Chromium	29.6	(ug/L)
Cobalt	6 U	(ug/L)
Copper	6 U	(ug/L)
Iron	3580	(ug/L)
Magnesium	39700	(ug/L)
Manganese	43.9	(ug/L)
Nickel	33.3	(ug/L)
Potassium	6700	(ug/L)
Silver	6 U	(ug/L)
Sodium	68500	(ug/L)
Vanadium	5 U	(ug/L)
Zinc	9820	(ug/L)

ANALYZED BY: RD 11-25-97

IVM
9 Dec 97

EPA CRL - REGION V
FINAL RESULTS REPORT
REPORT PRODUCED ON: 20 NOVEMBER 97

SAMPLE OGANIZATION:BLACK & VEATCH SAMPLE BATCH ID: 980088
SAMPLE REQUESTOR: STEVE MRKVICKA ACCOUNT NO: TFA301
LABORATORY: ESAT SAMPLE FACILITY: AMERICAN CHEMICAL SERVICES

SAMPLE: 98ZB03S04 FIELD: 98ZB03S04

COLLECTED: RECEIVED: 6 NOVEMBER 97 ANALYZED: 20 NOVEMBER 97

COMPOUND	AMOUNT	(Units)
Aluminum	80 U	(ug/L)
Barium	76.8	(ug/L)
Beryllium	2 U	(ug/L)
Calcium	64200	(ug/L)
Chromium	10 U	(ug/L)
Cobalt	6 U	(ug/L)
Copper	6 U	(ug/L)
Iron	939	(ug/L)
Magnesium	40700	(ug/L)
Manganese	13.6	(ug/L)
Nickel	20 U	(ug/L)
Potassium	5840	(ug/L)
Silver	6 U	(ug/L)
Sodium	64200	(ug/L)
Vanadium	5 U	(ug/L)
Zinc	1580	(ug/L)

ANALYZED BY: RD 11-25-97

lwm
9Dec97

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 5 CENTRAL REGIONAL LABORATORY

536 SOUTH CLARK STREET

CHICAGO, ILLINOIS 60605

Date: DEC 15 1997

Subject: Review of Region 5 Data for **AMERICAN CHEMICAL SERVICES**

From: Charles T. Elly, Director
Region 5 Central Regional Laboratory

To: B & V

Attached are the results for **AMERICAN CHEMICAL SERVICES**
CRL request number **980088**
for analyses for **Cyanide**
Results are reported for sample designations: 98ZB03S01, 98ZB03S02, 98ZB03S03, and 98ZB03S04.

Results Status:

(X) Acceptable for Use: **Cyanide**
( ) Data Qualified, but Acceptable for use:
( ) Data Unacceptable for Use:

( ) Sewer Disposal Criteria Met;

Comments on Data Quality by Reviewer:

All the water samples submitted for Cyanide analysis were assayed and the results are attached. Required quality control criteria for the laboratory, method, and system performance audits were evaluated and determined to be within the limits.

Comments on Sample Results:

All the cyanide results are acceptable for use.

Comments by Laboratory Director or Quality Control Coordinator:

Francis A. Arvanya 12/12/97
Review and Date (X) Reviewed ( ) Unreviewed

14 Dec 97
Team Leader and Date (X) Reviewed ( ) Unreviewed

Chuck Elly 12/12/97
QC Coordinator and Date ( ) Reviewed (X) Unreviewed

Sylvia Griffin DEC 15 1997
Data Management Coordinator and Date Received

Date Transmitted DEC 15 1997

Please sign and date this form below and return it with any comments to:

Sylvia Griffin
Data Management Coordinator
Region 5 Central Regional Laboratory
SL - 10C

_____
Received by and Date

Comments:

CYANIDE RESULTS (UG/L) FOR DATA SET 980088

Sample #	Analysis Date	Concentration	Analyst	Date
98ZB03S01	11-17-97	8U	J. Garry	11-18-97
98ZB03S02	11-17-97	8U	J. Garry	11-18-97
98ZB03S03	11-17-97	8U	J. Garry	11-18-97
98ZB03S04	11-17-97	8U	J. Garry	11-18-97

FOA 12/11/97

Letter of Transmittal
Black & Veatch Special Projects Corp.

101 North Wacker Drive, Suite 1100, Chicago, Illinois, 60606, Phone (312) 346-3775, Fax (312) 346-4781

To: Ms. Sheri Bianchin
United States Environmental Protection Agency
77 West Jackson Boulevard (SRW-6J)
Chicago, Illinois 60604

Date: 17-Mar-98
From: Steve Mrkvicka
Project: American Chemical Services
Project No.: 46517
File: C.3

We are sending you: [XXX] Attached [ ] Under separate cover via _____

[ ] Preliminary Report
[ ] Final Report
[XXX] Other: Data evaluation report for the production well split sampling results
[ ] Specifications
[ ] Change Order
[ ] Addendum

These items are transmitted:

[ ] As requested
[ ] For your approval
[XXX] For your information
[ ] For review and comment

Remarks: Enclosed is the data evaluation report for the production well abandonment split sampling results.

Please call me at 312/683-7849 if you have any questions.

American Chemical Services
Work Assignment 029-ROBE-05J7

Copy To: _____

Signed: 17-Mar-98

t:\projects\acs\letters\tran-let.wk4

FIELD GC DATA
LOWER AQUIFER INVESTIGATION REPORT

AMERICAN CHEMICAL SERVICE, INC.
NPL SITE
GRIFFITH, INDIANA

PREPARED FOR:
ACS RD/RA EXECUTIVE COMMITTEE

•••

PREPARED BY:
MONTGOMERY WATSON
ADDISON, ILLINOIS

MAY 1996

MONTGOMERY WATSON

FIELD GC SUMMARY SHEET - LOWER AQUIFER

ACS NPL SITE
Griffith, Indiana

	Acetone	1,1 Dichloroethene	trans 1,2 Dichloroethene	1,1 Dichloroethane	2-Butanone (MEK)	cis 1,2 Dichloroethene	1,2 Dichloroethane	1,1,1 Trichloroethane	Benzene	Carbon tetrachloride	Trichloroethene	MIBK	1,1,2 Trichloroethane	Toluene	Tetrachloroethene	Chlorobenzene	Ethylbenzene	m+p Xylene	Styrene	o Xylene	Total VOCs
	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	mg/L
MW8 39' (VP3)																					
MW8 39' (VP3) Dup																					
MW8 49' (VP3)																					
MW8 59' (VP3)																					
MW8 69' (VP3)						5.1															0.0 ppm
MW8 69' (VP3) Dup																					
MW8 79' (VP3)																					
MW8 89' (VP3)																					
MW8 99' (VP3)							57														0.1 ppm
MW8 99' (VP3) Dup							63														0.1 ppm
VP1 30'																					
VP1 39'	10																				0.0 ppm
VP1 49'																					
VP1 59'																					
VP1 69'																					
VP1 79'																					
VP1 92'																					
VP2 29'	38																				0.0 ppm
VP2 29' Dup	24																				0.0 ppm
VP2 39'																					
VP2 52'																					
VP2 59'																					
VP2 72'																					
VP2 79'																					
VP2 79' Dup																					

FIELD GC SUMMARY SHEET - LOWER AQUIFER

ACS NPL SITE
Griffith, Indiana

	Acetone	1,1 Dichloroethene	trans 1,2 Dichloroethene	1,1 Dichloroethane	2-Butanone (MEK)	cis 1,2 Dichloroethene	1,2 Dichloroethane	1,1,1 Trichloroethane	Benzene	Carbon tetrachloride	Trichloroethene	MIBK	1,1,2 Trichloroethane	Toluene	Tetrachloroethene	Chlorobenzene	Ethylbenzene	m+p Xylene	Styrene	o Xylene	Total VOCs
	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	mg/L
VP2 86'																					
VP4 58'																					
VP4 68'																					
VP4 79'																					
VP4 89'																					

This table presents the results of field GC analysis of soil samples collected during the Lower -Aquifer Investigation activities at the ACS Site in Griffith, Indiana during January and February 1996.

All results are considered to be estimated concentration. All samples were analyzed at a 1:1 dilution. The reporting limit for non-detected compounds is equal to the method reporting limit (5 ppb for all compounds except 10 ppb for acetone and MEK).

NOTEBOOK #2

ACS - FIELD GC (GC #2)

4077.0075

HNU SYSTEMS, INC.
160 CHARLEMONT STREET
NEWTON MA 02161

(617) 964-6690
PART NO. = 81-GC-102

NOTE: THE SRI IS DESIGNED TO WORK WITH HNU, TRACOR, OR O.I. CORP PID LAMPS

2) DELCD - DRY ELECTROLYTIC CONDUCTIVITY DETECTOR

- REACTOR SET @ 240 (MANUAL SUGGESTS 200 BUT, TECHNICAL ASSISTANCE SAID 240 BETTER)
- ACTUAL = 2B24 (200 ≈ 1000°C)

E. PURGE & TRAP - INJECTION SYSTEM

- TRAP = GR

EVENT SEQUENCE FOR PURGE & TRAP (PSAISMPG.TE EVENT FILE: ACS.EVT)

TIME (MIN)	EVENT CODE/STATUS
0.001	AUTOZERO
0.10	E/ON
3.00	D/ON
5.00	D/OFF
5.30	E/OFF
5.90	B/ON
6.00	C/ON
6.02	F/ON
8.00	G/ON
8.10	G/OFF
9.00	E/ON
9.30	D/ON
9.90	D/OFF
10.00	E/OFF
12.90	C/OFF
13.00	H/ON
13.10	H/OFF
13.20	E/ON
13.50	D/ON

Continued on Page

Read and Understood By

MLP 1/18/96
Signed Date Signed Date

NOTES ASSOCIATED WITH THIS FIELDGC JOB:

GAS CHROMATOGRAPH -

- SRI 8610A USED FOR ON-SITE SCREENING PROGRADES. INSTRUMENT EQUIPPED WITH SINGLE UNIT PURGE & TRAP W/ PID & DELCD DETECTORS IN SERIES.

SRI INSTRUMENTS
3882 DEL AMO BLVD., SUITE #601
TORRANCE, CA 90503

TELEPHONE: (310) 214-5092
FAX: (310) 214-5097

DATA ACQUISITION -

- PEAKSIMPLE III (PSAK2) EXECUTABLE FILE (PSAK201.EXE) USED FOR DATA ACQUISITION AND REPORT GENERATION.
- LAWSON INTERFACE BETWEEN GC AND PC
- PC USED = NEC POWERMATE SX (386) - EPSON FX-1050 PRINTER

GC PARAMETERS:

A) COLUMN - MTX-1, 0.53MM, 5.0uL FILM, 15M RESTEK
RESTEK CORPORATION, 110 BENNER CIRCLE, BELLEFONTE, PA 16823-8812; (814) 353-1300

B) CARRIER GAS: HELIUM - ZEROGRADE
OBTAINED AT: AGA GAS INC.
3930 MICHIGAN STREET
HAMMOND, IN 46323
(219) 989-9300

C) DELCD GAS: COMPRESSED AIR - ZEROGRADE - SAME SUPPLIER
NOTE: USE BOTTLED GAS NOT BUILT-IN AIR COMPRESSOR IN GC.

D) DETECTORS:
1) PHOTOIONIZATION DETECTOR: 70 MA CURRENT 10.2 MV/AMP

REPLACEMENT LAMPS AVAILABLE FROM:

Continued on Page

Read and Understood By

Signed 1/18/96 Signed
Date Date

- CHANNELS
  - #1) DELCD DISPLAYED ON CHANNEL 1
    - SAMPLE RATE = 1 HZ
    - PORT ADDRESS = 2
    - TRIGGER GROUP = MAIN
    - DEFAULT DISPLAY LIMITS = -25.6 → 512 mV
    - A/D BOARD TYPE = LAWSON 202
  - #2) PID DISPLAYED ON CHANNEL 2
    - SAMPLE RATE = 2 HZ
    - PORT ADDRESS = 2
    - TRIGGER GROUP = MAIN
    - DEFAULT DISPLAY LIMITS = -25.0 → 250 mV
    - A/D BOARD TYPE = LAWSON 202
- INTEGRATION
  - CHANNEL 1 - (DELCD)
    - PEAK = 95%
    - BASELINE = 60%
    - AREA REJECT = 100 mV
    - DILUTION FACTOR = 1.0
  - CHANNEL 2 - (PID)
    - PEAK = 95%
    - BASELINE = 60%
    - AREA REJECT = 25 mV
    - DILUTION FACTOR = 1
- COMPONENT FILES
  - CHANNEL 1 (DELCD) = ACSECD.CPT
  - CHANNEL 2 (PID) = ACSPID.CPT
- POSTRUN - SELECTED:
  - SAVE FILE AS: CHANNEL 1 ~~1DATA~~ 1data___.CHR( )
  - CHANNEL 2 2DATA___.CHR( )

Continued on Page

Read and Understood By

[signature] 1/18/96

Signed Date Signed Date

14.90	F/OFF
15.00	O/OFF
15.10	C/OFF
15.30	E/OFF

TEST SPECIFIC INFORMATION

- TEMPERATURE PROGRAM (PEAKSIMPLE II: ACS2.TEM)

INITIAL TEMP	HOLD (MIN)	RAMP (°C/MIN)	FINAL TEMP
35°C	14.0	10.0	70°C
70	7.0	0.0	70
70	0.0	20.0	135
135	0.0	0.0	35

- CARRIER GAS
  - HELIUM - ZERO GRADE
    9 PSI AT REGULATOR : CARRIER GAS PRESSURE (COLUMN HEAD PRESSURE & A.C ON LED DISPLAY OF GC)
- DELCO AIR (ZERO GRADE)
  - USE BOTTLED AIR NOT GC COMPRESSOR) - CAUSES WATER INTERFERENCE W/DETECT
    19 PSI AT REGULATOR
    DELCO AIR = 8.0 ON LED OF GC - VALVE RATED AS 9.2 ± 2 ML/MIN
- PID - GAIN SETTING OF HIGH - No ATTENUATION SETTINGS ON GC
- DELCO - GAIN SETTING OF MEDIUM -

PEAKSIMPLE II CONFIGURATION

CONTROL - (PEAKSIMPLE II ACS.CON FILE)

- OVERALL
  - DEFAULT DISPLAY 0-27.79 MIN
  - UNKNOWN PEAKS LABELED "UNKNOWN"
  - PRINTER TYPE: EPSON FX-1050
  - ON SCREEN PEAKS LABELED BY NAME

Continued on Page

POST OVERWRITE PROTECTION SELECTED

Read and Understood By

Signed	Date	Signed	Date
[signature]	1/18/96		

Certificate of Composition

DESCRIPTION: MONTGOMERY WATSON Q#119809

LOT NO.: LA 55370

ANALYTE (1)	PERCENT PURITY (2)	WEIGHT CONCENTRATION (3)
ACETONE	99.0	10004 +/- 50
2-BUTANONE	99.0	10008 +/- 50
4-METHYL-2-PENTANONE	99.0	5004 +/- 25

(1) Listed in alphabetical order.
(2) Determined by capillary GC-FID, unless otherwise noted.
(3) Quantity of analyte weighed into solution (ug/mL, +/- 0.5%). Weights of analytes less than 98% pure are corrected for impurities. Certified weights are not applicable to ampuls stored after opening, even if resealed.

Mark V. Robillard, Ph.D.
Custom Standards Department Manager

Supelco warrants that its products conform to the information contained in this publication. Purchaser must determine the suitability of the product for its particular use. Please see the latest catalog or order invoice and packing slip for additional terms and conditions of sale.

SUPELCO
Supelco Park • Bellefonte, PA
16823-0048 USA • Phone (814) 35

Signed Date 1/16/91

Signed Date

- ANALYSIS

- PRINT HEADER - SEE REPORT SHEETS
CHROMATOGRAM + CHART SPEED = 0.1"/MIN
REPORT - SEE REPORT SHEETS

STANDARD PREPARATION:

STANDARDS ORDERED FROM SUPELCO W/TARGET COMPOUNDS AS LISTED ALONG WITH %, PURITY AND WEIGHT CONCENTRATIONS (SEE FOLLOWING PAGES)

Continued on Page

Read and Understood By

Signed 1/18/96 Signed

Date Date

JECT ACS - FIELD GC 4077.0075 Continued From Page

Certificate of Composition

DESCRIPTION: MONTGOMERY WATSON Q#119808

LOT NO.: LA 55369

ANALYTE (1)	PERCENT PURITY (2)	WEIGHT CONCENTRATION (3)
CARBON TETRACHLORIDE	99.0	5004 +/- 25
STYRENE	99.0	5002 +/- 25
TETRACHLOROETHENE	99.0	5006 +/- 25
TRICHLOROETHYLENE	98.3	5004 +/- 25
1,1-DICHLOROETHYLENE	98.5 (a)	5006 +/- 25
1,1,1-TRICHLOROETHANE	99.0	5004 +/- 25
1,1,2-TRICHLOROETHANE	99.0	5004 +/- 25
1,2-DICHLOROETHANE	99.0	5004 +/- 25

(1) Listed in alphabetical order.

(2) Determined by capillary GC-FID, unless otherwise noted.
a) Capillary GC-Hall

(3) Quantity of analyte weighed into solution (ug/mL, +/- 0.5%). Weights of analytes less than 98% pure are corrected for impurities. Certified weights are not applicable to ampuls stored after opening, even if resealed.

Mark V. Robillard, Ph.D.
Custom Standards Department Manager

Supelco warrants that its products conform to the information contained in this publication. Purchaser must determine the suitability of the product for its particular use. Please see the latest catalog or order invoice and packing slip for additional terms and conditions of sale.

SUPELCO
Supelco Park • Bellefonte, PA
16823-0048 USA • Phone (814) 359-3441

Signed Date 1/18/96

Signed Date

Certificate of Composition

DESCRIPTION: MONTGOMERY WATSON Q#119807

LOT NO.: LA 55368

ANALYTE (1)	PERCENT PURITY (2)	WEIGHT CONCENTRATION (3)
BENZENE	99.0	4998 +/- 25
CHLOROBENZENE	99.0	5002 +/- 25
CIS-1,2-DICHLOROETHYLENE	99.0 (a)	4998 +/- 25
ETHYLBENZENE	99.0	5006 +/- 25
M-XYLENE	99.0	2498 +/- 12
O-XYLENE	98.9	5002 +/- 25
P-XYLENE	99.0	2504 +/- 12
TOLUENE	99.0	5006 +/- 25
TRANS-1,2-DICHLOROETHYLENE	99.0	5002 +/- 25
1,1-DICHLOROETHANE	99.0	4996 +/- 25

(1) Listed in alphabetical order.

(2) Determined by capillary GC-FID, unless otherwise noted.
a) Capillary GC-Hall

(3) Quantity of analyte weighed into solution (ug/mL, +/- 0.5%). Weights of analytes less than 98% pure are corrected for impurities. Certified weights are not applicable to ampuls stored after opening, even if resealed.

Mark V. Robillard, Ph.D.
Custom Standards Department Manager

Supelco warrants that its products conform to the information contained in this publication. Purchaser must determine the suitability of the product for its particular use. Please see the latest catalog or order invoice and packing slip for additional terms and conditions of sale.

Signed Date 1/19/01

SUPELCO
Supelco Park • Bellefonte, PA
16823-0048 USA • Phone (814) 359-3441

Signed Date

Notebook No. 2

OJECT ACS FIELD GC 4077.0075

Continued From Page

PID

PURGE & TRAP SOIL ANALYSES

1/18/96

	RT = 9.65 ACETONE	RT = 11.33 MEK C1,2DCE	RT = 13.225 BENZENE
	100 µg/L - 92.4	150 µg/L - 2216.44	50 µg/L - 3986.62
INTEGRATOR Ht. 6.44 →	20 - 37.66	30 ~~25~~ - 608.75	10 - 1151.23
	10 - 33.69	15.0 ~~12.5~~ - 326.68	5 - 610.64
	0 - 60.51	0 - 50.62	0 - 78.31
	CORR² = 0.999	CORR = ~~0.998~~	CORR = 0.998
	Y-INT = -38.86	Y-INT = ~~-15.78~~	Y-INT = -4.366
	SLOPE = ~~0.75109~~ 1.50219	SLOPE = ~~0.0744163~~ 0.999	SLOPE = 0.013586
		+11.18	
		0.0725215	

SOIL SAMPLE	WT (gr)	µl EXTRACT	DILUTION	AREA	µg/kg	AREA	µg/kg	AREA	µg/kg
202A - (16-18')	5.0	100	50X	44.51	~~<500~~ <710 (B)	37.82	~~<685~~ 750	1675.65	920 µg/kg
202A (13.5-15.5')	5.0	100	50X	44.72	<715 (B)	38.39	↓	809.76	330
103 (18.5-20.5')	5.0	100	50X	~~97.63~~ mm	~~<500~~ 5400	4287.20		470.90	~~102~~ <250
L (18.5-20.5')	1.0	50	500X	41.33	<11,700 (B)	822.04	~~22,700~~ 24,200	119.04	<2500
104 (18.5-20.5')	1.0	25	1000X	—	<10,000	860.40	~~48,300~~ 51,200	118.22	<5000
103 (1-3')	1.0	25	1000X	—	↓	27.32	<15,000	56.01	<5000
103 (1-3')	5.0	100	50X	59.89	<2570 (B)	40.67	<750	82.17	<250
106 (8.5-10.5')	1.0	25	1000X	25.51	<10,000	3667.09		181.15	<5000
106 (8.5-10.5')	1.0	10	2500X	—	<25,000	1523.47	248,000	86.11	<12,500
105 (18.5-20.5')	1.0	10	2500X	—	↓	191.25	<37,500	172.94	↓
0 µg/L CHECK STD	—	—	1	24.98		515.20	~~90.5%~~ 87.3%	1019.48	94.8%

INTEGRATOR Ht = 4.216

$\frac{4.216}{6.44} \times 100 = 65.5\%$

IF DETECTED IN BLANK AT A HIGHER CONCENTRATION

[ ] = CONCENTRATION EXCEEDS CALIBRATION RANGE (IF CALCULATED VALUE IS ESTIMATED)

Continued on Page

Read and Understood By

Signed [signature] Date 1/18/96 Signed Date

INTERMEDIATE STANDARD PREPARATION:

1.0 ML CUSTOM MIX AMPULE LOT #55368 (500 µg/ML) →
1.0 ML CUSTOM MIX AMPULE LOT #55369 → 10 ML MeOH = 500 µg/ML
1.0 ML CUSTOM MIX AMPULE LOT #55370 →

NOTE: INTERMEDIATE STANDARD PREPARED 1/11/96 AT MONT. WATSON ANALYTICAL LAB

WORKING STANDARD PREPARATION

per 1/18/96

250 ~~40~~ µl of 2000 µg/ML 1,4 DCBA →
250 ~~40~~ µl of 2000 µg/ML ααα-TFT → 10 ML MeOH = 50 µg/ML ACS MIX
1.0 ML of 500 µg/ML ACS MIX →

1st
2nd

50 µl of 2000 µg/ML 1,4 DCBA →
50 µl of 2000 µg/ML ααα TFT → 10 ML MeOH = 10 µg/ML SURROGATE MIX

DAILY STANDARD PREPARATION

20 µl of 500 µg/ML → 200 ML H_2O = 50 µg/L
40 µl of 50 µg/ML → 200 ML H_2O = 10 µg/L
20 µl of 50 µg/ML → 200 ML H_2O = 5 µg/L

Continued on Page

Read and Understood By

Signed — Date 1/18/96 — Signed — Date

	RT=10.783	RT=9.983	RT=10.60	RT=11.40	RT=12.46
	1,1DCA	1,1DCE	tV,2DCE	C12DCE	12DCA
50	6143.89	5045/L 3269.23	5045/L 5048.95	5045/L 7298.99	5045/L 6632.48
40	2069.48	10 767.40	11 1256.38	10 219.04	10 2082.96
5	802.70	5 404.85	5 387.63	5 802.75	5 886.80
0	117.80	0 ——	0 ——	0 ——	0 117.74
Corr	0.9919	Corr = 0.999	Corr: 0.997	Corr = 0.995	Corr = 0.995
Y-Int	-4.67	Y-Int = -1.74	Y-Int = -0.468	Y-Int = -2.70	Y-Int = -4.25
Slope	0.0087659	Slope = 0.0015872	Slope = 0.0099203	Slope = 0.0071589	Slope = 0.0080976

OIL SAMPLE	AREA	µg/Kg	AREA	µg/Kg	(1,1DCA)	AREA	µg/Kg	AREA	µg/Kg
3202A (16-18 FT)	——	<250	——	<250	4259	——	<250	——	<250
202A (13.5-15.5 FT)	——	↓	——	↓	↓	——	↓	——	↓
3103 (18.5-20.5 FT)	895.52	69	7666.02		7466.02	17549.11		——	
(18.5-20.5 FT)	168.46	<2500	——	<2500	1008.55 2000	39126.2 12700		——	<2500
104 (18.5-20.5 FT)	214.04	<5000	——	<5000	837.11 2670	4569.14 30000		——	<5000
103 (1-3 FT)	——	↓	——	↓	<5000	——	<5000	——	↓
3103 (1-3 FT)	——	<250	——	<250	<250	——	<250	——	<250
3106 (8.5-10.5 FT)	263.20	~~<5000~~	——	~~<5000~~	297.27 <5000	16768.25		——	~~<5000~~ 5000
3105 (18.5-20.5 FT)	——	<12,500	——	<12,500	282.04 <12,500	9012.1	<12,500	——	<12,500
049 L CHECK STD	1092.50	155%	1645.77	159%	2344.69 197%	2665.91	164%	2086.75	126%
5B106 (8.5-10.5 FT)	112.64	<12,500	——	<12,500	129.51 <12,500	8245.56		——	<12,500

Continued on Page

Read and Understood By

Signed 1/18/96 Date Signed Date

JECT ACS FIELD GC 4077.0075

Continued From Page

RT= 15.483	RT= 17.041	RT= 17.75	RT= 21.475	RT= 21.925	RT= 22.908	RT= 23.0[illegible]
XXX TFT	MIBK	TOLUENE	ETH-BENZ	M&P XYLENE	STYRENE	O-XYLENE
50 ug/L —	50 ug/L - 469.84	50 ug/L 3755.88	50 ug/L - 3492.65	50 ug/L - 4033.58	50 ug/L - Co-Elu	50 ug/L - Co-Elu
10 ug/L 536.02	10 - 105.26	10 - 1072.75	10 - 963.40	10 - 1101.11	10 - 884.48	10 - 912.93
5 ug/L 319.66	5 - 51.12	5 - 567.29	5 - 497.13	5 - 567.98	5 - 352.50	5 - 500.91
0 - 578.75	0 - —	0 - 65.89	0 - 29.53	0 - 55.36	0 - —	0 - 68.71
Corr = —	Corr = 0.999	Corr = 0.998	Corr = 0.999	Corr = 0.999	Corr = 1.0	Corr = 1.0
Y-Int = —	Y-Int = -0.937	Y-Int = -4.19	Y-Int = -3.57	Y-Int = -3.43	Y-Int = 1.69	Y-Int = -1.078
Slope = —	Slope = 0.1083869	Slope = 0.0143765	Slope = 0.0152877	Slope = 0.0132063	Slope = 0.009399	Slope = 0.01213
1 pt w/10 ug/L					2 pt	2 pt

Area	ug/kg	Area	ug/kg	Area	ug/kg	Area	ug/kg	Area	ug/kg	Area	ug/kg	Area	ug/kg
522.70	97.5%	—	<250	55.82	<250	—	<250	308.48	<250	41.72	<250	—	<250
589.00	101%	—	↓	50.58	↓	35.79	↓	3289.36	2000	68.18	↓	—	↓
560.78	105%	274.53	1440	10201	[ ]	3787.32	[ ]	13349.32	[ ]	5575.13	[ ]	—	↓
419.06	78.2%	45.96	<2500	2248.51	14100	755.77	3990	2568.63	17200	1037.90	5720	—	<2
440.91	82.3%	—	<5000	1712.11	20400	316.60	<5000	1246.21	13,000	379.79	5260	—	<5000
529.98	98.9%	—	↓	59.51	<5000	—	↓	83.94	<5000	—	<5000	35.56	↓
549.27	102%	—	<250	91.39	<250	253.42	<250	562.78	<250	—	<250	157.46	<250
491.08	91.6%	—	<5000	4279.21	[ ]	2386.93	32,900	7406.83	[ ]	—	<5000	4050.48	[ ]
472.83	88.2%	—	<12,500	1859.28	56,300	991.33	29,000	3314.13	101,000	—	<12,500	1863.23	53,800
506.18	94.4%	—	↓	599.49	11,100	73.61	<12,500	397.33	<12,500	—	↓	135.51	<12,500
470.39	87.8%	53.58	48.7%	967.62	97.2%	875.21	98.1%	996.68	97.3%	800.86	92.2%	756.83	81.1%

Continued on Page

Read and Understood By

[signature] 1/18/96

Signed Date Signed Date

OJECT ACS - FIELD GC 4077.0075 NOTEBOOK NO. 2

Continued From Page

DAILY SUMMARY

SOIL SAMPLE	TARGET COMPOUND DETECTS	TOTAL TARGET VOCs (PPM) (mg/kg)
SB202A (16-18')	920 ug/kg BENZENE,	0.92
SB202A (13.5-15.5')	330 ug/kg BENZENE, 2000 ug/kg M&P XYLENE	2.33
SB103 (18.5-20.5')	5400 ug/kg ACETONE, ~~22,700~~ 24,200 ug/kg MEK/C1,2DCE, 1,440 ug/kg MIBK, 14,000 ug/kg TOLUENE, 3990 ug/kg ETH-BENZENE, 17,200 ug/kg M&P XY. 5720 ug/kg STYRENE, 610 ug/kg 1,1DCE, 2080 ug/kg 1,1DCA 8030 ug/kg 1,1,1-TCA, 7920 ug/kg TCE, 49,600 ug/kg PCE *	140.3 ~~138.8~~ MDP 1/20/96
S104 (18.5-20.5') MDP	~~48,300~~ 51,200 ug/kg MEK/C1,2DCE 20,400 ug/kg TOLUENE, 13,000 ug/kg M&P XY. 5260 ug/kg STYRENE, 2070 ug/kg 1,1DCA, 17,000 ug/kg 1,1,1TCA 7050 ug/kg TCE, 13,600 ug/kg PCE	130.2 ~~127.0~~ MDP 1/21/96
3 (1-3')	N.D.	N.D.
B106 (9.5-10.5')	~~244,000~~ 248,000 ug/kg MEK/C1,2DCE, 56,300 ug/kg TOLUENE, 32,900 ug/kg ETH-BENZENE, 101,000 ug/kg M&P XYLENE, 53,800 ug/kg O-XYLENE, 14,300 ug/kg 1,1,1-TCA, 7610 ug/kg TCE, 18,200 ug/kg PCE	SB21.1 ~~528.1~~ MDP 1/22/96
B105 (18.5-20.5')	16,100 ug/kg TOLUENE, 17,280 ug/kg PCE	28.3

VALUE EXCEEDS CALIBRATION RANGE

J DETECTIONS ABOVE RDL

Continued on Page

Read and Understood By

Signed

1/15/96

Date

Signed

Date

JECT ACS FIELD GC 4077.0073

Continued From Page

RT=12.683	RT=13.45	RT=15.016	RT=17.533	RT=19.433	RT=20.683	RT=23.08
1,1,1-TCA	CCl_4	TCE	1,1,2-TCA	PCE	Cl-BENZ	1,4DCBALS
50 µg/L - 4786.26	50 - 9773.81	50 - 10733.77	50 - 9209.52	50 - 8304.68	50 - 5700.87	50 - —
10 - 1470.13	10 - 2936.21	10 - 3667.30	10 - 2825.82	10 - 2699.96	10 - 1520.60	10 - 1951.81
5 - 1201.49	5 - 1982.75	5 - 2360.88	5 - 1522.58	5 - 1753.41	5 - 824.10	5 - 984.29
0 - —	0 - —	0 - 596.09	0 - —	0 - 121.40	0 - —	0 - 2259.27
Corr = 0.999	Corr = 0.999	Corr = 0.999	Corr = 0.996	Corr = 0.999	Corr = 0.999	Corr = —
Y-Int = -9.02	Y-Int = -6.75	Y-Int = -8.89	Y-Int = -7.35	Y-Int = -7.94	Y-Int = -3.39	Y-Int = —
Slope = 0.0123457	Slope = 0.0058034	Slope = 0.0054701	Slope = 0.0069336	Slope = 0.0069619	Slope = 0.0093465	Slope = —
						1 pt w/10 µg/L

Area	µg/kg	Area	µg/kg	Area	µg/kg	Area	µg/kg	Area	µg/kg	Area	µg/kg	Area	µg/kg
—	<250	—	<250	—	<250	—	<250	—	<250	—	<250	1931.25	98.9
—	↓	—	↓	654.15	↓	—	↓	—		—	↓	2626.2	135%
7949.50	[ ]	—	↓	13681.87	[ ]	154.95	↓	44541.23	[ ]	—	↓	1341.64	68.7
2030.92	8030	—	<2500	4522.05	7920	—	<2500	15378.73	49600	—	<2500	1830.75	93.8%
2105.38	17,000	—	<5000	2914.78	7050	—	<5000	3099.09	13,600	—	<5000	2059.18	10
—	<5000	—	↓	627.19	<5000	—	↓	220.38	<5000	—	↓	2037.96	104%
—	<250	—	<250	731.75	<250	—	<250	257.45	<250	—	<250	2350.27	120%
1891.30	14,300	—	~~<12,500~~ 5000	3017.13	7610	—	~~<12,500~~ 5000	3754.69	18,200	301.25	~~<12,500~~ 5000	2495.75	128%
452.69	<12,500	—	<12,500	1345.69	<12,500	—	<12,500	2130.65	17,200	—	<12,500	2502.33	128%
2030.84	160%	3639.99	144%	4933.43	181%	2923.75	129%	3748.94	182%	1838.63	138%	1945.93	99.7
806.93	<12,500	—	<12,500	1535.40	<12,500	—	<12,500	1652.98	<12,500	—	<12,500	2799.19	143%

Continued on Page

Read and Understood By

Signed [signature] Date 1/18/96 Signed Date

OJECT ACS - FIELD GC 4077.0075

Notebook No.

Continued From Page

PID

PURGE AND TRAP SOIL ANALYSES 1/19/96

	R.T. = 9.69	R.T. = 11.44	R.T. = 13.36	R.T. = 15.64
	ACETONE	MEK / CLROCE	BENZENE	ΔΔΔ TFT (SURR)
	100 µg/L - 75.22	150 - 1979.30	50 - 3926.15	50 - 2013.68
	20 - 31.53	30 - 568.01	10 - 1056.78	10 - 549.09
	10 - 25.34	15 - 370.06	5 - 663.38	5 - 247.72
	0 - 41.47	0 - 68.78	0 - 97.37	0 - 548.50 (99.9%)
	GRR = 0.999	GRR = 0.999	GRR = 0.999	GRR =
	Y-INT = -36.55	Y-INT = -13.96	Y-INT = -5.17	Y-INT =
	SLOPE = 1.8142129	SLOPE = 0.0826149	SLOPE = 0.0140133	SLOPE =
				1pt w/10 µg/L

SAMPLE	wt	WL EXTRACT	DF	AREA	µg/kg	AREA	µg/kg	AREA	µg/kg	AREA	µg/kg
203 (16-18')	5.0	100	50X	42.07	<1990 (B)	32.54	<750	2207.81	1290	541.55	98.6%
203 (13.5-15.5')	5.0	100	50X	33.13	<1180 (B)	22.85	↓	525.80	<250	521.57	95.0%
204 (16-18')	5.0	100	50X	35.28	<1370 (B)	25.82	↓	590.67	↓	532.14	96.9%
204 (13.5-15.5')	5.0	100	50X	36.01	<1440 (B)	26.81	↓	93.50	↓	527.03	96.0%
101 (3.5-5.5')	5.0	100	50X	31.47	<1030 (B)	445.25	1140	423.63	↓	457.42	83.3%
[illegible] 5-5.5')	5.0	50	100X	31.09	<1000	260.27	<1500	243.67	<500	477.33	86.9%
101 (1-3')	1.0	25	1000X	20.60	<10,000	54.75	<15,000	89.96	<5000	487.21	88.7%
101 (1-3')	5.0	50	100X	23.54	<1000	150.87	<1500	194.20	<500	473.16	86.2%
205 (6-8')	1.0	50	500X	55.67	32,200 (B)	114.05	<7500	239.39	<2500	394.31	71.8%
205 (6-8')	1.0	5	5000X	21.68	<50,000	16.41	<75,000	97.81	<25,000	398.45	72.6%
µg/L CCV				27.10	4.761/5.212 (91.3%)	537.35	(101%)	1032.49	(93.0%)	503.61	(91.7%)
102 18.5-20.5'	1.0	10	2500X	—	<25,000	376.72	42,900	132.47	<12,500	469.19	85.4%
102 3.5-5.5'	1.0	10	2500X	—	↓	80.16	<37,500	111.35	↓	538.14	98.0%
102 3.5-5.5	1.0	100	250X	36.48	<7410 (B)	650.67	9950	155.75	<1250	514.58	93.7%
µg/L CCV				4.322/5.212 = (82.9%)		460.76	(80.4%)	933.33	(79.1%)	465.10	84.7%

(B) = DETECTED IN BLANK

D = EXCEEDS CALIBRATION RANGE

Continued on Page

Read and Understood By

Signed [signature] Date 1/20/96 Signed Date

PROJECT ACS - FIELD GC 4077.0075 Continued From Page

1/19/96 - DAILY STANDARD PREPARATION

20 ml of 500 µg/mL → 200 mL H_2O = 50 µg/L
40 ml of 50 µg/mL → 200 mL H_2O = 10 µg/L
20 ml of 50 µg/mL → 200 mL H_2O = 5 µg/L

Continued on Page

Read and Understood By

Signed 1/17/96 Signed
Date Date

OJECT ACS - FIELD GC 4077.0075

Notebook No. 2

Continued From Page

	R.T.= 10.03	R.T.= 10.66	R.T.= 10.80	R.T.= 11.50	R.T.= 12.61	R.T.= 12.85
	1,1DCE	t1,2DCE	1,1DCA	c1,2DCE	1,2DCA	1,1,1-TCA
	50- 4019.74	50- 5013.33	50- 8659.76	50- 7529.03	50- 5338.04	50- 7224.96
	10- 1019.74	10- 1678.31	10- 2782.04	10- 2750.98	10- 2284.45	10- 2205.14
	5- 550.04	5- 984.65	5- 1690.36	5- 1331.73	5- 1415.64	5- 1282.24
	0- —	0- —	0- —	0- —	0- 327.28	0- —
	Corr= 0.999	Corr= 0.998	Corr= 0.999	Corr= 0.993	Corr= 0.994	Corr= 0.999
	Y-Int= -2.74	Y-Int= -7.58	Y-Int= -7.11	Y-Int= -7.53	Y-Int= -14.18	Y-Int= -5.85
	Slope= 0.0130994	Slope= 0.0114307	Slope= 0.0065731	Slope= 0.007543	Slope= 0.0118988	Slope= 0.007705

L Sample	Area	µg/kg	Area	µg/kg	Area	µg/kg	Area	µg/kg	Area	µg/kg	Area	µg/kg
3203 16-18' (50X)	—	<250	—	<250	—	<250	—	<250	—	<250	—	<250
03 13.5-15.5 (50X)	—	↓	—	↓	—	↓	—	↓	—	↓	—	↓
04 16-18' (50X)	—	↓	—	↓	—	↓	—	↓	—	↓	—	↓
04 13.5-15.5 (50X)	—	↓	—	↓	—	↓	—	↓	—	↓	—	↓
01 3.5-5.5 (50X)	—	↓	—	↓	293.74	↓	2128.98	426	—	↓	—	↓
[illegible] 5-5.5' (100X)	—	<500	—	<500	149.25	<500	993.85	<500	—	<500	—	<500
01 1-3' (1000X)	—	<5000	—	<5000	—	<5000	—	<5000	—	<5000	—	<5000
01 1-3 (100X)	—	<500	—	<500	176.81	<500	607.73	<500	—	<500	—	<500
05 6-8' (500X)	1333.49	7360	—	<2500	215.62	<2500	312.34	<2500	1614.22	2510	—	<2500
05 6-8' (5000X)	182.31	<25,000	—	<25,000	—	<25,000	—	<25,000	225.58	<25,000	—	<25,000
0 µg/L CCV	812.53	79.0%	co-elute		co-elute		2954.42	148%	2432.64	148%	2603.92	142%
02 18.5-20.5' (2500X)	195.79	<12500	—	<12,500	759.28	<12,500	2266.35	23,900	—	<12,500	1612.59	16,400
02 3.5-5.5' (2500X)	—	↓	—	↓	—	↓	324.15	<12,500	—	↓	—	↓
02 3.5-5.5' (250X)	—	<1250	—	<1250	467.52	<1250	3489.61	4700	—	<1250	—	<1250
µg/L CCV	1313.96	145%	1785.27	128%	3222.57	141%	2810.30	137%	1852.96	78.7%	3050.65	177%

D = value used for reporting

Continued on Page

Read and Understood By

Signed [signature] Date 1/20/96 Signed Date

JECT ACS - FIELDGC 4077.0075 Continued From Page

R.T. = 17.20	R.T. = 17.87	R.T. = 21.63	R.T. = 22.08	R.T. = 23.48	R.T. = 27.25
MIBK	TOLUENE	ETH-BNZ	M/P XYLENE	STYRENE	O-XYLENE
So - 293.21	So - 3557.67	So - 3340.09	So - 3765.82	So - 3224.37	So - 2843.81
Io - 77.70	Io - 1033.27	Io - 934.12	Io - 1039.76	Io - 815.03	Io - 874.28
S - 39.77	S - 577.49	S - 520.37	S - 587.25	S - 376.89	S - 521.05
d - 25.80	d - 108.78	d - 29.80	d - 68.45	d - 121.34	d - 121.34
Corr = 0.997	Corr = 0.999	Corr = 0.999	Corr = 0.999	Corr = 0.999	Corr = 0.999
Y-Int = -5.04	Y-Int = -4.78	Y-Int = -4.24	Y-Int = -4.14	Y-Int = +1.98	Y-Int = -6.17
SLOPE = 0.2161317	SLOPE = 0.0953516	SLOPE = 0.0161971	SLOPE = 0.0143375	SLOPE = 0.0160683	SLOPE = 0.0196952

AREA	ug/kg	AREA	ug/kg	AREA	ug/kg	AREA	ug/kg	AREA	ug/kg	AREA	ug/kg
—	<250	75.82	<250	821.86	454	2330.22	1460	—	<250	64.83	<250
—		55.39		938.67	548	3300.87	2160	19.37		—	
—		56.60		984.16	585	3178.81	2070	—		278.54	
—		58.70		—	<250	1803.73	1090	—		38.86	
16.48		4501.87		1566.48	1060	3826.74		—		2949.14	
—	<500	2686.14	3650	1901.31	1040	2312.89	2910	—	<500	1840.99	3010
—	<5000	799.79	7500	270.49	<5000	764.88	6860	—	<5000	547.14	4610
—	<500	4573.38	3470	713.23	730	2058.09	2540	—	<500	1303.42	2570
1765.92		13615.16		7868.42		27774.64		—	<2500	13321.12	
369.84	374.000*	2416.70	162,000	1071.44	65,600	5143.09	348,000*	—	<25,000	2299.72	196,000
64.5	89.0%	1072.05	117%	914.38	106%	1042.00	108%	792.70	108%	804.81	196%
19.7	<12,500	671.22	13,800	163.87	<12,500	319.95	<2,500	—	<2500	170.80	<2,500
—		231.67	<12,500	35.22	<12500	146.73		—		103.57	
96.97	3980	734.39	1620	387.79	<1250	1491.62	4060	—	<1250	566.99	1250
46.76	50.7%	965.46	100%	786.24	84.9%	583.36	85.6%	576.96	72.9%	742.91	84.6%

( ) = VALUE USED FOR REPORTING

*= VALUE EXCEEDS CALIBRATION RANGE

Continued on Page

Read and Understood By

Signed

4/20/96
Date

Signed

Date

OJECT ACS - FIELD GC, 4077.0075 Notebook No. _____ Continued From Page _____

DAILY SUMMARY

SOIL SAMPLE	TARGET COMPOUND DETECTS	TOTAL TARGET VOCs (MG/KG) (PPM)
203 (16-18')	1290 ug/kg BENZENE, 454 ug/kg ETH-BENZENE, 1460 ug/kg M&P XYLENE,	3.2
203 (13.5-16.5')	548 ug/kg ETH-BENZENE, 2160 ug/kg M&P XYLENE,	2.7
204 (16-18')	585 ug/kg ETH-BENZENE, 2070 ug/kg M&P XYLENE,	2.7
204 (13.5-15.5')	2090 ug/kg M&P XYLENE	1.1
101 (3.5-5.5')	1140 ug/kg MEK & C1,2DCE, 3650 ug/kg TOLUENE, 1040 ug/kg ETH-BENZENE, 2910 ug/kg M&P XYLENE, 3010 ug/kg O-XYLENE,	11.8
101 (1-3')	3470 ug/kg TOLUENE, 730 ug/kg ETH-BENZENE, 2540 M&P XYLENE, 2570 ug/kg O-XYLENE	9.3
205 (6-8')	32,200 ug/kg ACETONE, 374,000 ug/kg MIBK, 162,000 ug/kg TOLUENE, 65,600 ug/kg ETH-BENZENE, 348,000 ug/kg M&P XYLENE*, 196,000 ug/kg O-XYLENE, 7360 ug/kg 1,1DCE, 6510 ug/kg 1,2DCA, 16,400 ug/kg TCE, 21,200 ug/kg PCE	1230
102 (18.5-20.5')	42,900 ug/kg MEK/C1,2DCE, 13,840 ug/kg TOLUENE, 16,400 ug/kg 1,1,1TCA, 14,600 ug/kg TCE, 26,400 ug/kg PCE	114
102 (3.5-5.5')	9950 ug/kg MEK & C1,2DCE, 3980 ug/kg MIBK, 1620 ug/kg TOLUENE, 4060 ug/kg M&P XYLENE, 1250 ug/kg O-XYLENE	20.9

* MAY BE CHROMATOGRAPHIC RESOLUTION PROBLEM

Continued on Page

Read and Understood By

Signed _____ Date 1/20/96 Signed _____ Date _____

OJECT ACS FIELD GC 4077.0075 Continued From Page

R.T. = 13.61	R.T. = 15.18	R.T. = 17.66	R.T. = 19.58	R.T. = 20.85	R.T. = 23.26
CCl4	TCE	1,1,2-TCA	PCE	Cl-BENZ	1,4DCBA(Sn
50%-13196.27	50-13149.26	50-7539.99	50-9929.79	50-6020.36	50-5170.31
10-4491.77	10-4875.45	10-3416.04	10-3848.52	10-1935.30	10-2299.52
5-2644.22	5-3450.05	5-2165.39	5-2597.62	5-1145.79	5-1429.17
0- —	0-507.16	0- —	0-118.68	0- —	0-2016.31 57.7%
Corr= 0.998	Corr= 0.999	Corr= 0.992	Corr= 0.998	Corr= 0.998	Corr=
Y-Int= -7.94	Y-Int= -12.03	Y-Int= -16.4	Y-Int= -12.6	Y-Int= -6.90	Y-Int=
Slope= 0.0043682	Slope= 0.0047067	Slope= 0.008704	Slope= 0.0062774	Slope= 0.0094152	Slope=
					1pt w/10ug/L

AREA	ug/kg	AREA	ug/kg	AREA	ug/kg	AREA	ug/kg	AREA	ug/kg	AREA	ug/kg
—	<250	503.02	<250	111.88	<250	—	<250	—	<250	2427.04	106%
—	↓	354.86	↓	—	↓	—	↓	—	↓	1879.79	81.7%
—	↓	580.71	↓	—	↓	—	↓	—	↓	2589.94	113%
—	↓	613.20	↓	—	↓	—	↓	—	↓	2711.68	118%
—	↓	1929.70	↓	—	↓	699.83	↓	—	↓	2314.82	101%
—	<500	1304.33	<500	—	<500	365.40	<500	—	<500	2987.93	130%
—	<5000	623.77	<5000	—	<5000	146.14	<5000	—	<5000	2454.60	107%
—	<500	854.60	<500	—	<500	205.57	<500	—	<500	2563.66	111%
—	<2500	9543.29	16,400	1687.90	<2500	9724.41	24,200	300.39	<2500	2770.22	120%
—	<25,000	2133.80	<25,000	—	<25,000	1800.92	<25,000	—	<25,000	3646.74	159%
4791.18	130%	5803.66	153%	3480.32	139%	4707.07	169%	2275.02	145%	2487.92	108%
—	<12,500	3797.42	14,600	220.15	<12,500	3687.08	26,400	—	<12,500	2862.09	124%
—	↓	802.80	<12,500	—	↓	220.47	<12,500	—	↓	2868.99	125%
—	<1250	776.73	<1250	—	<1250	672.07	<1250	107.36	<1250	2622.34	114%
5087.04	143%	5455.10	136%	2772.68	77.5%	4294.00	144%	1992.23	119%	1908.41	83.0%

( ) = VALUE USED FOR REPORTING

Continued on Page

Read and Understood By

Signed [signature] Date 1/20/96 Signed Date

1-23-96 TUESDAY

* 5 µl Surg added to all Samples

CALIBRATION

50 PPB = 20 µl Std @ 500 µg/mL → 200 mL H_2O, 5 mL Purged
10 PPB = 40 50 200 , 5 mL Purged
5 PPB = 20 50 200 , 5 mL Purged
Blank = 5 mL H_2O + Surg *
ICV = 40 µl Std @ 500 µg/mL → 200 mL H_2O, 5 mL Purged

SAMPLE	Sed	Ref		PID
B106 (8.5-10.5')	1.0g + 5.0mL,	25µl → 5mL H_2O* →	1000x	1833
B108 (3-5')	1.0g + 5.0mL,	10µl → 5mL H_2O* →	2500x	9922
B106 (3-5') Dup	1.0g + 5.0mL,	10µl → 5mL H_2O* →	2500x	"
B108 (9-11')	1.0g + 5.0mL,	25µl → 5mL H_2O* →	1000x	3868
B108 (11-13')	1.0g + 5.0mL,	25µl → 5mL H_2O* →	1000x	5016
"	"	0.5 → 5mL MeOH, 25µl → 5mL H_2O* =	10,000x	"
SB204 (5-7')	5.0g + 5.0mL,	100µl → 5mL H_2O* =	50x	330
SB206 (7-9')	5.0g + 5.0mL,	100µl → 5mL H_2O* =	50x	192
SB207 (13.5-15.5')	5.0g + 5.0mL,	100µl → 5mL H_2O* =	50x	36
207 (15-15')	5.0g + 5.0mL,	100µl → 5mL H_2O* =	50x	84
10 PPB CCV =	40µl @ 50 µg/mL → 200 mL H_2O,	5mL Purged		
SB207 (21-23')	5.0g + 5.0mL,	100µl → 5mL H_2O* =	50x	69
SB112 (9-11')	1.0g → 5.0mL,	10µl → 5mL H_2O* =	2500x	9524
SB112 (11-13')	1.0g → 5.0mL,	10µl → 5mL H_2O* =	2500x	9364
SB113 (7-9')	1.0g → 5.0mL,	25µl → 5mL H_2O* =	1000x	3879
SB113 (9-11')	1.0g → 5.0mL,	100µl → 5mL H_2O* =	250x	1579
10 PPB CCV-2 =	40µl @ 50 µg/mL → 200mL H_2O,	5mL Purged		—

Continued on Page

Read and Understood By

J Hunter — 1-23-96
Signed — Date — Signed — Date

SUBJECT ACS- FIELD GC

Continued From Page

MONDAY 1-22-95

— RUN LOG —

GC #2 CALIBRATION

50 PPB Std = 20 ul of 500 ug/mL Std → 200 mL H_2O, 5 mL Purged

10 PPB Std 40 ul of 50 ug/mL Std → 200 mL H_2O, 5 mL

5 PPB Std = 20 ul of 50 ug/mL Std → 200 mL H_2O, 5 mL

BLANK = 5 mL H_2O + 5 ul Surrg

10 PPB ICV = 40 ul of 50 ug/mL Std → 200 mL H_2O, 5 mL

SAMPLE	WT	~~Ext~~ ul	DF	
SB205 (3.5-5.5')	5.0 g	50	100x	PID = 592
"	1.0 g	10	2,500	
"	100 ul @ 2500x → 10 mL MeOH = 250,000 x			
Blank				
SB105 (8.5-10.5')	1.0 g	25	1000 x	PID 2259
SB107 (11-13')	1.0 g	25	1000 x	PID = 1520
"	"	100	250x 2500 x JAM	~~24~~ JAM
SB107 (1.-8')	1.0 g	100	250 x	PID 2463
"	~~5 ul @ 250x JAM~~ 1 g → 5 mL, 0.5 mL → 10 mL, 50 100 ul → 5 mL = 5,000 Dx			
"	1 g → 5 mL, 0.5 mL → 10 mL, 5 ul → 5 mL = 100,000 Dx			
SB109 (13-15')	5 g → 5 mL, 100 ul → 5 mL = 50x			PID = 49
CCV				

Continued on Page

Read and Understood By

J Hunterbrook 1-22-96

Signed Date Signed Date

1-24-96 * 5 ug added (5 µL)

10 ppb = 20 mL @ 500 ng/mL Std → 200 mL H_2O, 5 mL purged
10 ppb = 40 50 200 "
5 = 20 50 200 "
ICB = 5 ~~mg~~ H_2O mL * H_2O
ICV = 40 mL @ 50 ng/mL Std → 200 mL H_2O *, 5 mL purged
GPS0 = 5.0 mL *
GPS0A = 5.0 mL *
GPS1 = 5.0 mL *
GPS1A = 5.0 mL *
GP-1-24-96 FB = 5.0 mL *
GPS2 = 5.0 mL *
GPS3 = 5.0 mL *
Bake Column
Blank = 5.0 mL H_2O *
GPS5 = 5.0 mL *
CCV = 40 mL @ 50 ng/mL Std → 200 mL H_2O, 5 mL purged

Continued on Page

Read and Understood By

Signed — Date 1-24-96 — Signed — Date

PROJECT GC #1 Upper Aquifer

Continued From Page

1-23-96 TUESDAY

* Spike Study added

USE TEMP Program AC53

CALIBRATION

10 ppb Std = 40 ml of 50 ng/mL → 200 mL DI, 5 mL Purged

5 ppb Std = 20 ml of 50 ng/mL → 200 mL DI, 5 mL Purged

50 ppb Std = 20 ml of 500 ng/mL → 200 mL DI, 5 mL Purged *

Blank = 5 mL DI *

1c ✓ = 40 ml of 50 ng/mL → 200 mL DI, 5 mL Purged

Continued on Page

Read and Understood By

J Armstrong — 1-23-96

Signed — Date — Signed — Date

Notebook No.

OJECT GC #1 Upper Aquifer

Continued From Page

1-25-96 * 5 ul Surg added

Bake

50 PPB = 20 ul @ 500 ug/mL Std → 200 mL, 5 ml Purged *

10 PPB = 40 50

5 PPB = 20 50

Blank = 5.0 mL H_2O *

iCV = 40 ul of 50 ug/mL Std → 200 mL DI, 5 mL purged *

1 1-24-96 TB = 5.0 mL *

2 GP56 = 0.5 mL + 4.5 mL H_2O * = 10x

3 GP57 = 0.250 mL + 4.75 ml H_2O * = 20x

Benzene off Scale - Bake out

Blank

4 GP58 = 0.25 mL + 4.75 ml H_2O * = 20x

Blank

5 GP59 = 0.10 mL + 4.9 mL H_2O* = 50x

6 GP59 = 5.0 mL *

7 GP60 = 0.5 mL + 4.5 mL H_2O* = 10x

0 GP61 = 0.5 mL + 4.5 mL H_2O * = 10x

GP61 = 5.0 mL * = 1x

10 GP62 = 0.5 mL + 4.5 mL H_2O * = 10x

CCV = 40 ul @ 50 ug/ml Std → 200 ml H_2O, 5 ml purged

1 GP62 = 5.0 ml *

2 GP63 = .5 mL + 4.5 ml H_2O * = 10x

3 GP63 = 5.0 mL *

4 GP64 = 5.0 mL *

CCV = 40 ul @ 50 ug/ml → 200 ml; 5 ml purged

Continued on Page

Read and Understood By

I [signature] 1-25-96

Signed Date Signed Date

PROJECT GC #2 Barrier Wall

Continued From Page

1-24-96 * 5 mL Slurry added

50 PPB = 20 µL @ 500 µg/mL STD → 200 mL H_2O, 5 mL purged

10 PPB = 40 µL @ 50 → 200 "

5 PPB = 20 → 50 → 200 "

ICB = 5 mL H_2O *

ICV = 40 µL @ 50 µg/mL STD → 200 mL H_2O, 5 mL purged

			PID
1	SB111H (3.5-5.5') - 5.0 g + 5 mL MeOH, 50 µL → 5 mL H_2O* = 100x		904
2	" - " , 100 µL → 5 mL H_2O* = ~~100~~ 50x		"
3	SB110 (7-9') - 5.0 g + 5 mL MeOH, 100 µL → 5 mL H_2O* = 50x		?
	Blank 5 mL H_2O*		
	Bake Column @ 135° for 25 min		
	Blank - 5 mL H_2O*		
4	SB110 (7-9') - 1.0 g + 10 mL MeOH, 100 µL → 10 mL, 20 µL → 5 mL H_2O* = 250,000x		
5	" " " 50 µL → 5 mL H_2O* = 100,000x		
6	SB111 (1-3') - 1.0 + 10 mL MeOH, 100 µL → 5 mL, 50 µL → 5 mL = 50,000		9,128
7	" " 10 µL → 5 mL* = 5,000		8
8	SB111 (7-9') - 1.0 g + 5 mL MeOH, 10 µL → 5 mL H_2O* = 2,500x		8,000
9	SB208 (11-13') - 1.0 g + 5 mL MeOH, 25 µL → 5 mL H_2O* = 1,000x		38
10	" " " , 100 µL → 5 mL H_2O* = 250x		"

10 PPB = 40 µL @ 50 µg/mL STD → 200 mL H_2O, 5 mL purged

Continued on Page

Read and Understood By

J Hunterfield — Signed

1-24-96 — Date

Signed

Date

OJECT GC # 1 - Upper Aquifer

Notebook No.

Continued From Page

1-26-96 * 5 ml Sang added

10 PPB CCV - 40 ml of 50 ug/mL Std → 200 mL H_2O - 5 mL purged

43	Blank =	5.0 mL H_2O *
:15	GP65 =	5.0 mL *
.45	TB02 =	5.0 ml *
9:17	FB02 =	5.0 ml *
9:57	GP66 =	5.0 ml *
10:27	GP67 =	5.0 mL *
11:28	GP68 =	5.0 mL *
11:59	GP69 =	5.0 mL *
12:30	GP68 Dup =	5.0 mL *
13:42	GP70 =	5.0 mL *
14:12	GP71 =	5.0 mL *
CCV		
	GPFB03 (1/26) =	5.0 mL *
CCV		

Continued on Page

Read and Understood By

[signature] 1-26-96

Signed Date Signed Date

PROJECT BARRIER WALL

Continued From Page

1-25-96 * Std Surrog added

Bake

5 PPB = 20 ul, 50 ug/mL Std → 200 mL H_2O, 5 mL Purged

10 PPB = 40 50 200 5

50 PPB = 20 500 200 5

ICB = 5.0 mL H_2O *

PC locked up - rebooted system

ICV = 40 ul @ 50 ug/mL → 200 mL H_2O, 5 mL Purged

Run last - PID did not relight - poor contact. Tightened

ICV → 50 ul @ 50 ug/mL → 200 mL H_2O, 5 mL Purged

#	Sample		Prep		Dilution	PID
	[illegible] (6-8') Frozen					
1	SB208 (23.5-25.5')	-	5.0g → 5 mL MeOH, 50 ul → 5 mL H_2O *	=	100 x	830
2	"	-	" , 100 ul → 5 mL H_2O *	=	50 x	"
3	SB209 (16-18')	-	5.0g → 5 mL MeOH, 100 ul → 5 mL H_2O *	=	50 x	149
4	SB209 (18.5-20.5')	-	5.0g → 5 mL MeOH, 100 ul → 5 mL H_2O *	=	50 x	150
5	SB210 (16-18')	-	5.0g → 5 mL MeOH, 100 ul → 5 mL H_2O *	=	50 x	283
6	SB210 (18.5-20.5')	-	5.0g → 5 mL MeOH, 100 ul → 5 mL H_2O *	=	50 x	480
7	SB210 (18.5-20.5') Dup	-	5.0g → 5 mL MeOH, 100 ul → 5 mL H_2O *	=	50 x	
8	SB116 (6-8')	-	5.0g → 5 mL MeOH, 100 ul → 5 mL H_2O *	=	50 x	?
9	SB116 (1-3')	-	5.0g → 5 mL MeOH, 20 ul → 5 mL H_2O *	=	250 x	?
10	SB115 (3.5-5.5')	-	5.0g → 5 mL MeOH, 100 ul → 5 mL H_2O *	=	50 x	?

CCV = 40 ul @ 50 ug/mL → 200 mL H_2O, 5 mL Purged

Repeat - baseline on PID not stable after last sample

#	Sample		Prep		Dilution	PID
1	SB117 (16-18')	-	5.0g → 5 mL MeOH, 100 ul → 5 mL H_2O *	=	50 x	23[illegible]
2	SB118 (3.5-5.5')	-	1.0g → 5 mL MeOH, 50 ul → 5 mL H_2O *	=	500 x	496
	Blank	-	5 mL H_2O *			
3	SB118 (3.5-5.5')	-	1.0g →(10) 10 mL, 5 ul →(1000) 5 mL H_2O *	=	10,000 x	
4	SB118 (6-8')	-	1.0g →(10) 10 mL, 5 ul →(1000) 5 mL H_2O *	=	10,000 x	8629
5	"	-	" (10) .5 mL →(10) 5 mL, 5 ul →(1000) 5 mL H_2O *	=	100,000 x	
6	SB205A (8.5-10.5')		5.0g → 5.0 mL MeOH, 100 ul → 5 mL H_2O *	=	50 x	50
7	SB205A (23.5-25.5')		5.0g → 5.0 mL MeOH, 100 ul → 5 mL H_2O *	=	50 x	160

CCV 40 ul @ 50 ug/mL → 200 mL, 5 mL purged

Continued on Page

Ⓐ 10:2 lmf

Read and Understood By

J Hutchinson 1-25-96
Signed Date

Signed Date

OJECT GC #2 BARRIER WALL

Continued From Page

1-26-96 * 5 ml Sing

Time 7:03 JM 10 PPB CCV - 40 µl of 50 ug/mL Std → 200 mL H_2O, 5 mL purged

				PID
	31	BLANK - 5.0 mL H_2O *		
1	7:54	SB211 (8.5-10.5') - 5.0g + 5 mL MeOH, 100 µl → 5 mL H_2O* = 50x		60
2	8:26	SB211 (18.5-20.5') - 5.0g + 5 mL MeOH, 100 µl → 5 mL H_2O* = 50x		233
3	8:59	SB119 (3.5-5.5') - 1.0g + 5 mL MeOH, 5.0 µl → 1000 5 mL H_2O* = 5000x		? 329
4	10:04	SB119 (3.5-5.5') - 1.0g + 5 mL MeOH, .5 mL → 10 5 mL MeOH, 5 µl → 1000 5 mL H_2O* = 50,000		
5	10:35	SB119 (6-8') - 1.0g + 10 mL MeOH, 100 µl → 100 10 mL MeOH, 50 µl → 100 5 mL H_2O = 100,000x		3219
6	11:18	SB120 (11-13') - 1.0g + 10 mL MeOH, .5 mL → 10 5 mL MeOH, 5 µl → 1000 5 mL H_2O* = 100,000x		1243
7	11:52	SB120 (11-13') - 1.0g + 10 mL MeOH, 50 µl → 5 mL H_2O* = 1,000x		
8	12:23	SB121 (6-8') - 1.0g + 10 mL MeOH, 50 µl → 5 mL H_2O* = 1,000x		1684
9	12:51	SB121 (6-8) Dup - 1.0g + 10 mL MeOH, 50 µl → 5 mL H_2O* = 1,000x		
	1:18-1:35	Bake Column		
10	1:37	SB121 (11-13') - 1.0g + 10 mL MeOH, 25 µl → 200 5 mL H_2O* = 2,000x		2367
	2:06 CCV	- 40 µl of 50 ug/mL Std → 200 mL H_2O, 5 mL purged		
1	14:42	SB122 (1-3') - 1.0g + 10 mL MeOH, 50 µl → 100 5 mL H_2O* = 1,000x		1319
2	15:16	SB123 (3-5') - 1.0g + 5 mL, 50 µl → 5 mL H_2O* = 500x		366
~~3~~		~~SB124 (11-13') - 1.0g + 5 mL, 25 µl → 5 mL H_2O* = 1000x~~	Not run yet.	~~512~~
3	15:51	SB123 (3-5') - 1.0g + 5 mL, 50 µl → 5 mL H_2O* = 5,000x		
		Bake		
4	16:28	SB124 (11-13') - 1.0g + 5 mL, ~~25~~ JAH 5.0 µl → 5 mL H_2O* = 5,000x		512
5	16:56	SB124 (11-13') - 1.0g + 5 mL, 100 µl → 5 mL H_2O* = 250x		"
6	17:25	SB212 (19-21') - 5.0g + 5 mL MeOH, 25 µl → 5 mL H_2O* = 200x		726
7	18:00	SB212 (23-25') - 5.0g + 5 mL MeOH, 100 µl → 5 mL H_2O* = 50x		1788
8	18:30	SB213 (21-23') - 5.0g + 5 mL MeOH, 100 µl → 5 mL H_2O* = 50x		190
9	19:00	SB213 (26-28') - 5.0g + 5 mL MeOH, 00 µl → 5 mL H_2O* = 50x		199
	19:29 CCV	40 µl of 50 ug/mL Std → 200 mL H_2O, 5 mL purged		

Continued on Page

Read and Understood By

J Hunterhal — Signed

1-26-96 — Date

Signed

Date

INTERMEDIATE STANDARD PREPARATION

1.0 mL Custom Mix Ampule Lot # 55368 (5000 µg/mL)
1.0 mL Custom Mix Ampule Lot # 55369
1.0 mL Custom Mix Ampule Lot # 55370
→ 10 mL MeOH = 500 µg/mL

WORKING STANDARD PREPARATION

1.0 mL @ 500 µg/mL ACS Mix
250 µL @ 2000 µg/mL Kodak TFT (Lot # ZA-48820)
250 µL @ 2000 µg/mL 1,4DCBA (Lot # ZA-53870)
→ 10 mL MeOH = 50 µg/mL Target Mix
mof 1/29/96

50 mL @ 2000 µg/mL Kodak TFT (Lot # ZA-48820)
50 mL @ 2000 µg/mL 1,4DCBA (Lot # ZA-53870)
→ 10 mL MeOH = 10 µg/mL Surr. Mix

DAILY STANDARD PREPARATION

20 mL @ 500 µg/mL → 200 mL H_2O = 50 µg/L
40 mL @ 50 µg/mL → 200 mL H_2O = 10 µg/L
20 mL @ 50 µg/mL → 200 mL H_2O = 5 µg/L

Continued on Page

Read and Understood By

Signed — Date — Signed — Date

1/29/96

JECT ACS FIELD GC 4077.0075

Continued From Page

Certificate of Analysis

ISO 9 REGISTI QSR-2

DESCRIPTION: alpha, alpha, alpha-Trifluorotoluene

CATALOG NO.: 4-8389 MFG DATE: APR-95

LOT NO.: LA-48820 EXPIRATION DATE: APR-96

SOLVENT: METHANOL

ANALYTE	PERCENT PURITY (1)	WEIGHT(2)	ANALYTICAL(3) CONCENTRATION		STD DEV	VENDOR LOT NO	SUPELCO LOT NO
A,A,A-TRIFLUOROTOLUENE	99.0	1999	1904	+/-	11	AX 0593	LA24026

SUPELCO, INC. • Supelco Park • Bellefonte, PA 16823-0048 USA • Phone (814) 359-3441

alpha, alpha, alpha-Trifluorotoluene
1 x 1ml
2000ug/ml in methanol

Cat no 4-8389
Storage-REFRIGERATE
Lot no-LA48820
Mfg Date APR-95
Exp date APR-96

FOR LABORATORY USE ONLY. NOT FOR DRUG, HOUSEHOLD OR OTHER USES.

DANGER-TOXIC-MAY BE FATAL IF SWALLOWED
DANGER-EXTREMELY FLAMMABLE
May cause headache, nausea, blindness.

(1) Determined by capillary GC-FID, unless otherwise noted.

(2) Quantity of analyte weighed into solution (ug/ml, +/- 0.5%). Weights of analytes less than 98% pure are corrected for impurities. Certified weights are not applicable to ampuls stored after opening.

(3) Determined by chromatographic analysis against an independantly prepared reference lot. Mean of triplicate injections.

NOTE:

Supelco warrants that its products conform to the information contained in this and other Supelco publications. Purchaser must determine the suitability of the product for its particular use. See the latest Supelco catalog or order invoice for additional terms and conditions of sale.

Kenneth J. Herwehe

Kenneth J. Herwehe
QUALITY CONTROL SUPERVISOR 1/29/96

SUPELCO
Supelco Park • Bellefonte, PA
16823-0048 USA • Phone (814) 359-3441

12025a

Certificate of Analysis

DESCRIPTION: 1,4-Dichlorobutane

CATALOG NO.: 4-8066 MFG DATE: OCT-95

LOT NO.: LA-53870 EXPIRATION DATE: JUL-97

SOLVENT: METHANOL

ANALYTE	PERCENT PURITY (1)	WEIGHT(2) ANALYTICAL(3) CONCENTRATION		STD DEV	VENDOR LOT NO	SUPELCO LOT NO
1,4-DICHLOROBUTANE	98.8 (a)	2000.0	2022.0	+/- 25.0	051967	LA39007

(1) Determined by capillary GC-FID, unless otherwise noted.
a) Packed GC-Hall

(2) Quantity of analyte weighed into solution (ug/ml, +/- 0.5%). Weights of analytes less than 98% pure are corrected for impurities. Certified weights are not applicable to ampuls stored after opening.

(3) Determined by chromatographic analysis against an independantly prepared reference lot. Mean of triplicate injections.

Kenneth J. Herwehe

Kenneth J. Herwehe
Quality Control Supervisor

Supelco warrants that its products conform to the information contained in this publication. Purchaser must determine the suitability of the product for its particular use. Please see the latest catalog or order invoice and packing slip for additional terms and conditions of sale.

SUPELCO
Supelco Park • Bellefonte, PA
16823-0048 USA • Phone (814) 359-3441

Signed _____ 11/29/96 Date

Signed _____ Date

JECT ACS Field GC 4077.0075 Continued From Page

GC # II + UPPER AQUIFER

TIME	SAMPLE	SAMPLE PREPARATION	DILUTION FACTOR	PID READING
3:08	10 ug/L	40ml @ 50 ug/mL → 200mL H_2O	1	
13:43	5 ug/L	20 ml @ 50 ug/mL → 200mL H_2O	1	
14:57	50 ug/L	20ml @ 500 ug/mL → 200mL H_2O	1	
15:37	BLANK	5.0ml @ 10 ug/mL SURR	1	
16:11	10 ug/L CCV	40ml @ 50 ug/mL → 200mL H_2O	1	
16:54	GP74	5.0mL + 5.0ml @ 10 ug/mL SURR	1	
17:32	GA73	5.0mL + 5.0ml @ 10 ug/mL SURR	1	
18:07	GP-1/26/96 TB	5.0mL + 5.0ml @ 10 ug/mL SURR	1	
18:40	GP 1-29-96 FB	5.0mL + 5.0ml @ 10 ug/mL SURR	1	
19:17	GP75	5.0mL + 5.0ml @ 10 ug/mL SURR	1	
19:46	GP-1/29/96 FB RE	5.0mL SAMPLE + 5.0ml @ 10 ug/mL SURR	1	
20:49	GP 75	5.0mL SAMPLE + 5.0ml @ 10 ug/mL SURR	1	
20:18	GP 1/29/96 FB	5.0mL SAMPLE + 5.0ml @ 10 ug/mL SURR	1	
21:22	10 ug/L CCV	40ml @ 50 ug/mL → 200mL H_2O	1	

Continued on Page

Read and Understood By

Signed — Date 4/29/96 — Signed — Date

GC #2 - BARRIER WALL

TIME	SAMPLE	SAMPLE PREPARATION	DILUTION FACTOR	PID
12:26	50 ug/L	20 mL @ 500 ug/mL → 200 mL H_2O	1	
13:04	10 ug/L	40 mL @ 50 ug/mL → 200 mL H_2O	1	
13:41	5 ug/L	20 mL @ 50 ug/mL → 200 mL H_2O	1	
14:51	BLANK	100 mL MeOH + 5.0 mL @ 10 ug/mL SPIKE	50	
15:31	10 ug/L (CCV)	40 mL @ 50 ug/mL → 200 mL H_2O	1	
16:10	SB125 3.5-5.5'	1.0 g → 5.0 mL MeOH; 10 uL EXTRACT	2500	>2000
16:51	SB125 3.5-5.5'	1.0 g → 5.0 mL MeOH; 1.0 mL → 10 mL MeOH; 10 uL EXTRACT	25,000	>2000
17:33	SB125 6-8'	1.0 g → 10 mL MeOH; 1.0 mL → 10 mL MeOH; 100 uL EXTRACT	5000	>2000
18:10	SB125 6-8'	1.0 g → 10 mL MeOH; 1.0 mL → 10 mL MeOH; 20 uL EXTRACT	25,000	>2000
18:47	SB214 16-18'	1.0 g → 5 mL MeOH; 2 uL EXTRACT	1000	480
19:26	SB214 21-23'	1.0 g → 5 mL MeOH; 50 uL EXTRACT	500	552
20:03	SB214 11-13'	5.0 g → 5.0 mL MeOH; 20 uL EXTRACT	250	480
20:39	SB126 11-13'	1.0 g → 5.0 mL MeOH; 100 uL EXTRACT	250	662
21:16	10 ug/L (CCV)	40 mL @ 50 ug/mL → 200 mL	1	

Continued on Page

Read and Understood By

Signed _____ Date 1/24/96 Signed _____ Date _____

JECT ACS FIELD GC A077.0075 Continued From Page

GC# 1 - UPPER AQUIFER 1-30-96

TIME	SAMPLE	SAMPLE PREPARATION	DILUTION FACTOR
7:37	50 µg/L	20 mL @ 500 µg/mL + 25 mL @ 10 µg/mL SURR	1
8:10	10 µg/L	40 mL @ 50 µg/mL → 200 mL H_2O	1
9:04	5 µg/L	20 mL @ 50 µg/mL → 200 mL H_2O	1
9:36	BLANK (ICB)	5.0 mL H_2O + 5.0 mL @ 10 µg/mL SURR	1
10:11	10 µg/L (ICV)	40 mL @ 50 µg/mL → 200 mL H_2O	1
10:45	GP76	5.0 mL SAMPLE + 5.0 mL @ 10 µg/mL SURR	1
11:17	GP77	5.0 mL SAMPLE + 5.0 mL @ 10 µg/mL SURR	1
12:24	GP 1/26/96 TB	5.0 mL SAMPLE + 5.0 mL @ 10 µg/mL SURR	1
14:07	10 µg/L (CCV)	40 mL @ 50 µg/mL → 200 mL H_2O	1

Continued on Page

Read and Understood By

Signed 1/30/96 Signed

Date Date

ROJECT ACS FIELD GC 4077.0075

Notebook No.

Continued From Page

GC #2 BARRIER WALL

TIME	SAMPLE	SAMPLE PREPARATION	DILUTION FACTOR	PID
7:40	10 µg/L (CCV)	40 µl of 50 µg/mL → 200 mL H_2O	1	—
8:16	BLANK (CCB)	100 µl MeOH + 5.0 µl of 10 µg/mL SURR	50	—
9:03	SB126 11-13'	1.0 g Soil → 5.0 mL MeOH; 25 µl EXTRACT	1000	662
9:40	SB126 3.5-5.5'	1.0 g Soil → 5.0 mL MeOH; 25 µl EXTRACT	1000	604
10:18	SB215 17-19'	1.0 g Soil → 5.0 mL MeOH; 10 µl EXTRACT	2500	780
10:54	SB215 19-21'	1.0 g Soil → 5.0 mL MeOH; 50 µl EXTRACT	500	897
11:31	SB216 13.5-15.5'	5.0 g Soil → 5.0 mL MeOH; 100 µl EXTRACT	50	4200
12:12	SB215 19-21'	5.0 g Soil → 5.0 mL MeOH; 100 µl EXTRACT	50	897
12:49	SB216 13.5-15.5'	5.0 g Soil → 5.0 mL MeOH; 20 µl EXTRACT	250	4200
13:26	SB217 7-9'	1.0 g Soil → 5.0 mL MeOH; 50 µl EXTRACT	500	800
14:04	SB217 7-9'	1.0 g Soil → 5.0 mL MeOH; 10 µl EXTRACT	2500	800
14:41	SB217 13-15'	1.0 g Soil → 5.0 mL MeOH; 10 µl EXTRACT	2500	2680
15:18	10 µg/L (CCV)	40 µl of 50 µg/mL → 200 mL H_2O	1	—
15:56	SB217 13-15'	1.0 g Soil → 5.0 mL MeOH; 50 µl EXTRACT	500	2680
16:33	SB127 8.5-10.5'	1.0 g Soil → 5.0 mL MeOH; 1.0 mL → 10 mL MeOH; 10 µl EXTRACT	25,000	1300
17:11	SB127 8.5-10.5'	1.0 g Soil → 5.0 mL MeOH; 1.0 mL → 10 mL MeOH; 25 µl EXTRACT	10,000	1300
17:48	SB128 6-8'	1.0 g Soil → 5.0 mL MeOH; 1.0 mL → 10 mL MeOH; 25 µl EXTRACT	10,000	2000
18:26	SB128 6-8'	1.0 g Soil → 5.0 mL MeOH; 1.0 mL → 10 mL MeOH; 10 µl EXTRACT	25,000	2000
19:03	SB129 11-13'	1.0 g Soil → 5.0 mL MeOH; 1.0 mL → 10 mL MeOH; 25 µl EXTRACT	10,000	926
19:40	SB129 11-13'	1.0 g Soil → 5.0 mL MeOH; 25 µl EXTRACT	1000	926
20:18	SB130 6-8'	1.0 g Soil → 5.0 mL MeOH; 25 µl EXTRACT	1000	620
20:55	SB130 6-8'	1.0 g Soil → 5.0 mL MeOH; 10 µl EXTRACT	2500	620
	10 µg/L (CCV)	40 µl of 50 µg/mL → 200 mL H_2O	1	—

Continued on Page

Read and Understood By

[signature] 1/30/96

Signed Date Signed Date

PROJECT ACS FIELD GC 4077.0075 Continued From Page

1-31-96

GC#1 - UPPER AQUIFER

TIME	SAMPLE	SAMPLE PREPARATION	DILUTION FACTOR
7:58	5 ug/L	20ul of 50 ug/mL → 200mL H_2O	1
8:35	10 ug/L	40ul of 50 ug/mL → 200mL H_2O	1
9:20	50 ug/L	20ul of 500 ug/mL + 25ul of 10 ug/mL SURR	1
9:52	BLANK	5.0mL H_2O + 5.0ul of 10 ug/mL SURR	1
10:25	10 ug/L (ICV)	40ul of 50 ug/mL → 200mL H_2O	1
11:05	GP 1-31-96 FB	5.0mL SAMPLE + 5.0ul of 10 ug/mL SURR	1
11:39	50 ug/L (REPEAT)	20ul of 500 ug/mL → 200mL H_2O + 25ul of 10 ug/mL SURR	1
12:17	10 ug/L (REPEAT)	40ul of 50 ug/mL → 200mL H_2O	1
12:50	5 ug/L (REPEAT)	20ul of 50 ug/mL → 200mL H_2O	1
13:40	BLANK (REPEAT)	5.0mL H_2O + 5.0ul of 10 ug/mL SURR	1
14:12	10 ug/L ICV (REPEAT)	40ul of 50 ug/mL → 200 mL H_2O	1
14:57	GP 1/31/96 FB	5.0mL SAMPLE + 5.0ul of 10 ug/mL SURR	1
15:31	GP 78	5.0mL SAMPLE + 5.0ul of 10 ug/mL SURR	1
16:05	GP 79	5.0mL SAMPLE + 5.0ul of 10 ug/mL SURR	1
16:41	GP 80	100ul SAMPLE → 4.9mL H_2O + 5.0ul of 10 ug/mL SURR	50
17:17	GP 80	20ul SAMPLE → 5.0mL H_2O + 5.0ul of 10 ug/mL SURR	250
17:51	GP 81	10ul SAMPLE → 5.0mL H_2O + 5.0ul of 10 ug/mL SURR	500
18:28	GP 82	5ul SAMPLE → 5.0mL H_2O + 5.0ul of 10 ug/mL SURR	1000
19:03	GP 82	20ul SAMPLE → 5.0mL H_2O + 5.0ul of 10 ug/mL SURR	250
19:37	GP 81	25ul SAMPLE → 5.0mL H_2O + 5.0ul of 10 ug/mL SURR	200
20:13	~~GP 1/31/96 TB~~ GP83 NOP	5.0mL SAMPLE → + 5.0ul of 10 ug/mL SURR	1
20:50	GP 1/31/96 TB	5.0mL SAMPLE → 5.0ul of 10 ug/mL SURR	1
21:23	10 ug/L (CCV)	40ul of 50 ug/mL → 200mL H_2O	1
21:55	5 ug/L (DLV)	20ul of 50 ug/mL → 200mL H_2O	1
22:27	50 ug/L	20ul of 500 ug/mL → 200mL H_2O ; ~~5.0mL SOD + 25ul NOP~~	1

Continued on Page

Read and Understood By

[signature] 1/31/96

Signed Date Signed Date

PROJECT ACS FIELD GC 4077.0075 Notebook No.: _____ Continued From Page _____

GC #2: BARRIER WALL

TIME	SAMPLE		SAMPLE PREPARATION	DILUTION FACTOR	PID
7:51	10 ug/L (CCV)		40 mL of 50 ug/mL → 200 mL H_2O	1	—
8:29	BLANK (CCB)		100 mL Milli-Q H_2O + 5.0 mL of 10 ug/mL STD	50	—
9:09	SB130	16-18'	1.0 g SOIL → 5.0 mL MeOH; 10 uL EXTRACT	2500	1000
9:46	SB130	16-18'	1.0 g SOIL → 5.0 mL MeOH; 25 uL EXTRACT	1000	1000
10:23	SB218	3.5-5.5'	1.0 g SOIL → 5.0 mL MeOH; 25 uL EXTRACT	1000	2358
11:09	SB218	3.5-5.5'	5.0 g SOIL → 5.0 mL MeOH; 100 uL EXTRACT	50	2358
11:47	SB218	5.5-10.5'	5.0 g SOIL → 5.0 mL MeOH; 10 uL EXTRACT	50	3662
12:25	SB218	5.5-10.5'	5.0 g SOIL → 5.0 mL MeOH; 20 uL EXTRACT	250	3662
13:05	SB219	8.5-10.5'	1.0 g SOIL → 5.0 mL MeOH; 25 uL EXTRACT	1000	388
13:48	SB219	3.5-5.5'	1.0 g SOIL → 5.0 mL MeOH; 10 uL EXTRACT	2500	503
14:34	SB219	3.5-5.5'	1.0 g SOIL → 5.0 mL MeOH; 100 uL EXTRACT	250	503
16:24	SB220	8.5-10.5'	5.0 g SOIL → 5.0 mL MeOH; 100 uL EXTRACT	50	246
17:02	10 ug/L (CCV)		40 mL of 50 ug/mL → 200 mL H_2O	1	—
17:39	SB220	11-13'	5.0 g SOIL → 5.0 mL MeOH; 20 uL EXTRACT	250	1862
18:15	SB221	9-11'	1.0 g SOIL → 5.0 mL MeOH; 25 uL EXTRACT	1000	3105
18:54	SB221	11-13'	1.0 g SOIL → 5.0 mL MeOH; 25 uL EXTRACT	1000	1388
19:31	SB221	11-13'	1.0 g SOIL → 5.0 mL MeOH; 100 uL EXTRACT	250	1388
20:07	SB222	13.5-15.5'	1.0 g SOIL → 5.0 mL MeOH; 25 uL EXTRACT	1000	3015
20:45	SB222	13.5-15.5'	1.0 g SOIL → 5.0 mL MeOH; 100 uL EXTRACT	250	3015
21:24	SB131	13.5-15.5'	5.0 g SOIL → 5.0 mL MeOH; 100 uL EXTRACT	50	140
22:02	10 ug/L (CCV)		40 mL of 50 ug/mL → 200 mL H_2O	1	—
22:39	5 ug/L (DCV)		20 mL of 50 ug/mL → 200 mL H_2O	1	—

NOTE: POWER FAILURE @ 15:45

Continued on Page

Read and Understood By

Signed _____ Date 6/30/96 Signed _____ Date _____

JECT ACS FIELD GC 4077.0075 Continued From Page

2-1-96

GC #1: UPPER AQUIFER

TIME	SAMPLE	SAMPLE PREPARATION	DILUTION FACTOR
7:58	5 ug/L	20 ul of 50 ug/mL → 200 mL H_2O	1
8:32	10 ug/L	40 ul of 50 ug/mL → 200 mL H_2O	1
9:06	50 ug/L	20 ul of 500 ug/mL → 200 mL H_2O + 25 ul of 10 ug/mL SURR	1
9:41	BLANK	5.0 mL H_2O + 5.0 ul of 10 ug/mL SURR	1
10:15	10 ug/L (ICV)	40 ul of 50 ug/mL → 200 mL H_2O	1
10:55	GP8A	5.0 mL SAMPLE + 5.0 ul of 10 ug/mL SURR	1
11:36	GP83	5.0 mL SAMPLE + 5.0 ul of 10 ug/mL SURR	1
12:38	WATER SUPPLY	5.0 mL SAMPLE + 5.0 ul of 10 ug/mL SURR	1
13:17	GP86	5.0 mL SAMPLE + 5.0 ul of 10 ug/mL SURR	1
13:5	GP85	500 ul SAMPLE → 4.5 mL H_2O + 5.0 ul of 10 ug/mL SURR	10
14:29	GP85	5.0 mL SAMPLE → + 5.0 ul of 10 ug/mL SURR	1
15:07	GP 2/1/96 FB	5.0 mL SAMPLE + 5.0 ul of 10 ug/mL SURR	1
15:45	GP85 LAB DUP	5.0 mL SAMPLE + 5.0 ul of 10 ug/mL SURR	1
16:22	GP87	500 ul SAMPLE → 4.5 mL H_2O + 5.0 ul of 10 ug/mL SURR	10
17:03	GP88	5.0 mL SAMPLE + 5.0 ul of 10 ug/mL SURR	1
17:44	10 ug/L (CCV)	40 ul of 50 ug/mL → 200 mL H_2O	1

Continued on Page

Read and Understood By

Signed 2/1/96 Signed

Date Date

OJECT ACS Field GC 4077.0075 Notebook No. _____

Continued From Page _____

GC #2: BARRIER WALL

TIME	SAMPLE	SAMPLE PREPARATION	DILUTION FACTOR	PID
7:18	10 ug/L (CCV)	40 ml of 50 ug/ml → 200 ml H_2O	1	—
8:00	BLANK (CCB)	5.0 ml H_2O + 100 ul MeOH + 5.0 ul of 10 ug/ml SURR	50	—
8:37	SB13	13.5-15.5'	5.0 g Soil → 5.0 ml MeOH; 20 ul EXTRACT	250	140
9:20	SB132	11-13'	5.0 g Soil → 5.0 ml MeOH; 100 ul EXTRACT	50	160
9:59	SB132	11-13'	5.0 g Soil → 5.0 ml MeOH; 20 ul EXTRACT	250	160
10:42	BAKE	BAKEOUT	—	—	—
11:08	SB132	11-13'	5.0 g Soil → 5.0 ml MeOH; 20 ul EXTRACT	250	160
11:53	SB133	11-13'	5.0 g Soil → 5.0 ml MeOH; 20 ul EXTRACT	250	600
12:30	SB133	11-13'	1.0 g Soil → 5.0 ml MeOH; 25 ul EXTRACT	1000	600
13:10	SB133	16-18'	1.0 g Soil → 5.0 ml MeOH; 25 ul EXTRACT	1000	1000
13:54	SB133	11-13' WATER	1.0 g Soil → 5.0 ml MeOH; 25 ul EXTRACT	1000	600
14:36	SB135	9-11'	1.0 g Soil → 5.0 ml MeOH; 25 ul EXTRACT	1000	330
15:18	SB135	9-11'	1.0 g Soil → 5.0 ml MeOH; 100 ul EXTRACT	250	330
15:58	10 ug/L (CCV)	40 ml H_2O 50 ug/ml → 200 ml H_2O	1	—
16:37	SB135	5-7'	1.0 g Soil → 5.0 ml MeOH; 100 ul EXTRACT	2500	70
17:11	SB135	5-7'	5.0 g Soil → 5.0 ml MeOH; 100 ul EXTRACT	50	70
17:48	10 ug/L (CCV)	40 ml of 50 ug/ml → 200 ml H_2O	1	—

Continued on Page

Read and Understood By

Signed _____ Date 2/1/96

Signed _____ Date _____

OJECT ACS FIELD GC 4077.0075

Continued From Page

GC #1: UPPER AQUIFER

TIME	SAMPLE	SAMPLE PREPARATION	DILUTION FACTOR
7:58	10 µg/L (CCV)	40 ml of 50 µg/mL → 200 mL H_2O (5.0 mL PURGE)	1
8:39	BLANK (CCB)	5.0 mL H_2O + 5.0 ml of 10 µg/mL SURR	1
NOP	~~SB134 14 21'~~	~~1.0 g Soil → 5.0 mL MeOH; 10 ml EXTRACT~~	~~2500~~
9:17	GP 2/1/96 TB	5.0 mL SAMPLE + 5.0 ml of 10 µg/mL SURR	1
9:56	GP 87	200 ml of SAMPLE → 5.0 mL H_2O + 5.0 µg/mL SURR	25
10:31	GP 88	1.0 mL SAMPLE → 4.0 mL H_2O + 5.0 ml of 10 µg/mL SURR	5
11:07	GP 88 LAB DUP	100 mL SAMPLE → 5.0 mL H_2O + 5.0 ml of 10 µg/mL SURR	25
11:43	10 µg/L (CCV)	40 ml of 50 µg/mL → 200 mL H_2O (5 mL PURGE)	1

Continued on Page

Read and Understood By

[signature] 2/2/96

Signed Date Signed Date

OJECT ACS Field GC 4077.0075

Notebook No. _____

Continued From Page _____

GC #2 - Barrier Wall Soils

Time	Sample	Sample Preparation	Dilution Factor	PID
7:23	10 mg/L (ccv)	40 uL of 50 mg/mL → 200 mL H_2O	5 mL Purge	1	—
8:02	BLANK (CCB)	4.9 mL H_2O + 100 uL MeOH + 5.0 uL of 10 mg/mL Surr	50	—
9:42	SB134 19-21'	1.0 g Soil → 5.0 mL MeOH; 10 uL extract	500	?
10:24	SB134 19-21'	1.0 g Soil → 5.0 mL MeOH; 1.0 mL → 10 mL MeOH; 10 uL extract	25,000	?
11:02	SB134 19-21' (LAB DUP)	1.0 g Soil → 5.0 mL MeOH; 1.0 mL → 10 mL MeOH; 10 uL extract	25,000	
11:41	10 ug/L (ccv)	40 uL of 50 mg/mL → 200 mL H_2O	5 mL Purge	—	—

Continued on Page

Read and Understood By

2/2/96

Signed Date Signed Date

INTERMEDIATE STANDARD PREPARATION -

1.0mL CUSTOM MIX AMPULE Lot # 55368 (5000 µg/mL)
1.0mL CUSTOM MIX AMPULE Lot # 55369
1.0mL CUSTOM MIX AMPULE Lot # 55370
→ 10mL MeOH = 500 µg/mL

WORKING STANDARD PREPARATION -

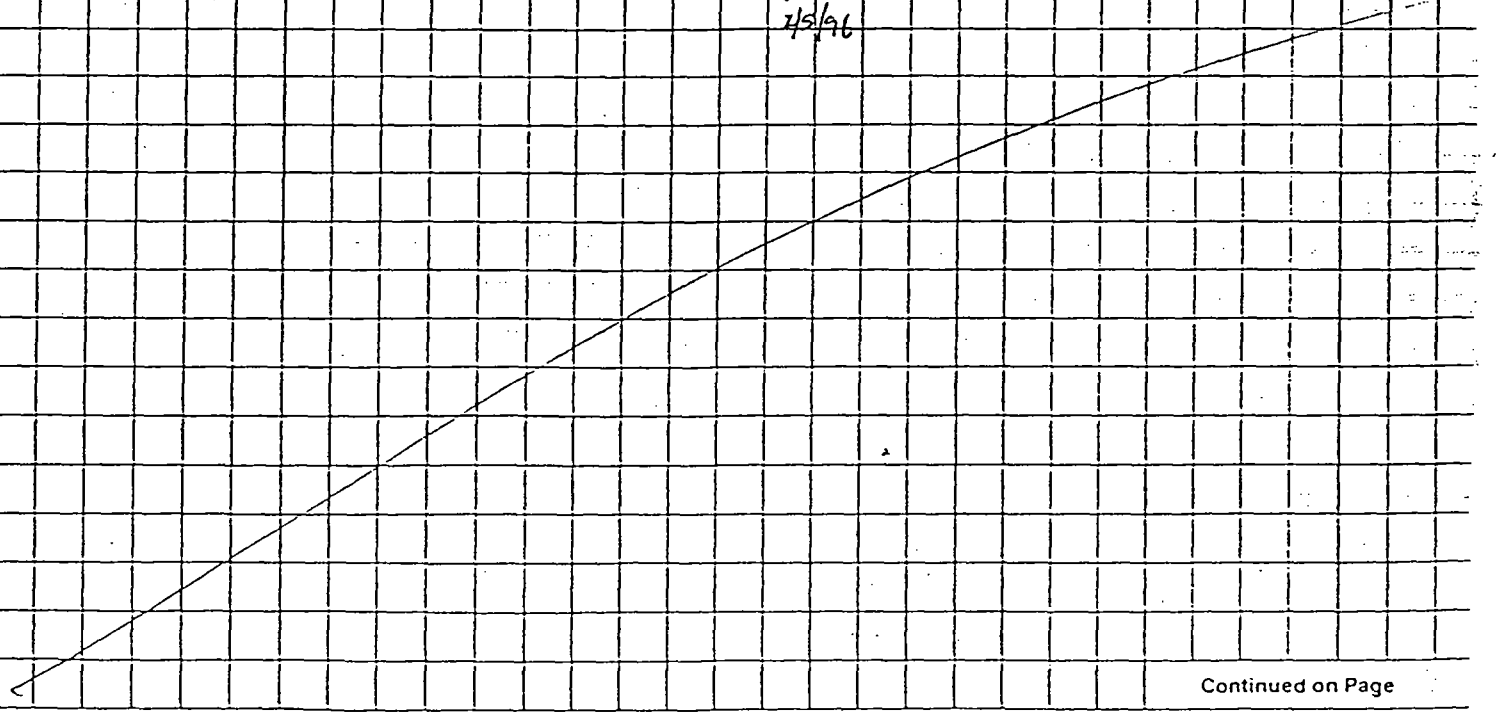
10mL of 500 µg/mL ACS MIX
250 µL of 2000 µg/mL α-α-TFT Lot # LA 48820
250 µL of 2000 µg/mL 1,4-DCBA Lot # LA 53870
→ 10mL MeOH = 50 µg/mL

50 µL of 2000 µg/mL α-α-TFT (Lot # LA-48820)
50 µL of 2000 µg/mL 1,4-DCBA (Lot # LA-53870)
→ 10mL MeOH 10 µg/mL Surr

DAILY STANDARD PREPARATION -

20 µL of 500 µg/mL → 200 mL H2O = 50 µg/L
40 µL of 50 µg/mL → 200 mL H2O = 10 µg/L
20 µL of 50 µg/mL → 200 mL H2O = 5 µg/L

WDP 2/5/96



Continued on Page

Read and Understood By

WDP 2/5/96

Signed Date Signed Date

PROJECT ACS FIELD GC 4077.0075 Notebook No. _____

Continued From Page _____

2-5-96

GC #1 UPPER AQUIFER

TIME	SAMPLE	SAMPLE PREPARATION	DILUTION FACTOR
11:56	5 ug/L	20 ml @ 50 ug/ml → 200 ml H_2O (5 ml purge)	1
12:33	10 ug/L	40 ml @ 50 ug/ml → 200 ml H_2O (5 ml purge)	1
13:15	50 ug/L	20 ml @ 500 ug/ml → 200 ml H_2O; 5 ml purge + 25 ml @ 10 ug/ml surr	1
13:53	BLANK	5.0 ml H_2O + 5.0 ml @ 10 ug/ml surr	1
14:34	10 ug/L (ICV)	40 ml @ 50 ug/ml → 200 ml H_2O (5 ml purge)	1
15:13	GP 89	200 ml sample → 4.8 ml H_2O + 5.0 ml @ 10 ug/ml surr	25
	BAKEOUT		
16:24	GP 89	50 ml sample → 5.0 ml H_2O + 5.0 ml @ 10 ug/ml surr	100
17:01	GP 2/5/96 FB	5.0 ml sample + 5.0 ml @ 10 ug/ml surr	1
17:37	GP 2/5/96 TB	5.0 ml sample + 5.0 ml @ 10 ug/ml surr	1
18:14	GP 90	200 ml sample → 4.8 ml H_2O + 5.0 ml @ 10 ug/ml surr	25
	BAKEOUT		
19:28	GP 90	1.0 ml sample → 45 ml H_2O; 5 ml → 45 ml + 5.0 ml @ 10 ug/ml surr	250
20:00	GP 90	1.0 ml sample → 100 ml H_2O; 50 ml → 45 ml + 5.0 ml @ 10 ug/ml surr	1000
20:36	10 ug/L (CCV)	40 ml @ 50 ug/ml → 200 ml (5.0 ml purge)	
21:12	5 ug/L (DLV)	20 ml @ 50 ug/ml → 200 ml (5.0 ml purge)	
21:47	50 ug/L	20 ml @ 500 ug/ml → 200 ml (5.0 ml purge)	

Continued on Page

Read and Understood By

Signed _____ Date 2/9/96

Signed _____ Date _____

OJECT ACS FIELD GC 4077.0045 Continued From Page

GC #2: BARRIER WALL (SOILS)

TIME	SAMPLE	SAMPLE PREPARATION	DILUTION FACTOR	PID
12:02	5 ug/L	20 uL @ 50 ug/mL → 200 mL H_2O (5 mL Purge)		
12:39	10 ug/L	PURGE TUBE NOT ON AT STARTOF RUN → REPEAT		
13:19	10 ug/L	40 uL @ 50 ug/mL → 200 mL H_2O, (5 mL Purge)		
13:59	50 ug/L	20 uL @ 500 ug/mL → 200 mL H_2O + 25 mL @ 10 ug/mL Surr		
14:40	BLANK	4.9 mL H_2O + 100 uL MeOH + 50 uL @ 10 ug/mL Surr	50	
15:18	10 ug/L (ICV)	40 uL @ 50 ug/mL → 200 mL H_2O (5 mL Purge)		
15:57	SB136 17-19	1.0 g Soil → 5.0 mL MeOH; 10 uL EXTRACT	2500	1012
16:35	SB138 3.5-5.5'	1.0 g Soil → 5.0 mL MeOH; 1 mL → 10 mL MeOH; 25 mL EXTRACT	10,000	519
17:13	SB138 3.5-5.5'	1.0 g Soil → 5.0 mL MeOH; 50 uL EXTRACT	500	519
18:07	SB138 3.5-5.5'	1.0 g Soil → 5.0 mL MeOH; 50 uL EXTRACT (REPEAT)	500	519
18:56	SB139 16-18'	5.0 g Soil → 5.0 mL MeOH; 10 uL EXTRACT	50	500
19:35	SB139 16-18'	5.0 g Soil → 5.0 mL MeOH; 10 uL EXTRACT	500	500
20:13	SB139 16-18' LAB DUP	5.0 g Soil → 5.0 mL MeOH; 10 uL EXTRACT	500	500
20:53	10 ug/L (CCV)	40 uL @ 50 ug/mL → 200 mL H_2O (5 mL Purge)		
21:29	5 ug/L (DCV)	20 uL @ 50 ug/mL → 200 mL H_2O (5 mL Purge)		

Continued on Page

Read and Understood By

Signed — Date — Signed — Date

2/9/96

OJECT ACS FIELD GC 4077.0075 Notebook No. _____

Continued From Page _____

2-6-96

GC #1: UPPER AQUIFER

TIME	SAMPLE	SAMPLE PREPARATION	DILUTION FACTOR
7:40	5 ug/L	20 ml @ 50 ug/ml → 200 ml H_2O (5 mL PURGE)	—
8:25	10 ug/L	40 ml @ 50 ug/ml → 200 ml H_2O (5 mL PURGE)	—
9:04	50 ug/L	20 ml @ 500 ug/ml → 200 ml H_2O · 5.0 mL STD + 75 ml @ 10 ug/ml SURR	—
9:37	BLANK	5.0 ml H_2O + 5.0 ml @ 10 ug/ml SURR	—
10:15	10 ug/L (CCV)	40 ml @ 50 ug/ml → 200 ml H_2O (5 mL PURGE)	—
10:50	GP 2-6-96 FB	5.0 mL SAMPLE + 5.0 ml @ 10 ug/ml SURR	1
11:26	GP91	500 ml SAMPLE → 4.5 mL H_2O + 5.0 ml @ 10 ug/ml SURR	10
12:02	GP91	5.0 mL SAMPLE + 5.0 ml @ 10 ug/ml SURR	1
	BAKEOUT		
13:31	GP92	5.0 mL SAMPLE + 5.0 ml @ 10 ug/ml SURR	1
14:07	GP93	5.0 mL SAMPLE + 5.0 ml @ 10 ug/ml SURR	1
14:40	GP94	5.0 mL SAMPLE + 5.0 ml @ 10 ug/ml SURR	1
15:14	GP95	5.0 mL SAMPLE + 5.0 ml @ 10 ug/ml SURR	1
15:48	GP96	5.0 mL SAMPLE + 5.0 ml @ 10 ug/ml SURR	1
16:23	GP97	5.0 mL SAMPLE + 5.0 ml @ 10 ug/ml SURR	1
16:57	GP98	5.0 mL SAMPLE + 5.0 ml @ 10 ug/ml SURR	1
17:30	10 ug/L (CCV)	40 ml @ 50 ug/ml → 200 ml H_2O (5 mL PURGE)	—
18:04	5 ug/L (CCV)	20 ml @ 50 ug/ml → 200 ml H_2O (5 mL PURGE)	—

Continued on Page

Read and Understood By

Signed _____ Date 2/6/96

Signed _____ Date _____

OJECT ACS FIELD GC 4077.0075

Continued From Page

2-6-96

GC #2: BARRIER WALL

TIME	SAMPLE	SAMPLE PREPARATION	DILUTION FACTOR	PID
7:49	5 ug/L	20 ml of 50 ug/mL → 200 mL H_2O (5 mL PURGE)	—	—
8:26	10 ug/L	40 ml of 50 ug/mL → 200 mL H_2O (5 mL PURGE)	—	—
9:04	50 ug/L	20 ml of 500 ug/mL → 200 mL H_2O; 5.0 mL + 5.0 ml of 10 ug/mL SURR	—	—
9:44	BLANK	5.0 mL H_2O + 5.0 ml of 10 ug/mL SURR + 100 ml MeOH	50	—
10:23	10 ug/L (CCV)	40 ml of 50 ug/mL → 200 mL H_2O (5 mL PURGE)	—	—
11:02	SB141 3.5-5.5'	1.0 g SOIL → 5.0 mL MeOH; 25 ml EXTRACT	1000	2000
11:40	SB141 3.5-5.5'	5.0 g SOIL → 5.0 mL MeOH; 100 ml EXTRACT	50	2000
12:19	SB140 6-8'	5.0 g SOIL → 5.0 mL MeOH; 100 ml EXTRACT	50	10
13:02	SB142 6-8'	1.0 g SOIL → 5.0 mL MeOH; 1.0 mL → 10 mL MeOH; 10 ml EXTRACT	25,000	1534
13:44	SB142 6-8'	1.0 g SOIL → 5.0 mL MeOH; 1.0 mL → 10 mL MeOH; 5 ml EXTRACT	50,000	1534
14:23	SB142 6-8' LAB DUP	1.0 g SOIL → 5.0 mL MeOH; 1.0 mL → 10 mL MeOH; 5 ml EXTRACT	50,000	1534
15:06	10 ug/L (CCV)	40 ml of 50 ug/mL → 200 mL H_2O (5 mL PURGE)	—	—
15:50	5 ug/L (DLV)	20 ml of 50 ug/mL → 200 mL H_2O (5 mL PURGE)	—	—

Continued on Page

Read and Understood By

[signature] 2/6/96

Signed Date Signed Date

2-7-96

GC #1: UPPER AQUIFER

TIME	SAMPLE	SAMPLE PREPARATION	DILUTION FACTOR
7:51	5 ug/L	20 ul of 50 ug/mL → 200 mL H_2O (5 mL Pulled)	
8:28	10 ug/L	40 ul of 50 ug/mL → 200 mL H_2O (5 mL Pulled)	
9:21	50 ug/L	20 ul of 500 ug/mL → 200 mL H_2O + 5.0 mL + 25 ul of 10 ug/mL Stock	
9:57	BLANK	5.0 mL H_2O + 5.0 mL of 10 ug/mL Surr	
10:36	10 ug/L (CCV)	40 ul of 50 ug/mL → 200 mL H_2O (5 mL Pulled)	
11:13	GP 7/6/96 TB	5.0 mL Sample + 5.0 ul of 10 ug/mL Surr	1
11:52	GP 99	5.0 mL Sample + 5.0 ul of 10 ug/mL Surr	1
12:26	GP 100	5.0 mL Sample + 5.0 ul of 10 ug/mL Surr	1
13:09	GP 101	5.0 mL Sample + 5.0 ul of 10 ug/mL Surr	1
13:46	GP 102	5.0 mL Sample + 5.0 ul of 10 ug/mL Surr	1
14:21	GP 103	5.0 mL Sample + 5.0 mL of 10 ug/mL Surr	1
14:58	GP 104	5.0 mL Sample + 5.0 ul of 10 ug/mL Surr	1
15:38	GP 99 LAB DUP	5.0 mL Sample + 5.0 ul of 10 ug/mL Surr	1
16:14	GP 7/6/96 TB (REPEAT)	5.0 mL Sample + 5.0 ul of 10 ug/mL Surr	1
16:51	GP 105	5.0 mL Sample + 5.0 ul of 10 ug/mL Surr	1
17:37	10 ug/L (CCV)	40 ul of 50 ug/mL → 200 mL H_2O (5 mL Pulled)	
18:13	GP 105	1.0 mL Sample → 4.0 mL H_2O + 5.0 ul of 10 ug/mL Surr	5
18:47	GP 106	5.0 mL Sample + 5.0 ul of 10 ug/mL Surr	1
19:26	GP 106	1.0 mL Sample → 4.0 mL H_2O + 10 ug/mL Surr	5
20:01	GP 107	5.0 mL Sample + 5.0 ul of 10 ug/mL Surr	1
	BLANK DUP		~~50~~ 10
21:03	GP 107	100 ul Sample → 4.9 mL H_2O + 5.0 ul of 10 ug/mL Surr	50
21:39	GP 117	20 ul Sample → 5.0 mL H_2O + 5.0 ul of 10 ug/mL Surr	250
22:13	10 ug/L (CCV)	40 ul of 50 ug/mL → 200 mL H_2O (5 mL Pulled)	

Continued on Page

Read and Understood By

Signed 2/7/96 Date

Signed Date

OJECT ACS Field GC 4077.0075 Continued From Page

GC #2: BARRIER WALL

TIME	SAMPLE	SAMPLE PREPARATION	DILUTION FACTOR	PID
7:57	5 ug/L	2 mL of 50 ug/mL → 200 mL H_2O (5 mL PURGE)	—	—
8:37	10 ug/L	4 mL of 50 ug/mL → 200 mL H_2O (5 mL PURGE)	—	—
9:22	50 ug/L	20 mL of 500 ug/mL → 200 mL H_2O; 5 mL + 5 mL to 10 mL SYR	—	—
10:03	BLANK	5.0 mL H_2O + 5.0 mL of 10 ug/mL SPIKE + 100 uL MeOH	—	—
10:42	10 ug/L (CCV)	40 mL of 50 ug/mL → 200 mL H_2O (5 mL PURGE)	—	—
11:23	SB143 6-8'	1.0 g SOIL → 5.0 mL H_2O (MeOH) 1.0 mL → 10 mL MeOH; 25 uL EXTRACT	10,000	1052
12:11	SB143 6-8'	1.0 g SOIL → 5.0 mL MeOH: 1.0 mL → 10 mL MeOH; 5 uL EXTRACT	50,000	1052
13:10	SB143 6-8' LAB DUP	1.0 g SOIL → 5.0 mL MeOH; 1.0 mL → 10 mL MeOH; 5 uL EXTRACT	50,000	1052
13:56	SB143 8.5-10.5'	1.0 g SOIL → 5.0 mL MeOH; 1.0 mL → 10 mL MeOH; 25 uL EXTRACT	10,000	994
14:38	SB143 8.5-10.5'	1.0 g SOIL → 5.0 mL MeOH; 100 uL EXTRACT + 50 ug/L to 10 mL SYR	250	994
15:20	SB143 6-8'	1.0 g SOIL → 5.0 mL MeOH; 1.0 mL → 10 mL MeOH; 1.0 mL → 10 mL MeOH; 10 uL	250,000	1052
16:01	SB144 8.5-10.5'	1.0 g SOIL → 5.0 mL MeOH; 10 uL EXTRACT + 5.0 mL 10 ug/mL SPIKE	2500	1867
16:43	SB144 8.5-10.5'	1.0 g SOIL → 5.0 mL MeOH 50 uL EXTRACT	500 ~~2500~~	1867
17:37	10 ug/L (CCV)	40 mL of 50 ug/mL → 200 mL H_2O (5 mL PURGE)	—	—
18:17	5 ug/L (OCV)	20 mL of 50 ug/mL → 200 mL H_2O (5 mL PURGE)	—	—

Continued on Page

Read and Understood By

Signed — Date 1/7/96 — Signed — Date

2-8-96

GC #1: UPPER AQUIFER

Time	Sample	Sample Preparation	Dilution Factor
7:21	10 ug/L (CCV)	40 ul of 50 ug/mL → 200 mL H_2O (5 mL Purge)	
8:01	BLANK (CCB)	5.0 mL H_2O + 5.0 ul of 10 ug/mL SURR	
8:41	GP-2 2/8/96 FB	5.0 mL SAMPLE + 5.0 ul of 10 ug/mL SURR	
9:18	GP-2 2/8/96 FB	5.0 mL SAMPLE + 5.0 ul of 10 ug/mL SURR	
9:55	GP-2 2/8/96 FB (RESURGE)	5.0 mL SAMPLE + 5.0 ul of 10 ug/mL SURR	
10:32	GP 108	5.0 mL SAMPLE + 5.0 ul of 10 ug/mL SURR	
11:09	GP 2/8/96 FB	5.0 mL SAMPLE + 5.0 ul of 10 ug/mL SURR	
12:04	GP 109	5.0 mL SAMPLE + 5.0 ul of 10 ug/mL SURR	
12:41	GP 110	5.0 mL SAMPLE + 5.0 ul of 10 ug/mL SURR	
13:18	GP 111	5.0 mL SAMPLE + 5.0 ul of 10 ug/mL SURR	
13:58	GP 112	5.0 mL SAMPLE + 5.0 ul of 10 ug/mL SURR	
14:21	GP 112	1.0 mL SAMPLE → 4.0 mL H_2O + 5.0 ul of 10 ug/mL SURR	5
15:13	10 ug/L (CCV)	40 ul of 50 ug/mL → 200 mL H_2O (5 mL Purge)	
15:55	GP 113	5.0 mL SAMPLE + 5.0 ul of 10 ug/mL SURR	
16:33	GP 114	5.0 mL SAMPLE + 5.0 ul of 10 ug/mL SURR	
17:13	GP 115	5.0 mL SAMPLE + 5.0 ul of 10 ug/mL SURR	
17:51	GP-4 2/8/96 TB	5.0 mL SAMPLE + 5.0 ul of 10 ug/mL SURR	
18:27	GP 116	5.0 mL SAMPLE + 5.0 ul of 10 ug/mL SURR	
	BAKEOUT	BAKEOUT	
19:31	GP 116	20 ul SAMPLE → 5.0 mL H_2O + 5.0 ul of 10 ug/mL SURR	250
20:08	10 ug/L (CCV)	40 ul of 50 ug/mL → 200 mL H_2O (5 mL Purge)	

Continued on Page

Read and Understood By

Signed _____ Date 2/8/96 Signed _____ Date _____

OJECT ACS FIELD GC 4077.0075

Continued From Page

GC #2: LOWER AQUIFER

TIME	SAMPLE	SAMPLE PREPARATION	DILUTION FACTOR
8:00	5 µg/L	20 ml of 50 µg/ml → 200 ml H_2O (5 ml PURGE)	—
8:41	10 µg/L	40 ml of 50 µg/ml → 200 ml H_2O (5 ml PURGE)	—
9:23	50 µg/L	20 ml of 500 µg/ml → 200 ml H_2O; 5 ml + 25 ml of 10 µg/ml SURR	—
10:02	BLANK (ICB)	5.0 ml H_2O + 5.0 ml of 10 µg/ml SURR	1
10:44	10 µg/L (ICV)	40 ml of 50 µg/ml → 200 ml H_2O (5 ml PURGE)	—
11:25	EQUIPMENT BLANK	5.0 ml SAMPLE + 5.0 ml of 10 µg/ml SURR	1
12:05	MW8 39' (VERT)	5.0 ml SAMPLE + 5.0 ml of 10 µg/ml SURR	1
12:43	MW8 49' (VERT)	5.0 ml SAMPLE + 5.0 ml of 10 µg/ml SURR	1
13:21	MW8 39' (VERT) LAB DUP	5.0 ml SAMPLE + 5.0 ml of 10 µg/ml SURR	1
14:03	GP 102 (REPEAT)	5.0 ml SAMPLE + 5.0 ml of 10 µg/ml SURR	1
15:56	MW8 59' (VERT)	5.0 ml SAMPLE + 5.0 ml of 10 µg/ml SURR	1
16:36	MW8 69' (VERT)	5.0 ml SAMPLE + 5.0 ml of 10 µg/ml SURR	1
17:18	MW8 79' (VERT)	5.0 ml SAMPLE + 5.0 ml of 10 µg/ml SURR	1
17:57	10 µg/L (CCV)	40 ml of 50 µg/ml → 200 ml H_2O (5 ml PURGE)	—
18:36	5 µg/L (DLV)	20 ml of 50 µg/ml → 200 ml H_2O (5 ml PURGE)	—

VERT = VERTICAL PROFILE SAMPLE

Continued on Page

Read and Understood By

[signature] 2/8/96

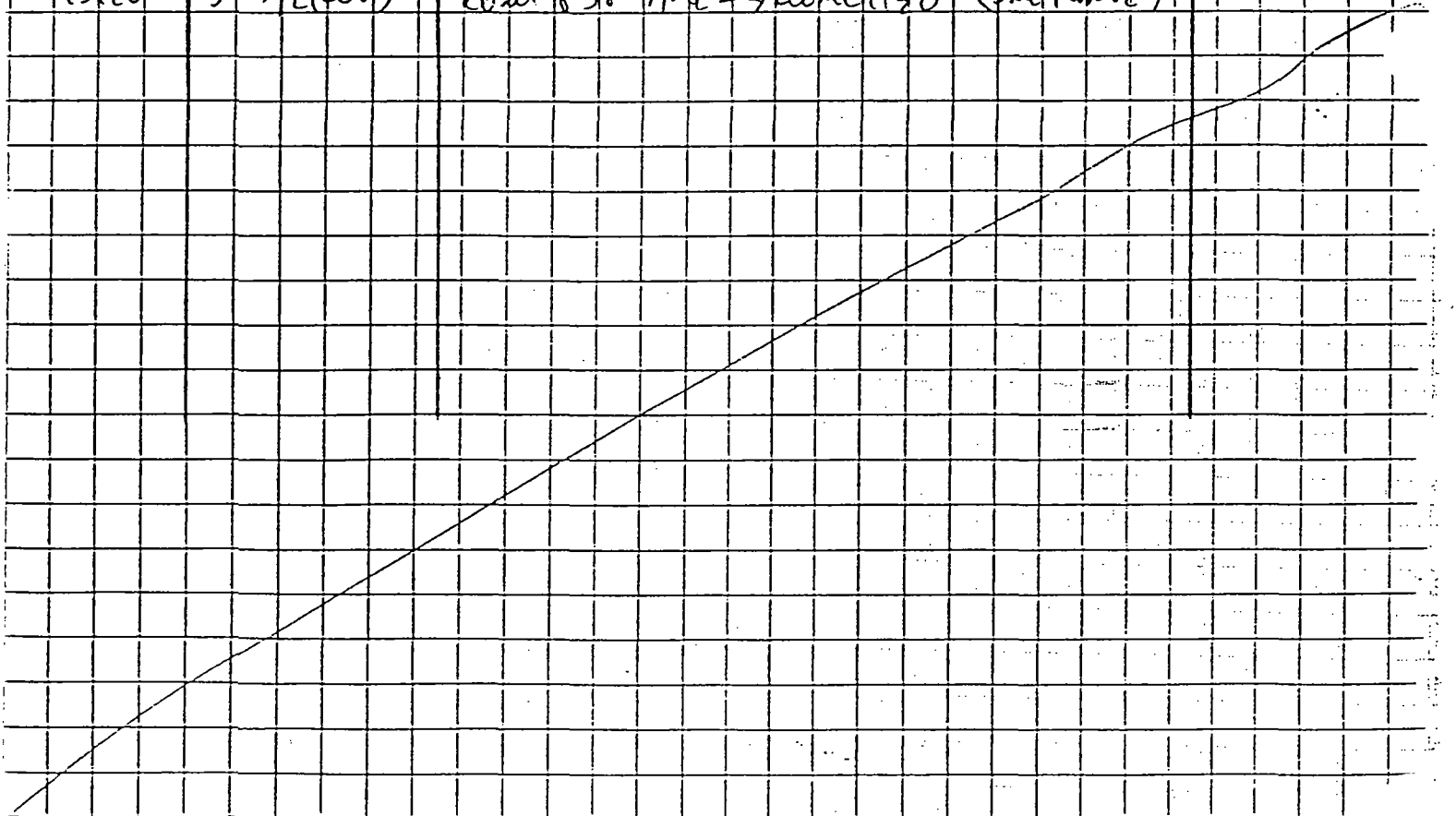
Signed Date Signed Date

OJECT ACS FIELD GC 4077-0075 Notebook No. _____

Continued From Page _____

GC #1: UPPER AQUIFER

TIME	SAMPLE	SAMPLE PREPARATION	DILUTION FACTOR
7:47	10 ug/L (CCV)	40 ul @ 50 ug/mL → 200 mL H_2O (5 mL Pipette)	———
8:32	BLANK (CCB)	5.0 mL H_2O + 5.0 ul @ 10 ug/mL Surr	1
9:13	GP 16	50 ul SAMPLE → 5.0 mL H_2O + 5.0 ul @ 10 ug/mL Surr	100
9:54	GP 16	500 ul SAMPLE → 4.5 mL H_2O + 5.0 ul @ 10 ug/mL Surr	10
	BAKEOUT		
11:32	GP 17	5.0 mL SAMPLE + 5.0 ul @ 10 ug/mL Surr	1
12:08	GP 19	5.0 mL SAMPLE + 5.0 ul @ 10 ug/mL Surr	1
12:45	GP 17	11.0 mL SAMPLE + 5.0 ul @ 10 ug/mL Surr	5
13:26	GP 12	500 ul SAMPLE → 4.5 mL H_2O + 5.0 ul @ 10 ug/mL Surr	10
14:10	GP 12	50 ul SAMPLE → 5.0 mL H_2O + 5.0 ul @ 10 ug/mL Surr	100
14:44	10 ug/L (CCV)	40 ul @ 50 ug/mL → 200 mL H_2O (5 mL Pipette)	———
15:20	5 ug/L (CCV)	20 ul @ 50 ug/mL → 200 mL H_2O (5 mL Pipette)	———



Continued on Page _____

Read and Understood By

Signed _____ Date 2/9/96

Signed _____ Date _____

PROJECT ACS Field GC #077.0075 Continued From Page

GC #2: Lower Aquifer / Upper Aquifer

TIME	SAMPLE	SAMPLE PREPARATION	DILUTION FACTOR
8:26	10 ug/L (CCV)	40 mL @ 50 ug/mL → 200 mL H_2O (Stock Purge)	—
9:05	BLANK (CCB)	5.0 mL H_2O + 5.0 mL @ 10 ug/mL Stock	1
9:54	GP118	5.0 mL Sample + 5.0 mL @ 10 ug/mL Stock	1
10:38	MW8 89'	5.0 mL Sample + 5.0 mL @ 10 ug/mL Stock	1
11:21	MW8 69' (ABS DUP)	5.0 mL Sample + 5.0 mL @ 10 ug/mL Stock	1
12:00	GP-219 96+FB	5.0 mL Sample + 5.0 mL @ 10 ug/mL Stock	1
12:46	GP120	1.0 mL Sample + 9.0 mL @ 10 ug/mL Stock	5
13:28	GP122	500 mL Sample + 4.5 mL H_2O + 5.0 mL @ 10 ug/mL Stock	10
14:09	GP122	5.0 mL Sample + 5.0 mL @ 10 ug/mL Stock	1
14:50	10 ug/L (CCV)	40 mL @ 50 ug/mL → 200 mL H_2O (Stock Purge)	—
15:31	5 ug/L (CCV)	20 mL @ 50 ug/mL → 200 mL H_2O (Stock Purge)	—

Continued on Page

Read and Understood By

Signed — Date — Signed — Date

2/9/96

PROJECT ACS Field GC 4077.0075 Notebook No. _____

Continued From Page _____

Intermediate Standard Preparation –

1.0 mL Custom Mix Ampule Lot # 55368 (5000 µg/mL)
1.0 mL Custom Mix Ampule Lot # 55369
1.0 mL Custom Mix Ampule Lot # 55370
→ 10 mL MeOH = 500 µg/mL

Working Standard Preparation –

1.0 mL of 500 µg/mL ACS Mix
250 µL of 2000 µg/mL 4-BrTFT Lot # LA 48820
250 µL of 2000 µg/mL 1,4-DCBA Lot # LA 53870
→ 10 mL MeOH = 50 µg/mL

50 µL of 2000 µg/mL 4-BrTFT Lot # LA 48820
50 µL of 2000 µg/mL 1,4-DCBA Lot # LA 53870
→ 10 mL MeOH = 10 µg/mL
SPIKE

Daily Standard Preparation –

20 µL of 500 µg/mL → 200 mL H_2O = 50 µg/L
40 µL of 50 µg/mL → 200 mL H_2O = 10 µg/L
20 µL of 50 µg/mL → 200 mL H_2O = 5 µg/L

Continued on Page

Read and Understood By

Signed _____ Date 2/12/96

Signed _____ Date _____

OJECT ACS FIELD GC 4077.0075 Continued From Page

GC #1: UPPER AQUIFER

TIME	SAMPLE	SAMPLE PREPARATION	DILUTION FACTOR
10:25	5 ug/L	20 uL @ 50 ug/mL → 200 mL H_2O; 5 mL Purge	
11:06	10 ug/L	40 uL @ 50 ug/mL → 200 mL H_2O; 5 mL Purge	
11:50	50 ug/L	20 uL @ 500 ug/mL → 200 mL H_2O; 5 mL + 25 uL @ 10 ug/mL Surr	
12:35	BLANK (ICB)	5.0 mL H_2O + 5.0 uL @ 10 ug/mL Surr	
13:15	10 ug/L (CCV)	40 uL @ 50 ug/mL → 200 mL H_2O; 5 mL Purge	
13:54	GP130	5.0 mL Sample + 5.0 uL @ 10 ug/mL Surr	1
14:30	GP130	1.0 mL Sample → 4.0 mL H_2O + 5.0 uL @ 10 ug/mL Surr	5
15:06	GP127	5.0 mL Sample + 5.0 uL @ 10 ug/mL Surr	1
15:41	GP126	5.0 mL Sample + 5.0 uL @ 10 ug/mL Surr	1
16:18	GP124	100 uL Sample → 4.9 mL H_2O + 5.0 uL @ 10 ug/mL Surr	50
16:56	GP124	20 uL @ Sample → 5.0 mL H_2O + 5.0 uL @ 10 ug/mL Surr	250
17:35	QC 2/9/96 TB	5.0 mL Sample + 5.0 uL @ 10 ug/mL Surr	1
18:12	QC 2/12/96 TB	5.0 mL Sample + 5.0 uL @ 10 ug/mL Surr	1
18:51	GP127 LAB DUP	5.0 mL Sample + 5.0 uL @ 10 ug/mL Surr	1
19:27	10 ug/L (CCV)	40 uL @ 50 ug/mL → 200 mL H_2O; 5 mL Purge	
20:03	5 ug/L (CCV)	20 uL @ 50 ug/mL → 200 mL H_2O; 5 mL Purge	
15:27	GP128		100

Continued on Page

Read and Understood By

Signed 2/12/96 Signed

Date Date

PROJECT ACS FIELD GC 4077.0075 Notebook No. _____

Continued From Page _____

GC #2: LOWER AQUIFER / UPPER AQUIFER

TIME	SAMPLE	SAMPLE PREPARATION	DILUTION FACTOR
10:26	5 ug/L	20 ul @ 50 ug/mL → 200 mL H_2O ; 5 mL Purge	
11:06	10 ug/L	40 ul @ 50 ug/mL → 200 mL H_2O ; 5 mL Purge	
11:50	50 ug/L	20 ul @ 500 ug/mL → 200 mL H_2O ; 5 mL Purge + 75 ul @ 10 ug/mL Surr	
12:38	BLANK (ICB)	5.0 mL H_2O + 5.0 ul @ 10 ug/mL Surr	
13:14	10 ug/L (CCV)	40 ul @ 50 ug/mL → 200 mL H_2O ; 5 mL Purge	
14:01	GP129	5.0 mL Sample + 5.0 ul @ 10 ug/mL Surr	1
14:44	GP128	500 ul Sample → 4.5 mL H_2O + 5.0 ul @ 10 ug/mL Surr	10
15:24	GP128	50 ul Sample → 5.0 mL H_2O + 5.0 ul @ 10 ug/mL Surr	100
16:04	GP125	5.0 mL Sample + 5.0 ul @ 10 ug/mL Surr	1
16:50	GP123	50 ul @ Sample → 5.0 mL H_2O + 5.0 ul @ 10 ug/mL Surr	50
17:29	GP123	25 ul @ Sample → 5.0 mL H_2O + 5.0 ul @ 10 ug/mL Surr	200
18:06	GP 2/12/96 FB	5.0 mL H_2O + 5.0 ul @ 10 ug/mL Surr	1
18:46	GP123 MS/DUP	25 ul @ Sample → 5.0 mL H_2O + 5.0 ul @ 10 ug/mL Surr	200
19:25	10 ug/L (CCV)	40 ul @ 50 ug/mL → 200 mL H_2O ; 5 mL Purge	
20:04	5 ug/L (DUP)	20 ul @ 50 ug/mL → 200 mL H_2O ; 5 mL Purge	

Continued on Page

Read and Understood By

Signed _____ Date 2/12/96

Signed _____ Date _____

GC #1: UPPER AQUIFER / LOWER AQUIFER

TIMES	SAMPLES	SAMPLE PREPARATION	DILUTION FACTOR
8:03	5 ug/L	20 mL of 50 ug/mL → 250 mL H_2O ; 5 mL Purge	—
8:46	10 ug/L	40 mL of 50 ug/mL → 200 mL H_2O ; 5 mL Purge	—
9:27	50 ug/L	20 mL of 500 ug/mL → 200 mL H_2O ; 5 mL + 25 uL of 10 ug/mL Surr	—
10:07	BLANK (ECD)	5.0 mL H_2O + 50 uL of 10 ug/mL Surr	1
10:47	10 ug/L (ECD)	40 mL of 50 ug/mL → 200 mL H_2O ; 5 mL Purge	—
12:10	VP3 99'	5.0 mL SAMPLE + 50 uL of 10 ug/mL SURR	1
12:51	GP57A	5 mL SAMPLE → 5.0 mL H_2O + 50 uL of 10 ug/mL SURR	100
13:51	GP57A	1.0 mL SAMPLE → 100 mL H_2O · 50 mL → 4.5 mL H_2O + 5.0 mL of 10 ug/mL Surr	1000
14:26	VP3 99' LAB DUP	5.0 mL SAMPLE + 50 uL of 10 ug/mL SURR	1
15:09	VP3 99' (1/5)	1.0 mL SAMPLE → 4.0 mL H_2O + 5.0 mL of 10 ug/mL SURR	5
15:47	GP68A	5.0 mL SAMPLE + 50 uL of 10 ug/mL SURR	1
16:35	GP68A (1/5)	1.0 mL SAMPLE → 4.0 mL H_2O + 5.0 mL of 10 ug/mL SURR	5
17:16	10 ug/L (CCV)	40 mL of 50 ug/mL → 200 mL H_2O ; 5 mL Purge	1
17:57	5 ug/L (CCV)	20 mL of 50 ug/mL → 200 mL H_2O ; 5 mL Purge	1

Continued on Page

Read and Understood By

Signed — Date 2/13/96 — Signed — Date

OJECT ACS FIELD GC 4077.0075

Notebook No.

Continued From Page

GC #2: BARRIER WALL

TIME	SAMPLE	SAMPLE PREPARATION	DILUTION FACTOR	PID
8:01	5 ug/L	20 ml of 50 ug/mL → 200 mL H_2O 5 mL PURGE	—	—
8:41	10 ug/L	40 ml of 50 ug/mL → 200 mL H_2O 5 mL PURGE	—	—
9:22	50 ug/L	20 ml of 500 ug/mL → 200 mL H_2O; 5 mL + 25 ml of 10 ug/mL SURR	—	—
10:04	BLANK (ICB)	5.0 mL H_2O + 5.0 ml of 10 ug/mL SURR + 100 ml MeOH	50	—
10:44	10 ug/L (CCV)	40 ml of 50 ug/mL → 200 mL H_2O 5 mL PURGE	—	—
11:26	SB149 8.5-10.5'	5.0 g SOIL → 5.0 mL MeOH; 20 ml EXTRACT	250	450
12:09	SB149 8.5-10.5'	5.0 g SOIL → 5.0 mL MeOH 100 ml EXTRACT	50	450
12:57	SB150 6-8'	1.0 g SOIL → 5.0 mL MeOH; 1.0 mL → 10 mL MeOH; 10 ml EXTRACT	25,000	1640
13:39	SB150 6-8'	1.0 g SOIL → 5.0 mL MeOH; 25 ml EXTRACT	1000	1640
14:21	SB150 6-8'	5.0 g SOIL → 5.0 mL MeOH; 100 ml EXTRACT	50	1640
15:02	SB151 19-21'	1.0 g SOIL → 5.0 mL MeOH 1.0 mL → 10 mL MeOH; 10 ml EXTRACT	25,000	3251
15:43	SB151 19-21'	1.0 g SOIL → 5.0 mL MeOH; 25 ml EXTRACT	1000	3251
16:26	SB223 18.5-20.5'	5.0 g SOIL → 5.0 mL MeOH; 100 ml EXTRACT	50	51
17:10	SB150 6-8' LAB DUP	5.0 g SOIL → 5.0 mL MeOH; 100 ml EXTRACT	50	1640
17:50	10 ug/L (CCV)	40 ml of 50 ug/mL → 200 mL H_2O; 5 mL PURGE	1	—
18:28	5 ug/L (OLV)	20 ml of 50 ug/mL → 200 mL H_2O; 5 mL PURGE	1	—

Continued on Page

Read and Understood By

[signature] 2/13/96

Signed Date Signed Date

PROJECT ACS Field GC 4077.0075 Continued From Page

GC #1: Upper Aquifer / Lower Aquifer

TIME	SAMPLE #	SAMPLE PREPARATION	DILUTION FACTOR
8:03	10 ug/L (CCV)	40 uL @ 50 ug/mL → 200 mL H_2O; Sml Purge	———
8:42	BLANK (CCB)	5.0 mL H_2O + 5.0 uL @ 10 ug/mL SURR	———

Continued on Page

Read and Understood By

Signed 2/14/96 Date

Signed Date

PROJECT ACS FIELD GC 4077.0075

Notebook No.

Continued From Page

GC #2: UPPER AQUIFER / LOWER AQUIFER

TIME	SAMPLE	SAMPLE PREPARATION	DILUTION FACTOR
7:59	10 µg/L (CCV)	40 µl of 50 µg/mL → 200 mL H_2O; 5 mL PURGE	—
8:39	BLANK (CCB)	5.0 mL H_2O + 5.0 µl of 10 µg/mL SULFUR	—

Continued on Page

Read and Understood By

[signature] 2/14/96

Signed Date Signed Date

OJECT ACS FIELD GC 4077.0075

Continued From Page

WORKING STANDARD PREPARATION

1.0 mL of 500 µg/mL ASC Mix
250 ul of 2000 µg/mL xxx TFT Lot # LA 48820
250 ul of 2000 µg/mL 1,4 DCBA Lot # LA 53870
→ 10 mL MeOH = 50 µg/mL ACS Mix

50 ul of 2000 µg/mL xxx TFT Lot # LA 48820
50 ul of 2000 µg/mL 1,4 DCBA Lot # LA 53870
→ 10 mL MeOH = 10 µg/mL Surr

DAILY STANDARD PREPARATION

20 ul of 500 µg/mL → 200 mL H_2O = 50 µg/L
40 ul of 50 µg/mL → 200 mL H_2O = 10 µg/L
20 ul of 50 µg/mL → 200 mL H_2O = 5 µg/L

Continued on Page

Read and Understood By

[signature] 2/19/96

Signed Date Signed Date

OJECT ACS FIELD GC 4077.0075

Notebook NO.

Continued From Page

GC #1: UPPER AQUIFER / LOWER AQUIFER

TIME	SAMPLE	SAMPLE PREPARATION	DILUTION FACTOR
10:26	5 ug/L	20 ul @ 150 ug/mL → 200 mL H_2O; 5 mL Purge	—
11:12	10 ug/L	40 ul @ 500 ug/mL → 200 mL H_2O; 5 mL Purge	—
11:53	50 ug/L	20 ul @ 500 ug/mL → 200 mL H_2O; 5 mL + 2.5 mL @ 10 ug/mL Surr	—
12:31	BLANK	5.0 mL H_2O + 5.0 ul @ 10 ug/mL Surr	1
13:12	10 ug/L (DCV)	40 ul @ 500 ug/mL → 200 mL H_2O; 5 mL Purge	—
14:29	GP132	5.0 mL Sample + 5.0 uL @ 10 ug/mL Surr	1
15:07	GP133	5.0 mL Sample + 5.0 uL @ 10 ug/mL Surr	1
15:46	GP-2/19/96-FB	5.0 mL Sample + 5.0 uL @ 10 ug/mL Surr	1
16:22	GP133 LAB DUP	5.0 mL Sample + 5.0 uL @ 10 ug/mL Surr	1
16:59	GP-2/19/96 FB REPEAT	5.0 mL Sample + 5.0 uL @ 10 ug/mL Surr	1
17:35	GP134	5.0 mL Sample + 5.0 uL @ 10 ug/mL Surr	1
18:05	BAKEOUT		
18:37	GP134	250 ul @ Sample → 4.75 mL H_2O + 5.0 uL @ 10 ug/mL Surr	RQ
19:11	GP-2/19/96 TB	5.0 mL Sample + 5.0 uL @ 10 ug/mL Surr	1
19:51	10 ug/L (CCV)	40 ul @ 500 ug/mL → 200 mL H_2O; 5 mL Purge	—
20:33	5 ug/L (QCV)	20 ul @ 500 ug/mL → 200 mL H_2O; 5 mL Purge	—

Continued on Page

Read and Understood By

Signed — Date — Signed — Date

2/19/96

PROJECT ACS FIELDGC 4077-0075

Continued From Page

GC #2: UPPER AQUIFER / LOWER AQUIFER

TIME	SAMPLE	SAMPLE PREPARATION	DILUTION FACTOR
10:21	5 ug/L	20 mL @ 50 ug/mL → 200 mL H_2O; 5 mL Purge	
11:04	10 ug/L	40 mL @ 50 ug/mL → 200 mL H_2O; 5 mL Purge	
11:49	50 ug/L	20 mL @ 500 ug/mL → 200 mL H_2O; 5 mL + 25 mL 100 ug/mL Surr	
12:34	BLANK	5.0 mL H_2O + 5.0 mL @ 10 ug/mL Surr	
13:16	10 ug/L (CCV)	40 mL @ 50 ug/mL → 200 mL H_2O; 5 mL Purge	
18:13	GP135	5.0 mL H_2O + 5.0 mL @ 10 ug/mL Surr	
18:53	GP136	5.0 mL H_2O + 5.0 mL @ 10 ug/mL Surr	
19:27	GP136 LAB DUP	5.0 mL H_2O + 5.0 mL @ 10 ug/mL Surr	
20:05	10 ug/L (CCV)	40 mL @ 50 ug/mL → 200 mL H_2O; 5 mL Purge	
20:43	5 ug/L (OLV)	20 mL @ 50 ug/mL → 200 mL H_2O; 5 mL Purge	

Continued on Page

Read and Understood By

Signed — Date — Signed — Date

2/12/96

OJECT ACS FIELDGC 4077.0075 Notebook No. _____ Continued From Page _____

GC # 1: Upper Aquifer / Lower Aquifer

TIME	SAMPLE	SAMPLE PREPARATION	DILUTION FACTOR
8:07	5 ug/L	20ul of 50 ug/mL → 200mL H_2O; 5mL Purge	1
8:48	10 ug/L	40 ul of 50 ug/mL → 200mL H_2O; 5mL Purge	1
9:28	50 ug/L	20 ul of 500 ug/mL → 200mL H_2O; 5mL + 25ul of 10 ug/mL Surr	1
10:11	BLANK (FCB)	5.0 mL H_2O + 5.0 ul of 10 ug/mL Surr	1
10:51	10 ug/L (FCV)	40ul of 50 ug/mL → 200mL H_2O; 5mL Purge	1
12:37	GP137	5.0 mL SAMPLE + 5.0 ul of 10 ug/mL Surr	1
13:17	GP137	1.0 mL Sample → 5.0 mL H_2O + 5.0 ul of 10 ug/mL Surr	5
13:57	GP138	5.0 mL Sample + 5.0 ul of 10 ug/mL Surr	1
14:32	GP139	5.0 mL Sample + 5.0 ul of 10 ug/mL Surr	1
15:08	GP139 MS DUP	5.0 mL Sample + 5.0 ul of 10 ug/mL Surr	1
15:54	GP140	5.0 mL Sample + 5.0 ul of 10 ug/mL Surr	1
16:34	GP 2/20/96 FB	5.0 mL Sample + 5.0 ul of 10 ug/mL Surr	1
17:12	GP141	5.0 mL Sample + 5.0 ul of 10 ug/mL Surr	1
17:48	GP142	5.0 mL Sample + 5.0 ul of 10 ug/mL Surr	1
18:24	GP 2/20/96 TB	5.0 mL Sample + 5.0 ul of 10 ug/mL Surr	1
18:59	10 ug/L (CCV)	40 ul of 50 ug/mL → 200mL H_2O; 5mL Purge	1
19:37	5 ug/L (DLV)	20 ul of 50 ug/mL → 200mL H_2O; 5mL Purge	1

Continued on Page

Read and Understood By

Signed _____ Date 2/20/96

Signed _____ Date _____

OJECT ACS FIELD GC 4077.0075 Continued From Page

GC #2: UPPER AQUIFER / LOWER AQUIFER

TIME	SAMPLE	SAMPLE PREPARATION	ALLOCATION FACTOR
8:06	5 ug/L	20 ul @ 50 ug/mL → 200 mL H_2O; 5 mL Purge	1
8:47	10 ug/L	40 ul @ 50 ug/mL → 200 mL H_2O; 5 mL Purge	1
9:28	50 ug/L	20 ul @ 500 ug/mL → 200 mL H_2O 5 mL Purge	1
10:10	BLANK (ICB)	5.0 mL H_2O + 5.0 ul @ 10 ug/mL Spike	1
10:51	10 ug/L (ICV)	40 ul @ 50 ug/mL → 200 mL H_2O; 5 mL Purge	1
13:16	VP2 39'	5.0 mL Sample + 5.0 ul @ 10 ug/mL Spike	1
14:01	VP2 29'	500 ul @ Sample → 4.5 mL H_2O + 5.0 ul @ 10 ug/mL Spike	10
14:40	VP2 29	5.0 mL Sample + 5.0 ul @ 10 ug/mL Spike	1
15:20	VP2 52'	5.0 mL Sample + 5.0 ul @ 10 ug/mL Spike	1
15:59	VP2 59'	5.0 mL Sample + 5.0 ul @ 10 ug/mL Spike	1
16:40	VP2 29' LAB DUP	5.0 mL Sample + 5.0 ul @ 10 ug/mL Spike	1
17:35	VP2 72'	5.0 mL Sample + 5.0 ul @ 10 ug/mL Spike	1
18:15	GP52A	5.0 mL Sample + 5.0 ul @ 10 ug/mL Spike	1
18:57	10 ug/L (CCV)	40 ul @ 50 ug/mL → 200 mL H_2O; 5 mL Purge	1
19:37	5 ug/L (QLV)	20 ul @ 50 ug/mL → 200 mL H_2O; 5 mL Purge	1

Continued on Page

Read and Understood By

Signed 2/20/96 Signed

Date Date

PROJECT ACS 4077-0075 FIELD GC

NOTEBOOK NO.

Continued From Page

GC #1: UPPER AQUIFER

TIME	SAMPLE	SAMPLE PREPARATION	DILUTION FACTOR
8:28	5 ug/L	20 mL of 50 ug/mL ACS MIX → 200 mL H_2O; 5 mL PURGE	—
9:08	10 ug/L	40 mL of 50 ug/mL → 200 mL H_2O; 5 mL PURGE	—
9:50	50 ug/L	20 mL of 500 ug/mL → 200 mL H_2O; 5 mL PURGE + 25 mL of 10 ug/mL SURR	—
10:25	BLANK (FCB)	5.0 mL H_2O + 5.0 mL of 10 ug/mL SURR	1
11:02	10 ug/L (FCV)	40 mL of 50 ug/mL → 200 mL H_2O; 5 mL PURGE	—
11:37	GP 66A	5.0 mL SAMPLE + 5.0 mL of 10 ug/mL SURR	1
12:23	GP 66A DUP	5.0 mL SAMPLE + 5.0 mL of 10 ug/mL SURR	1
12:58	GP 70 A	5.0 mL SAMPLE + 5.0 mL of 10 ug/mL SURR	1
13:46	GP 71 A	5.0 mL SAMPLE + 5.0 mL of 10 ug/mL SURR	1
14:22	GP 70 A	1.0 mL SAMPLE → 4.0 mL H_2O + 5.0 mL of 10 ug/mL SURR	5
14:55	BAKEOUT	BAKEOUT 185° → 180°C	
15:36	GP 71 A	1.0 mL SAMPLE → 4.0 mL H_2O + 5.0 mL of 10 ug/mL SURR	5
16:11	GP 2/21/96 FB	5.0 mL SAMPLE + 5.0 mL of 10 ug/mL SURR	1
16:49	GP 2/21/96 TB	5.0 mL SAMPLE + 5.0 mL of 10 ug/mL SURR	1
17:25	BLANK (CCB)	5.0 mL H_2O + 5.0 mL of 10 ug/mL SURR	1
18:19	10 ug/L (CCV)	40 mL of 50 ug/mL → 200 mL H_2O; 5 mL PURGE	—

— SAMPLES REPEATED ON GC #2 ON 2/22/96 DUE TO ACETONE CONTAMINATION PRESENT ON BLANKS ASSOCIATED WITH THESE SAMPLES.

Continued on Page

Read and Understood By

Signed — Date — Signed — Date

2/21/96

OJECT ACS FIELDGC 4077.0075

Continued From Page

GC #2: LOWER AQUIFER

TIME	SAMPLE	SAMPLE PREPARATION	DILUTION FACTOR
8:27	5 ug/L	20 ml of 50 ug/ml ACS MIX → 200 ml H_2O; 5 ml PURGE	—
9:07	10 ug/L	40 ml of 50 ug/ml → 200 ml H_2O; 5 ml PURGE	—
9:48	50 ug/L	20 ml of 500 ug/ml → 200 ml H_2O; 5 ml PURGE + 25 ml of 10 ug/ml SURR	—
10:28	BLANK (ICB)	5.0 ml H_2O + 5.0 ml of 10 ug/ml SURR	1
11:09	10 ug/L (ICV)	40 ml of 50 ug/ml → 200 ml H_2O; 5 ml PURGE	—
11:49	VP2 79'	5.0 ml SAMPLE + 5.0 ml of 10 ug/ml SURR	1
12:30	VP2 86'	5.0 ml SAMPLE + 5.0 ml of 10 ug/ml SURR	1
13:10	VP2 79' LAB DUP	5.0 ml SAMPLE + 5.0 ml of 10 ug/ml SURR	1
13:51	GP143	5.0 ml SAMPLE + 5.0 ml of 10 ug/ml SURR	1
14:35	GP143	1.0 ml SAMPLE → 4.0 ml H_2O + 5.0 ml of 10 ug/ml SURR	5
15:18	GP144	1.0 ml SAMPLE → 4.0 ml H_2O + 5.0 ml of 10 ug/ml SURR	5
15:59	GP145	1.0 ml SAMPLE → 4.0 ml H_2O + 5.0 ml of 10 ug/ml SURR	5
16:39	GP145	5.0 ml SAMPLE + 5.0 ml of 10 ug/ml SURR	1
17:21	GP70A	1.0 ml SAMPLE → 4.0 ml H_2O + 5.0 ml of 10 ug/ml SURR	5
18:19	10 ug/L (CCV)	40 ml of 50 ug/ml → 200 ml H_2O; 5 ml PURGE	—

Continued on Page

Read and Understood By

[signature] 2/21/96

Signed Date Signed Date

OJECT ACS FIELD GC 4077.0075

Notebook No.

Continued From Page

GC #1: UPPER AQUIFER

TIME	SAMPLE	SAMPLE PREPARATION	DILUTION FACTOR

- ACETONE CONTAMINATION PROBLEMS WITH THIS GC 2/21/96. MAINTENANCE PERFORMED ON THIS GC TODAY TO ELIMINATE FALSE POSITIVES FOR ACETONE.

Continued on Page

Read and Understood By

Signed [signature] Date 2/22/96 Signed Date

OJECT HCS FIELD GC 4077.0075

Continued From Page

GC#2: UPPER AQUIFER / LOWER AQUIFER

TIME	SAMPLE	SAMPLE PREPARATION	DILUTION FACTOR
10:12	10 ug/L (CCV)	40 ml of 50 ug/ml → 200 ml H_2O ; 5 ml PURGE	
10:51	BLANK (CCB)	5.0 ml H_2O + 5.0 ml of 10 ug/ml SURR	1
11:31	GP71A (REPEAT)	5.0 ml H_2O + 5.0 ml of 10 ug/ml SURR	1
12:12	GP70A (REPEAT)	5.0 ml H_2O + 5.0 ml of 10 ug/ml SURR	1
12:52	GP66A (REPEAT)	5.0 ml H_2O + 5.0 ml of 10 ug/ml SURR	1
13:35	GP 2/21/96 TB (REPEAT)	5.0 ml SAMPLE + 5.0 ml of 10 ug/ml SURR	1
14:17	GP 2/21/96 FB (REPEAT)	5.0 ml SAMPLE + 5.0 ml of 10 ug/ml SURR	1
14:58	GP136 (REPEAT)	5.0 ml SAMPLE + 5.0 ml of 10 ug/ml SURR	1
15:39	GP138 (REPEAT)	5.0 ml SAMPLE + 5.0 ml of 10 ug/ml SURR	1
16:18	GP140 (REPEAT)	5.0 ml SAMPLE + 5.0 ml of 10 ug/ml SURR	1
17:01	GP141 (REPEAT)	5.0 ml SAMPLE + 5.0 ml of 10 ug/ml SURR	1
17:41	GP142 (REPEAT)	5.0 ml SAMPLE + 5.0 ml of 10 ug/ml SURR	1
18:24	10 ug/L (CCV)	40 ml of 50 ug/ml → 200 ml H_2O ; 5 ml PURGE	1
19:03	BLANK (CCB)	5.0 ml H_2O + 5.0 ml of 10 ug/ml SURR	1

Continued on Page

Read and Understood By

[signature] 2/22/96

Signed Date Signed Date

OJECT ACS FIELD GC 4077.0075

Notebook No.

Continued From Page

GC #1: TIME SERIES SAMPLES-PRODUCTION WELLS

TIME	SAMPLE	SAMPLE PREPARATION	DILUTION FACTOR
7:53	5 ug/L	20 ml of 50 ug/mL → 200 mL H_2O; 5 mL PURGE	—
8:29	10 ug/L	40 ml of 50 ug/mL → 200 mL H_2O; 5 mL PURGE	—
9:07	50 ug/L	20 ml of 500 ug/mL → 200 mL H_2O; 5 mL + 25 ml of 10 ug/mL SURR	—
9:44	BLANK (ICB)	5.0 mL H_2O + 5.0 ml of 10 ug/mL SURR	1
10:27	10 ug/L (ICV)	40 ml of 50 ug/mL → 200 mL H_2O; 5 mL PURGE	—
11:09	IW1 - 15 MIN	5.0 mL SAMPLE + 5.0 ml of 10 ug/mL SURR	1
11:47	IW1 - 30 MIN	5.0 mL SAMPLE + 5.0 ml of 10 ug/mL SURR	1
12:25	IW1 - 60 MIN	5.0 mL SAMPLE + 5.0 ml of 10 ug/mL SURR	1
13:03	IW1 - 120 MIN	5.0 mL SAMPLE + 5.0 ml of 10 ug/mL SURR	1
13:40	IW1 - 180 MIN	5.0 mL SAMPLE + 5.0 ml of 10 ug/mL SURR	1
14:16	IW1 - 270 MIN	5.0 mL SAMPLE + 5.0 ml of 10 ug/mL SURR	1
14:53	IW1 - 380 MIN	5.0 mL SAMPLE + 5.0 ml of 10 ug/mL SURR	1
16:03	IW1 - 30 MIN LAB DUP	5.0 mL SAMPLE + 5.0 ml of 10 ug/mL SURR	1
16:44	IW1 - 480 MIN	5.0 mL SAMPLE + 5.0 ml of 10 ug/mL SURR	1
17:21	10 ug/L (CCV)	40 ml of 50 ug/mL → 200 mL H_2O; 5 mL PURGE	—
18:23	5 ug/L (OLV)	20 ml of 50 ug/mL → 200 mL H_2O; 5 mL PURGE	—

Continued on Page

Read and Understood By

[signature] 2/23/96

Signed Date Signed Date

GC #2: LOWER AQUIFER / UPPER AQUIFER (REPEATS)

TIME	SAMPLE	SAMPLE PREPARATION	DILUTION FACTOR
8:15	10 ug/L (CCV)	40 ml of 50 ug/mL → 200 mL H_2O; 5 mL Purge	—
8:55	BLANK (CCB)	5.0 mL H_2O + 5.0 ml of 10 ug/mL Surr	1
9:36	GP137 (REPEAT)	5.0 mL Sample + 5.0 ml of 10 ug/mL Surr	1
10:21	VP1 30'	5.0 mL Sample + 5.0 ml of 10 ug/mL Surr	1
11:04	VP1 39'	5.0 mL Sample + 5.0 ml of 10 ug/mL Surr	1
11:46	VP1 49'	5.0 mL Sample + 5.0 ml of 10 ug/mL Surr	1
12:27	VP1 59'	5.0 mL Sample + 5.0 ml of 10 ug/mL Surr	1
13:08	VP1 69'	5.0 mL Sample + 5.0 ml of 10 ug/mL Surr	1
13:50	VP1 79'	5.0 mL Sample + 5.0 ml of 10 ug/mL Surr	1
14:38	VP1 39' CARBON	5.0 mL Sample + 5.0 ml of 10 ug/mL Surr	1
15:22	VP1 92'	5.0 mL Sample + 5.0 ml of 10 ug/mL Surr	1
16:01	VP1 92' AFTER CARBON	5.0 mL Sample + 5.0 ml of 10 ug/mL Surr	1
16:43	10 ug/L (CCV)	10 ml of 50 ug/mL → 200 mL H_2O; 5 mL Purge	—
17:25	5 ug/L (QLV)	20 ml of 50 ug/mL → 200 mL H_2O; 5 mL Purge	—

Continued on Page

Read and Understood By

Signed — Date — Signed — Date

2/23/96

GC #2: Lower Aquifer

Time	SAMPLE	SAMPLE PREPARATION	DILUTION FACTOR
8:43	10 ug/L (CCV)	40 uL @ 50 ug/mL → 200 mL H_2O, 5 mL Purge	1
9:21	BLANK (CCB)	5.0 mL H_2O + 5.0 uL @ 10 ug/mL Surr	1
10:00	VP4 58'	5.0 mL SAMPLE + 5.0 uL @ 10 ug/mL SURR	1
10:38	VP4 68'	5.0 mL SAMPLE + 5.0 mL @ 10 ug/mL SURR	1
11:17	VP4 79'	5.0 mL SAMPLE + 5.0 uL @ 10 ug/mL SURR	1
11:56	VP4 74' DUP	5.0 mL SAMPLE + 5.0 uL @ 10 ug/mL SURR	1
13:19	VP4 89'	5.0 mL SAMPLE + 5.0 uL @ 10 ug/mL SURR	1
13:58	10 ug/L (CCV)	40 uL @ 5 ug/mL → 200 mL H_2O, 5 mL Purge	1
14:38	5 ug/L (DLV)	20 uL @ 50 ug/mL → 200 mL H_2O, 5 mL Purge	1

Continued on Page

Read and Understood By

Signed [signature] Date 2/24/96 Signed Date

JECT ACS FIELD GC 4077.0075

Continued From Page

GC #2: UPPER AQUIFER

TIME	SAMPLE	SAMPLE PREPARATION	DILUTION FACTOR
11:17 ~~11:38~~	5 ug/L	20 ul of 50 ug/mL → 200 mL H_2O; 5 mL PURGE	—
11:30	10 ug/L	40 ul of 50 ug/mL → 200 mL H_2O; 5 mL PURGE	—
12:10	50 ug/L	20 ul of 500 ug/mL → 200 mL; 5 mL + 25 ul of 10 ug/mL SURR	—
12:47	BLANK (ICB)	5.0 mL H_2O + 5.0 ul of 10 ug/mL SURR	1
13:27	10 ug/L (ICV)	40 ul of 50 ug/mL → 200 mL H_2O; 5 mL PURGE	—
14:16	GP1A6	5.0 mL of SAMPLE + 5.0 ul of 10 ug/mL SURR	1
14:54	GP1A6 LAB DUP	5.0 mL SAMPLE + 5.0 ul of 10 ug/mL SURR	1
15:35	GP-2/29/96 TB	5.0 mL SAMPLE + 5.0 ul of 10 ug/mL SURR	1
16:20	11 ug/L (CCV)	40 ul of 50 ug/mL → 200 mL H_2O; 5 mL PURGE	—
17:04	5 ug/L (DLV)	20 ul of 50 ug/mL → 200 mL H_2O; 5 mL PURGE	—

Continued on Page

Read and Understood By

[signature] 2/29/96

Signed Date Signed Date

OJECT ACS FIELD GC 4077.0075 NOTEBOOK NO.: Continued From Page

GC #2: UPPER AQUIFER

TIME	SAMPLE	SAMPLE PREPARATION	DILUTION FACTOR
8:13	5 µg/L	20 mL @ 50 µg/mL → 200 mL H_2O; 5 mL Purge	—
8:53	10 µg/L	40 µL @ 50 µg/mL → 200 mL H_2O; 5 mL Purge	—
10:14	50 µg/L	20 µL @ 500 µg/mL → 20 mL H_2O; 5 mL + 25 µL 10 µg/mL Stock	—
10:56	BLANK (ICB)	5.0 mL H_2O + 5.0 µL @ 10 µg/mL Stock	1
11:40	10 µg/L (ICV)	40 µL @ 50 µg/mL → 200 mL H_2O; 5 mL Purge	—
12:21	GP148	5.0 mL Sample + 5.0 µL @ 10 µg/mL Stock	1
13:01	GP149	5.0 mL Sample + 5.0 µL @ 10 µg/mL Stock	1
13:39	GP150	5.0 mL Sample + 5.0 µL @ 10 µg/mL Stock	1
14:20	GP151	5.0 mL Sample + 5.0 µL @ 10 µg/mL Stock	1
14:58	GP152	5.0 mL Sample + 5.0 µL @ 10 µg/mL Stock	1
15:43	GP153	5.0 mL Sample + 5.0 µL @ 10 µg/mL Stock	1
16:20	GP 3/1/96 FB	5.0 mL Sample + 5.0 µL @ 10 µg/mL Stock	1
16:57	GP153 µg/L DUP	5.0 mL Sample + 5.0 µL @ 10 µg/mL Stock	1
17:35	GP 3/1/96 TB	5.0 mL Sample + 5.0 µL @ 10 µg/mL Stock	1
18:14	10 µg/L (CCV)	40 µL @ 50 µg/mL → 200 mL H_2O; 5 mL Purge	—

Continued on Page

Read and Understood By

Signed 3/1/96 Date Signed Date

PROJECT ACS FIELD QC 4077.0075 Continued From Page

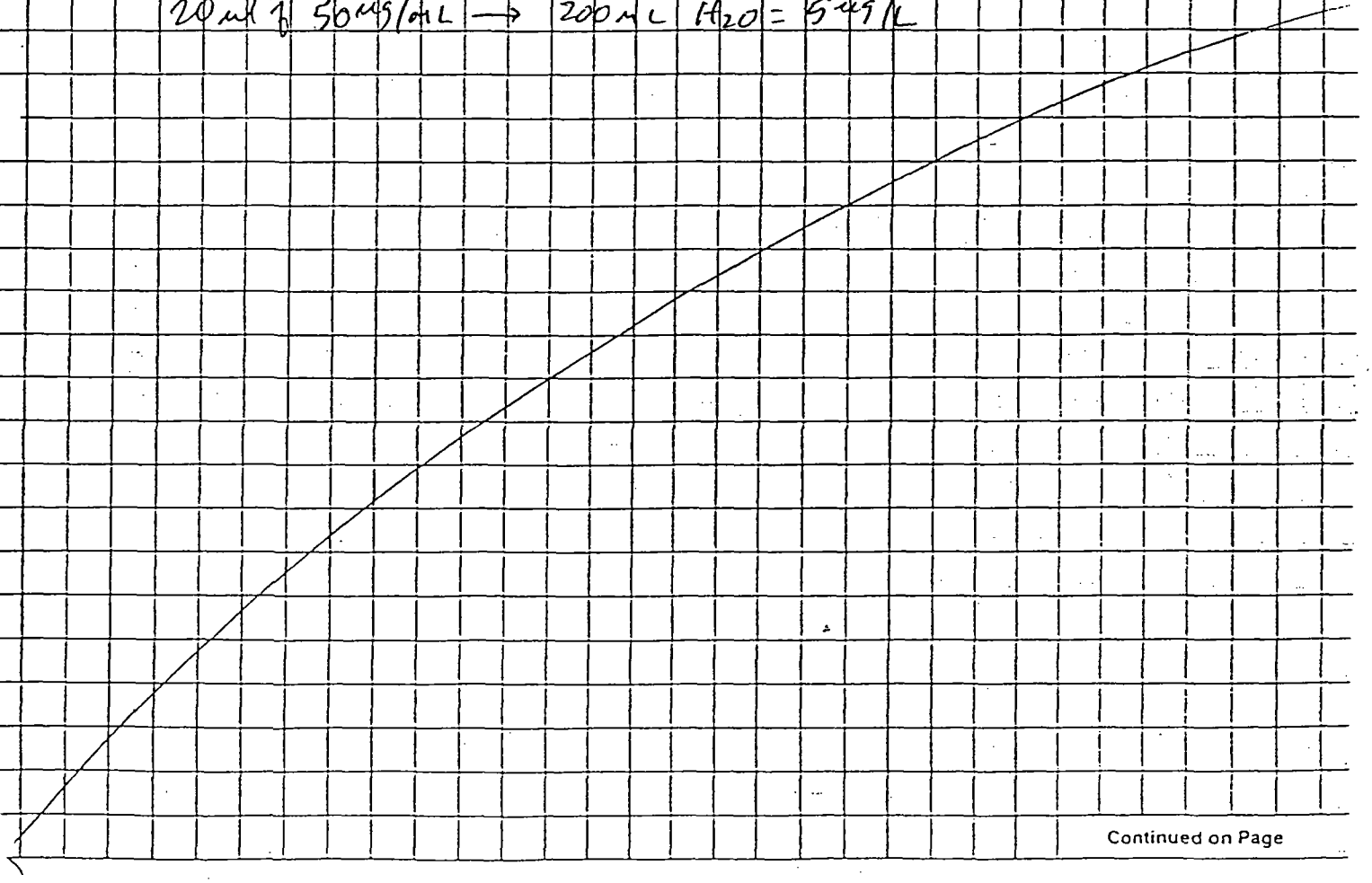
Working Standard Preparation

1.0 mL of 500 µg/mL ACS MIX
250 µL of 2000 µg/mL ~~XXX~~ TFT Lot #LA48820
250 µL of 2000 µg/mL 1,4 DCBA Lot #LA53870
→ 10 mL MeOH = 50 µg/mL

50 µL of 2000 µg/mL ~~XXX~~ TFT Lot # LA48820
50 µL of 2000 µg/mL 1,4 DCBA Lot # LA53870
→ 10 mL MeOH = 10 µg/mL

Daily Standard Preparation

20 µL of 500 µg/mL → 200 mL H_2O = 50 µg/L
40 µL of 50 µg/mL → 200 mL H_2O = 10 µg/L
20 µL of 50 µg/mL → 200 mL H_2O = 5 µg/L



Continued on Page

Read and Understood By

Signed — Date 3/4/96 — Signed — Date

PROJECT ACS Field QC 4077.0075 Notebook No. _____

Continued From Page _____

GC #2: UPPER AQUIFER

TIME	SAMPLE	SAMPLE PREPARATION	DILUTION FACTOR
9:09	5 ug/L	20ml @ 50ug/mL → 200mL H_2O; 5mL Purge	—
9:47	10ug/L	40ml @ 50ug/mL → 200mL H_2O; 5mL Purge	—
10:26	50ug/L	20ml @ 50ug/mL → 200mL H_2O; 5mL + 25ml @ 10ug/mL Surr	—
11:07	BLANK (FCB)	5.0mL H_2O + 5.0mL @ 10ug/mL Surr	1
11:45	10ug/L (ICV)	40ml @ 50ug/mL → 200mL H_2O; 5mL Purge	—
12:23	GP154	5.0mL Sample + 5.0ml @ 10ug/mL Surr	1
13:00	GP155	5.0mL Sample + 5.0ml @ 10ug/mL Surr	1
13:38	GP156	5.0mL Sample + 5.0ml @ 10ug/mL Surr	1
14:16	GP157	5.0mL Sample + 5.0ml @ 10ug/mL Surr	1
14:56	BLANK (CCB)	5.0mL H_2O + 5.0ml @ 10ug/mL Surr	1
15:39	GP159	5.0mL Sample + 5.0ml @ 10ug/mL Surr	1
16:17	GP158	5.0mL Sample + 5.0ml @ 10ug/mL Surr	1
16:55	GP157 LAB DUP	5.0mL Sample + 5.0ml @ 10ug/mL Surr	1
17:33	GP 3/4/96 AB	5.0mL Sample + 5.0ml @ 10ug/mL Surr	1
18:11	GP 3/4/96 TB	5.0mL Sample + 5.0ml @ 10ug/mL Surr	1
18:51	10ug/L (CCV)	40ml @ 50ug/mL → 200mL H_2O; 5mL Purge	—
21:48	GP160	5.0mL Sample + 5.0ml @ 10ug/mL Surr	1
22:24	GP161	5.0mL Sample + 5.0ml @ 10ug/mL Surr	1
23:01	SW101	25ml Sample → 475mL H_2O + 5.0ml @ 10ug/mL Surr	20
23:38	10ug/L (CCV)	40ml @ 50ug/mL → 200mL H_2O; 5mL Purge	—

GC ALLOWED TO TEMPERATURE RAMP FOR 3 CYCLES. (19:27 - 20:03 & 20:38)

Continued on Page

Read and Understood By

Signed _____ Date 3/4/96

Signed _____ Date _____

FIELD GC SUMMARY SHEET

ACS NPL SITE
Griffith, Indiana

	Acetone	1,1 Dichloroethene	trans 1,2 Dichloroethene	1,1 Dichloroethane	2-Butanone (MEK)	cis 1,2 Dichloroethene	1,2 Dichloroethane	1,1,1 Trichloroethane	Benzene	Carbon tetrachloride	Trichloroethene	MIBK	1,1,2 Trichloroethane	Toluene	Tetrachloroethene	Chlorobenzene	Ethylbenzene	m+p Xylene	Styrene	o Xylene	Total VOCs
	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	mg/L
MW8 39' (VP3)																					0
MW8 49' (VP3)																					0
MW8 59' (VP3)																					0
MW8 69' (VP3)						5.1															0.01
MW8 79' (VP3)																					0
MW8 99' (VP3)							56.5														0.06
MW8 99' (VP3) Dup							63														0.06
VP1 30'																					0
VP1 39'	10																				0.01
VP1 49'																					0
VP1 59'																					0
VP1 69'																					0
VP1 79'																					0
VP1 92'																					0
VP2 29'	37.7																				0.04
VP2 39'																					0
VP2 52'																					0
VP2 59'																					0
VP2 72'																					0
VP2 79'																					0
VP2 86'																					0
VP4 58'																					0
VP4 69'																					0
VP4 79'																					0
VP4 89'																					0

2-8-96

GC #2

Lower Aquifer

ACS Field GC #2

Compound Date 2/8/96	PK #	RT	STD1 50 *Run #*	STD2 10 *Run #*	STD3 5 *Run #*	Linear Regression CC	 Slope	 Int.	ICB 10.0 g. *run#*	 ug/L	10 ICV	%D ICV/STD	1 EQUIPMENT BLANK 5.00 mL	 ug/L	2 MW8 39' 5.00 mL	 ug/L
Acetone	1	11.2	74	28	20	0.999	8.5E-01	-12.7			28	100.0%				
1,1,-DCE	2	11.5	632	141	76	1.000	8.1E-02	-1.3			146	103.5%				
trans-1,2-DCE	3	12.6	2,452	635	370	1.000	2.2E-02	-3.4			640	100.8%				
MEK/cis 1,2-DCE	4	14.1	1,817	519	304	1.000	3.0E-02	-4.8			481	92.7%				
Benzene	6	16.7	3,497	1,024	606	0.999	1.6E-02	-5.3			971	94.8%				
TCE	7	18.1	2,494	716	417	0.999	2.2E-02	-4.9			688	96.1%				
MIBK	8	19.8	274	86	43	0.997	2.0E-01	-5.2			67	77.9%				
Toluene	9	20.6	3,225	988	608	0.999	1.7E-02	-6.3			932	94.3%				
PCE	10	21.9	2,056	595	360	1.000	2.7E-02	-5.3			575	96.6%				
Chlorobenzene	11	23.7	3,249	986	573	0.999	1.7E-02	-5.7			891	90.4%				
Ethylbenzene	12	24.0	2,977	835	472	0.999	1.8E-02	-4.3			791	94.7%				
m+p-Xylene	13	24.2	3,389	976	574	1.000	1.6E-02	-5.0			930	95.3%				
Styrene	14	25.5	3,142	777	377	0.999	1.6E-02	-2.0			677	87.1%				
o-Xylene	15		2,428	767	457	0.999	2.3E-02	-6.6			721	94.0%				
1,1,-DCE	1	11.5	3,321	818	452	1.000	1.6E-02	-2.5			644	78.7%				
t-1,2-DCE	2	12.6	3,648	1,175	723	0.999	1.6E-02	-7.3			924	78.6%				
1,1-DCA	3	13.4	5,540	1,626	985	1.000	1.0E-02	-5.5			1,589	97.7%				
cis-1,2-DCE	4	14.5	5,726	1,791	1,129	0.999	9.9E-03	-6.9			1,382	77.2%				
1,2-DCA	5	14.9	4,884	1,801	1,023	0.996	1.2E-02	-9.2			1,166	64.7%				
1,1,1-TCA	6	15.9	4,286	1,060	687	1.000	1.2E-02	-3.4			1,285	121.2%				
Carbon Tet.	7	16.6	9,589	2,606	1,622	1.000	5.7E-03	-4.5			2,418	92.8%				
TCE	8	18.2	9,780	3,025	2,064	1.000	5.9E-03	-7.4			2,488	82.2%				
1,1,2-TCA	9	21.2	6,316	2,428	1,450	0.996	9.5E-03	-10.8			1,712	70.5%				
PCE	10	21.9	7,667	2,488	1,577	0.999	7.5E-03	-7.7			2,032	81.7%				
Chlorobenzene	11	23.7	4,968	1,366	782	1.000	1.1E-02	-4.1			1,022	74.8%				
a,a,a-TFT	8	18.5	1,754	**478**	278				448	94%	462	97%	456	95%	438	92%
1,4-DCBA	12	26.8	4,564	**1,881**	1,064				1,516	81%	1,356	72%	1634	87%	1084	58%
TOTAL VOCs (PPM)														**0.0**		**0.0**

Analyst _____

Check _____

Lower Aquifer

ACS Field GC #2	3		4		5		6		7		8			
Compound **Date** **2/8/96**	**MW8 49'** 5.00 mL	ug/L	**MW8 39' DUP** 5.00 mL	ug/L	**GP102** 5.00 mL	ug/L	**MW8 59'** 5.00 mL	ug/L	**MW8 69'** 5.00 mL	ug/L	**MW8 79'** 5.00 mL	ug/L	**10** **CCV**	**%D** CCV/STD
Acetone													22	78.6%
1,1,-DCE													154	109.2%
trans-1,2-DCE													564	88.8%
MEK/cis 1,2-DCE													437	84.2%
Benzene													874	85.4%
TCE													626	87.4%
MIBK													50	58.1%
Toluene													876	88.7%
PCE													577	97.0%
Chlorobenzene													840	85.2%
Ethylbenzene													739	88.5%
m+p-Xylene													856	87.7%
Styrene													582	74.9%
o-Xylene													706	90.9%
1,1,-DCE													941	115.0%
t-1,2-DCE													1272	108.3%
1,1-DCA													1725	106.1%
cis-1,2-DCE									1 PT(5UG/L)	5.1			1793	100.1%
1,2-DCA													1414	78.5%
1,1,1-TCA													1373	129.5%
Carbon Tet.													2873	110.2%
TCE													3198	105.7%
1,1,2-TCA													2021	83.2%
PCE													2792	112.2%
Chlorobenzene													1169	85.6%

a,a,a-TFT	458	96%	452	95%	427	89%	435	91%	441	92%	387	81%	440.0	92%
1,4-DCBA	1607	85%	1606	85%	1109	59%	1479	79%	1731	92%	1197	64%	1,596.0	85%

TOTAL VOCs (PPM	**0.0**		**0.0**		**0.0**		**0.0**		**0.0**		**0.0**		

Analyst _____
Check _____

Lower Aquifer

ACS Field GC #2

Compound Date 2/8/96	5 DLV	%D 5 STD
Acetone	18	90.0%
1,1,-DCE	77	101.3%
trans-1,2-DCE	330	89.2%
MEK/cis 1,2-DCE	263	86.5%
Benzene	541	89.3%
TCE	395	94.7%
MIBK	31	72.1%
Toluene	551	90.6%
PCE	351	97.5%
Chlorobenzene	491	85.7%
Ethylbenzene	436	92.4%
m+p-Xylene	577	100.5%
Styrene	291	77.2%
o-Xylene	422	92.3%
1,1,-DCE	445	98.5%
t-1,2-DCE	648	89.6%
1,1-DCA	952	96.6%
cis-1,2-DCE	1044	92.5%
1,2-DCA	795	77.7%
1,1,1-TCA	817	118.9%
Carbon Tet.	1656	102.1%
TCE	1991	96.5%
1,1,2-TCA	1195	82.4%
PCE	1667	105.7%
Chlorobenzene	662	84.7%

a,a,a-TFT	247.0	89%
1,4-DCBA	895.0	84%

TOTAL VOCs (PPM

Analyst _____

Check _____

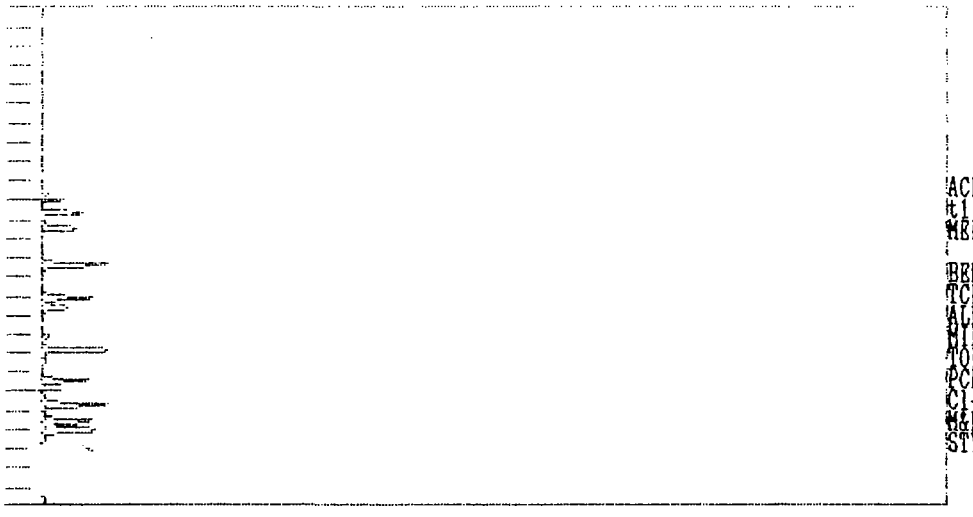
GC#2

5 ug/L

PID

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/08/1996 08:00:17
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 2DATA297.CHR ( )
Operator : MARK PAULI

-25.000mV 512.000mV



Component	Retention	Height	Area	
ACETONE	9.725	3.074	19.55	
c1_2-DCE	10.625	47.630	370.06	
MEK & c1_2-DCE	11.458	30.198	303.89	
BENZENE	13.375	42.150	606.07	
TCE	15.116	28.716	416.55	M
ALPHA-TFT(SURR)	15.616	17.328	277.65	M
MIBK	17.141	3.531	43.24	
TOLUENE	17.841	54.120	607.80	
PCE	19.458	27.584	359.82	
C1-BENZENE	20.716	40.329	573.45	
M&P-XYLENE	22.016	34.302	573.54	
STYRENE	23.183	27.658	456.69	

Component	Retention	Height	Area	
(unknown)	9.075	3.014	16.76	
ACETONE	9.725	3.074	19.55	
1_1-DCE	9.991	11.547	75.89	
c1_2-DCE	10.625	47.630	370.06	
MEK & c1_2-DCE	11.458	30.198	303.89	
BENZENE	13.375	42.150	606.07	
TCE	15.116	28.716	416.55	M
ALPHA-TFT(SURR)	15.616	17.328	277.65	M
MIBK	17.141	3.531	43.24	
TOLUENE	17.841	54.120	607.80	
PCE	19.458	27.584	359.82	
C1-BENZENE	20.716	40.329	573.45	
ETHYL BENZENE	21.566	30.998	471.76	
M&P-XYLENE	22.016	34.302	573.54	
STYRENE	23.000	26.545	376.92	
~~STYRENE~~ O-XYLENE	23.183	27.658	456.69	
(unknown)	26.333	3.810	34.32	
(unknown)	27.533	1.934	17.07	

18 5601.03

2/8/96 MP

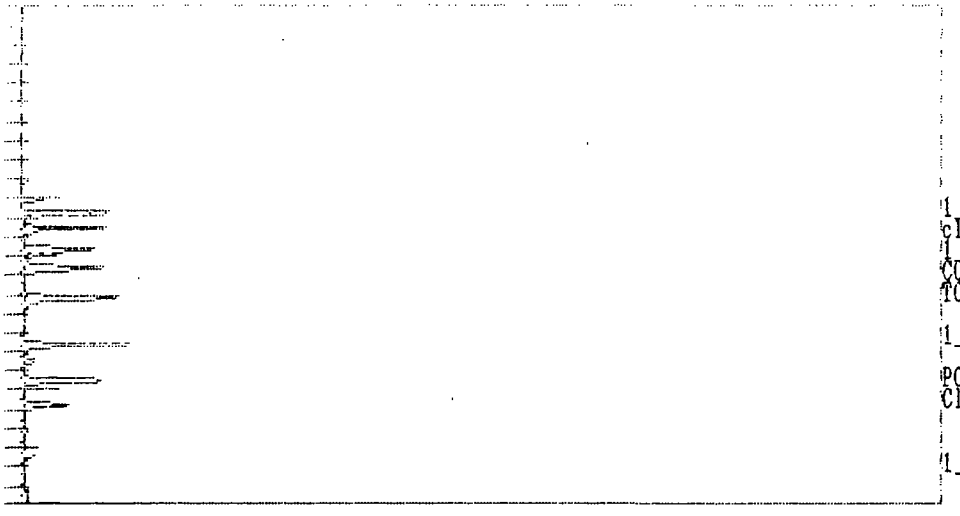
5 ug/L

GC #2

DELCD

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/08/1996 08:00:17
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 1data297.CHR ()
Operator : MARK PAULI

-25.600mV 1024.000mV



Component	Retention	Height	Area	
1_1-DCA	10.833	96.514	985.01	M
cI_2-DCE	11.516	92.965	1128.53	
1_1_1-TCA	12.850	47.773	686.82	M
CCI4	13.616	88.265	1622.41	
TCE	15.183	120.936	2063.89	
1_1_2-TCA	17.633	116.323	1449.64	
PCE	19.516	112.200	1577.12	
Cl-BENZENE	20.800	53.451	781.64	
1_4-DCBA (SURR)	23.200	51.694	1063.93	

Component	Retention	Height	Area	
1_1-DCE	10.050	54.327	451.86	
t1_2-DCE	10.683	99.413	723.21	M
1_1-DCA	10.833	96.514	985.01	M
c1_2-DCE	11.516	92.965	1128.53	
1_2-DCA	12.616	82.093	1022.86	M
1_1_1-TCA	12.850	47.773	686.82	M
CCl4	13.616	88.265	1622.41	
TCE	15.183	120.936	2063.89	
1_1_2-TCA	17.633	116.323	1449.64	
PCE	19.516	112.200	1577.12	
Cl-BENZENE	20.800	53.451	781.64	
1_4-DCBA (SURR)	23.200	51.694	1063.93	
12			13556.93	

2/8/96
mop

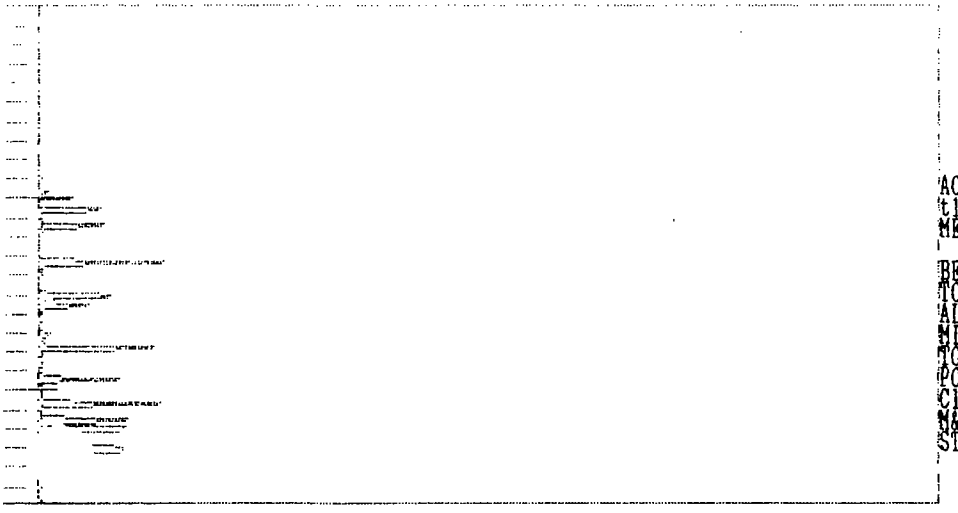
10 ug/L

GC #2

PID

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/08/1996 08:41:17
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 2DATA298.CHR ()
Operator : MARK PAULI

-25.000mV 512.000mV



Component	Retention	Height	Area	
ACETONE	9.716	4.594	28.41	
t1_2-DCE	10.616	82.061	634.81	
MEK & c1_2-DCE	11.433	51.247	518.58	
BENZENE	13.333	71.811	1023.70	
TCE	15.083	47.602	716.10	M
ALPHA-TFT(SURR)	15.575	29.551	478.03	M
MIBK	17.116	6.878	85.59	
TOLUENE	17.833	87.415	987.95	
PCE	19.433	45.726	594.96	
C1-BENZENE	20.708	69.921	986.07	
M&P-XYLENE	22.008	57.824	976.41	
STYRENE	23.175	48.814	766.78	

Component	Retention	Height	Area	
(unknown)	9.075	5.236	27.96	
ACETONE	9.716	4.594	28.41	
1_1-DCE	9.983	21.172	141.22	
t1_2-DCE	10.616	82.061	634.81	
MEK & c1_2-DCE	11.433	51.247	518.58	
BENZENE	13.333	71.811	1023.70	
TCE	15.083	47.602	716.10	M
ALPHA-TFT(SURR)	15.575	29.551	478.03	M
MIBK	17.116	6.878	85.59	
TOLUENE	17.833	87.415	987.95	
PCE	19.433	45.726	594.96	
C1-BENZENE	20.708	69.921	986.07	
ETHYL BENZENE	21.558	54.191	834.84	
M&P-XYLENE	22.008	57.824	976.41	
STYRENE	22.975	50.356	776.79	
~~STYRENE~~ o-XYLENE	23.175	48.814	766.78	
(unknown)	26.375	4.083	32.71	
(unknown)	27.575	1.967	15.38	
18			9626.28	

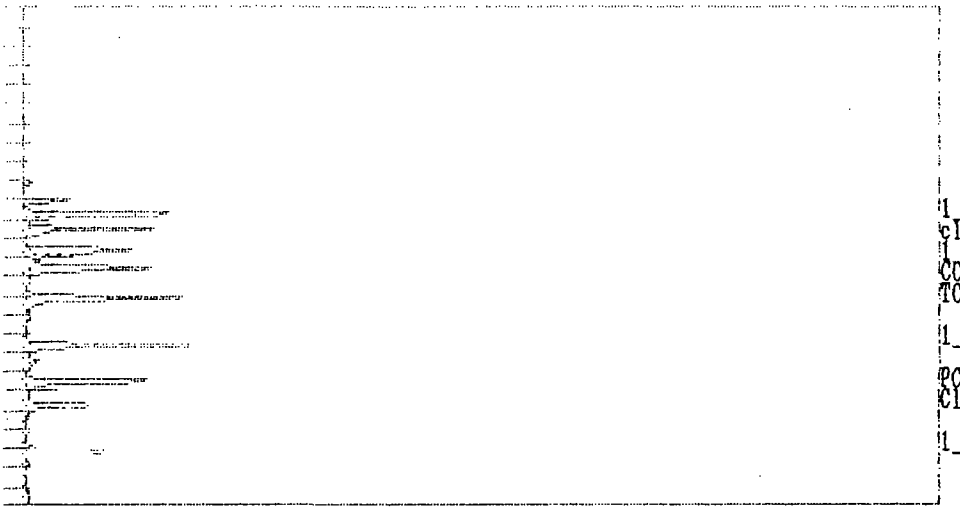
2/8/96
MP

10 ug/L

GC#2
DELCD

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/08/1996 08:41:17
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 1data298.CHR ( )
Operator : MARK PAULI

-25.600mV 1024.000mV



Component	Retention	Height	Area	
1_1-DCA	10.816	154.729	1626.02	M
cl_2-DCE	11.500	153.537	1790.60	
1_1_1-TCA	12.816	77.695	1060.36	M
CCl4	13.583	142.141	2605.75	
TCE	15.150	177.807	3024.53	
1_1_2-TCA	17.616	191.797	2428.28	
PCE	19.500	177.699	2488.07	
Cl-BENZENE	20.766	93.726	1365.81	
1_4-DCBA (SURR)	23.183	88.594	1881.15	

Component	Retention	Height	Area	
1_1-DCE	10.050	100.277	817.54	
tl_2-DCE	10.683	171.409	1174.94	M
1_1-DCA	10.816	154.729	1626.02	M
cl_2-DCE	11.500	153.537	1790.60	
1_2-DCA	12.583	140.250	1801.23	M
1_1_1-TCA	12.816	77.695	1060.36	M
CCl4	13.583	142.141	2605.75	
TCE	15.150	177.807	3024.53	
1_1_2-TCA	17.616	191.797	2428.28	
PCE	19.500	177.699	2488.07	
Cl-BENZENE	20.766	93.726	1365.81	
1_4-DCBA (SURR)	23.183	88.594	1881.15	

12 22064.27

2/8/96 MP

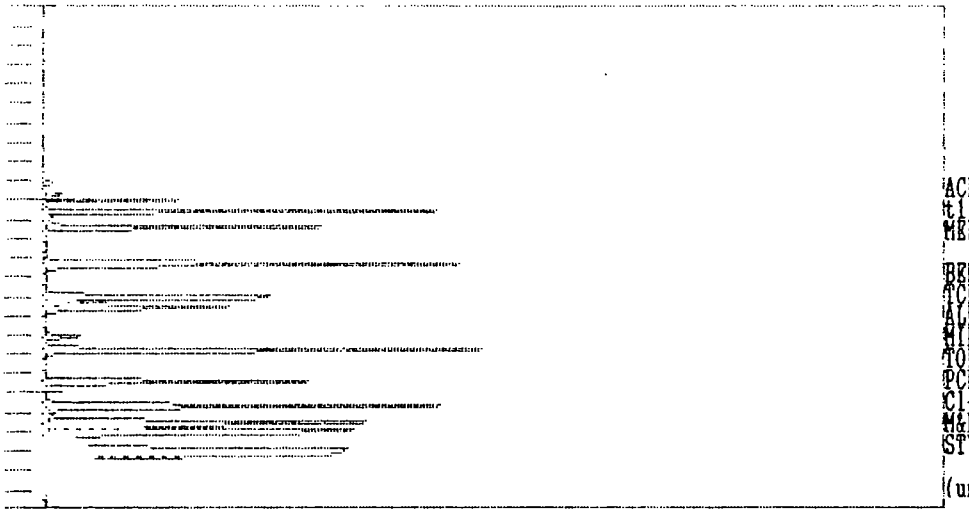
50 ug/L

GC#2

PID

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/08/1996 09:23:02
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 2DATA299.CHR ()
Operator : MARK PAULI

-25.000mV 512.000mV



Component	Retention	Height	Area	
ACETONE	9.691	12.051	74.48	
t1_2-DCE	10.591	305.682	2451.66	
MEK & c1_2-DCE	11.425	175.972	1817.08	
BENZENE	13.308	239.307	3497.12	
TCE	15.058	161.897	2493.52	
ALPHA-TFT(SURR)	15.575	107.379	1753.61	
MIBK	17.100	21.644	273.80	
TOLUENE	17.808	272.239	3224.96	
PCE	19.425	154.396	2053.75	
C1-BENZENE	20.700	225.677	3249.45	
M&P-XYLENE	22.000	196.841	3388.91	
STYRENE	23.116	168.821	2428.32	M
(unknown)	25.133	1.149	18.78	

Component	Retention	Height	Area	
(unknown)	9.075	14.852	105.50	
ACETONE	9.691	12.051	74.48	
1_1-DCE	9.958	87.001	631.51	
t1_2-DCE	10.591	305.682	2451.66	
MEK & c1_2-DCE	11.425	175.972	1817.08	
BENZENE	13.308	239.307	3497.12	
TCE	15.058	161.897	2493.52	
ALPHA-TFT(SURR)	15.575	107.379	1753.61	
MIBK	17.100	21.644	273.80	
TOLUENE	17.808	272.239	3224.96	
PCE	19.425	154.396	2053.75	
C1-BENZENE	20.700	225.677	3249.45	
ETHYL BENZENE	21.550	186.424	2976.85	
M&P-XYLENE	22.000	196.841	3388.91	
STYRENE	22.966	181.082	3141.67	M
~~STYRENE~~ O-XYLENE	23.116	168.821	2428.32	M
(unknown)	25.133	1.149	18.78	
(unknown)	26.316	7.140	70.33	
(unknown)	27.516	2.574	22.74	
19			33674.04	

2/8/96
mdp

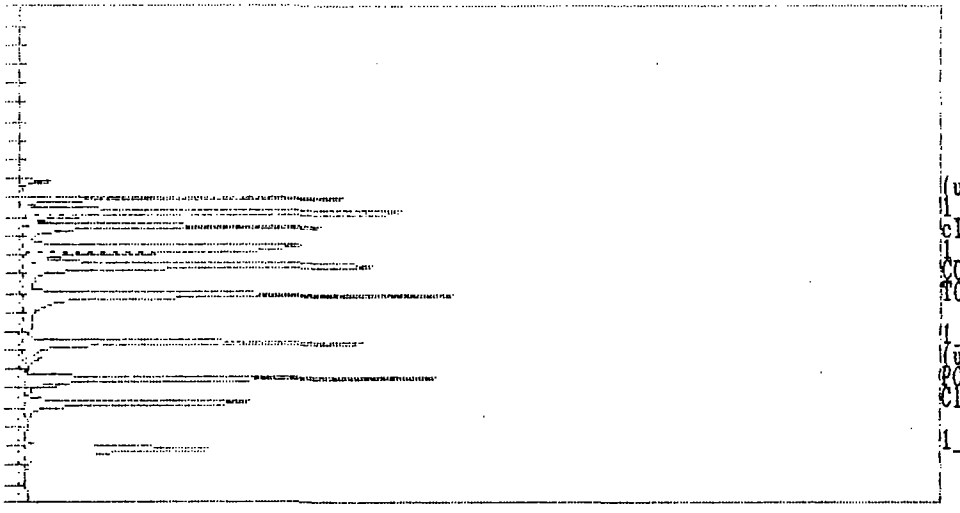
50 ug/L

GC #2

DELCD

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/08/1996 09:23:02
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 1data299.CHR ()
Operator : MARK PAULI

-25.600mV 1024.000mV



Component	Retention	Height	Area	
(unknown)	9.116	82.032	565.93	
1_1-DCA	10.800	484.634	5540.12	M
c1_2-DCE	11.466	452.277	5726.34	M
1_1_1-TCA	12.766	268.276	4286.05	M
CCl4	13.550	445.888	9588.58	M
TCE	15.116	497.336	9779.70	M
1_1_2-TCA	17.583	447.208	6315.89	M
(unknown)	18.483	19.296	529.78	M
PCE	19.466	519.894	7667.45	M
Cl-BENZENE	20.750	321.495	4967.74	M
1_4-DCBA (SURR)	23.166	211.925	4564.20	

Component	Retention	Height	Area	
(unknown)	9.116	82.032	565.93	
1_1-DCE	10.016	397.711	3321.13	M
c1_2-DCE	10.650	525.981	3648.44	M
1_1-DCA	10.800	484.634	5540.12	M
c1_2-DCE	11.466	452.277	5726.34	M
1_2-DCA	12.550	376.784	4883.73	M
1_1_1-TCA	12.766	268.276	4286.05	M
CCl4	13.550	445.888	9588.58	M
TCE	15.116	497.336	9779.70	M
1_1_2-TCA	17.583	447.208	6315.89	M
(unknown)	18.483	19.296	529.78	M
PCE	19.466	519.894	7667.45	M
Cl-BENZENE	20.750	321.495	4967.74	M
1_4-DCBA (SURR)	23.166	211.925	4564.20	

14 71385.08

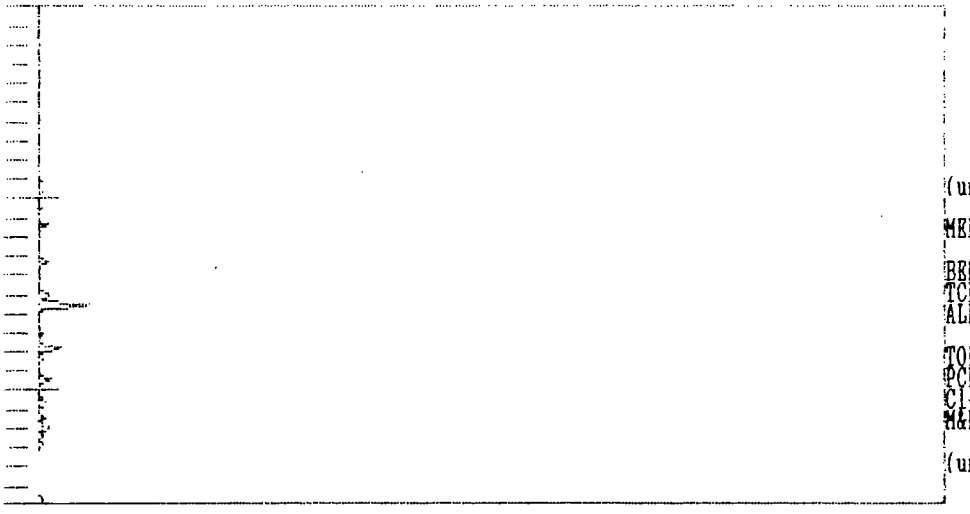
2/8/96 msp

BLANK (ICB)

GC #2 PID

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/08/1996 10:02:15
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 2DATA300.CHR ()
Operator : MARK PAULI

-25.000mV 512.000mV



Component	Retention	Height	Area
(unknown)	9.150	2.309	23.01
MEK & c1_2-DCE	11.425	5.015	50.70
BENZENE	13.325	4.873	69.91
TCE	15.066	5.887	75.13
ALPHA-TFT(SURR)	15.583	28.672	448.35
TOLUENE	17.825	16.590	184.00
PCE	19.441	7.198	92.07
C1-BENZENE	20.708	3.025	49.20
M&P-XYLENE	22.008	6.153	93.03
(unknown)	23.200	2.776	67.72

Component	Retention	Height	Area
(unknown)	9.150	2.309	23.01
MEK & c1_2-DCE	11.425	5.015	50.70
BENZENE	13.325	4.873	69.91
TCE	15.066	5.887	75.13
ALPHA-TFT(SURR)	15.583	28.672	448.35
TOLUENE	17.825	16.590	184.00
PCE	19.441	7.198	92.07
~~C1-BENZENE~~	20.708	3.025	49.20
ETHYL BENZENE	21.558	2.202	26.85
M&P-XYLENE	22.008	6.153	93.03
(unknown)	23.200	2.776	67.72
(unknown)	26.341	4.118	42.19
(unknown)	27.541	2.301	20.96

13 1243.12

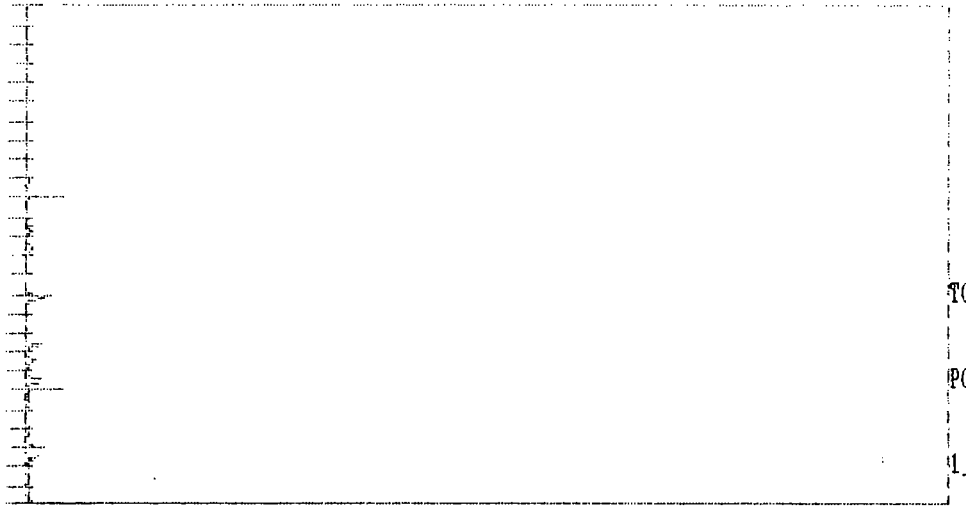
2/8/96 MCP

BLANK (ICB)

GC #2
DELCD

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/08/1996 10:02:15
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 1data300.CHR ()
Operator : MARK PAULI

-25.600mV 1024.000mV



Component	Retention	Height	Area
TCE	15.150	29.618	499.33
PCE	19.516	22.469	311.67
1_4-DCBA (SURR)	23.200	71.520	1515.71

Component	Retention	Height	Area
TCE	15.150	29.618	499.33
PCE	19.516	22.469	311.67
1_4-DCBA (SURR)	23.200	71.520	1515.71
3			2326.71

2/8/96 MOP

10 ug/L

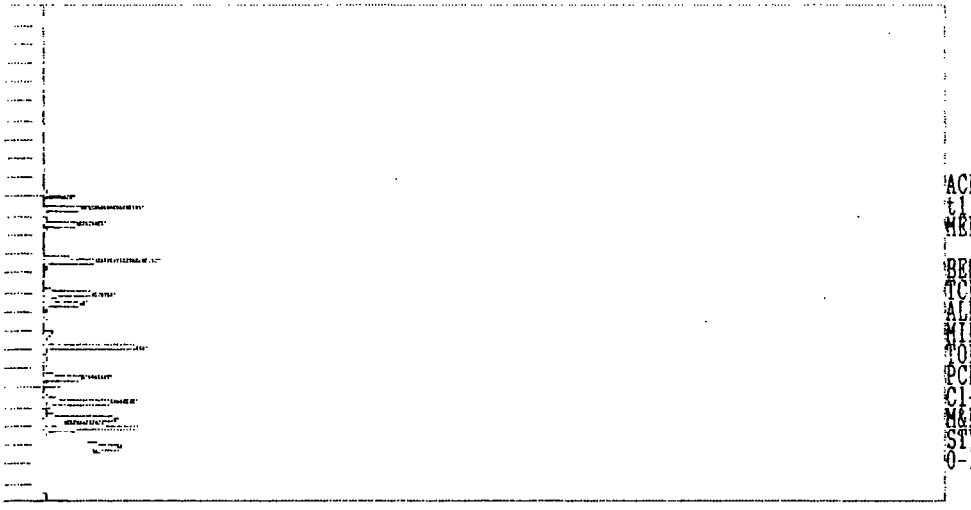
GC #2

PID

(CCV)

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/08/1996 10:44:25
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 2DATA301.CHR ()
Operator : MARK PAULI

-25.000mV 512.000mV



Component	Retention	Height	Area	
ACETONE	9.691	4.841	28.42	
t1_2-DCE	10.600	82.168	639.89	
MEK & c1_2-DCE	11.433	48.326	480.54	
BENZENE	13.350	68.113	970.66	
TCE	15.091	45.892	687.67	M
ALPHA-TFT(SURR)	15.608	28.819	461.72	M
MIBK	17.150	5.500	66.77	
TOLUENE	17.841	81.771	931.87	
PCE	19.483	43.863	574.70	
C1-BENZENE	20.733	62.910	891.36	
M&P-XYLENE	22.050	54.865	930.39	
STYRENE	23.050	44.660	677.31	
O-XYLENE	23.216	44.612	720.68	

Component	Retention	Height	Area	
(unknown)	9.058	2.899	18.85	
ACETONE	9.691	4.841	28.42	
1_1-DCE	9.958	22.487	146.30	
t1_2-DCE	10.600	82.168	639.89	
MEK & c1_2-DCE	11.433	48.326	480.54	
BENZENE	13.350	68.113	970.66	
TCE	15.091	45.892	687.67	M
ALPHA-TFT(SURR)	15.608	28.819	461.72	M
MIBK	17.150	5.500	66.77	
TOLUENE	17.841	81.771	931.87	
PCE	19.483	43.863	574.70	
C1-BENZENE	20.733	62.910	891.36	
ETHYL BENZENE	21.600	51.022	790.89	
M&P-XYLENE	22.050	54.865	930.39	
STYRENE	23.050	44.660	677.31	
O-XYLENE	23.216	44.612	720.68	
(unknown)	26.358	4.681	40.67	
(unknown)	27.550	2.280	19.55	
18			9078.25	

2/8/96 mof

10 ug/L
(CCV)

GC #2
DELCD

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/08/1996 10:44:25
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 1data301.CHR ()
Operator : MARK PAULI

-25.600mV 1024.000mV

Component	Retention	Height	Area	
1_1-DCA	10.800	149.526	1589.07	M
cI_2-DCE	11.500	120.425	1382.10	
1_1_1-TCA	12.833	82.319	1284.79	
CCl4	13.600	131.865	2418.06	
TCE	15.150	144.479	2487.51	
1_1_2-TCA	17.633	136.717	1711.98	
PCE	19.550	142.874	2031.75	
Cl-BENZENE	20.816	69.254	1021.94	
1_4-DCBA (SURR)	23.233	64.758	1355.76	

Component	Retention	Height	Area	
1_1-DCE	10.016	82.534	643.85	
tI_2-DCE	10.666	137.398	923.86	M
1_1-DCA	10.800	149.526	1589.07	M
cI_2-DCE	11.500	120.425	1382.10	
1_2-DCA	12.600	101.745	1165.90	
1_1_1-TCA	12.833	82.319	1284.79	
CCl4	13.600	131.865	2418.06	
TCE	15.150	144.479	2487.51	
1_1_2-TCA	17.633	136.717	1711.98	
PCE	19.550	142.874	2031.75	
Cl-BENZENE	20.816	69.254	1021.94	
1_4-DCBA (SURR)	23.233	64.758	1355.76	
12			18016.56	

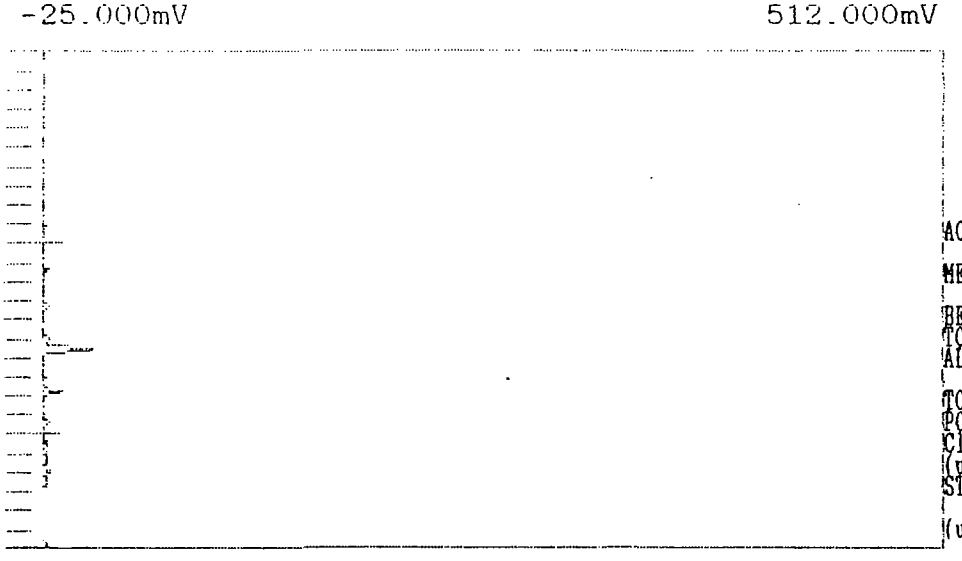
2/8/96
MSP

EQUIPMENT BLANK

GC #2

PID

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/08/1996 11:25:00
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 2DATA302.CHR ()
Operator : MARK PAULI



Component	Retention	Height	Area
ACETONE	9.700	2.527	16.70
MEK & c1_2-DCE	11.416	2.441	24.13
BENZENE	13.316	2.581	38.22
TCE	15.050	2.993	36.68
ALPHA-TFT(SURR)	15.550	29.070	455.70
TOLUENE	17.800	11.470	125.57
PCE	19.425	3.800	48.28
C1-BENZENE	20.691	1.181	20.89
(unknown)	21.958	3.090	49.57
STYRENE	23.125	1.280	27.05
(unknown)	25.108	2.115	36.12

Component	Retention	Height	Area
(unknown)	9.150	1.749	17.56
ACETONE	9.700	2.527	16.70 <
MEK & c1_2-DCE	11.416	2.441	24.13 <
BENZENE	13.316	2.581	38.22 <
TCE	15.050	2.993	36.68
ALPHA-TFT(SURR)	15.550	29.070	455.70
TOLUENE	17.800	11.470	125.57 <
PCE	19.425	3.800	48.28
~~C1-BENZENE~~	20.691	1.181	20.89
(unknown)	21.958	3.090	49.57
STYRENE	23.125	1.280	27.05 <
(unknown)	25.108	2.115	36.12
(unknown)	26.291	3.716	36.09
13			932.55

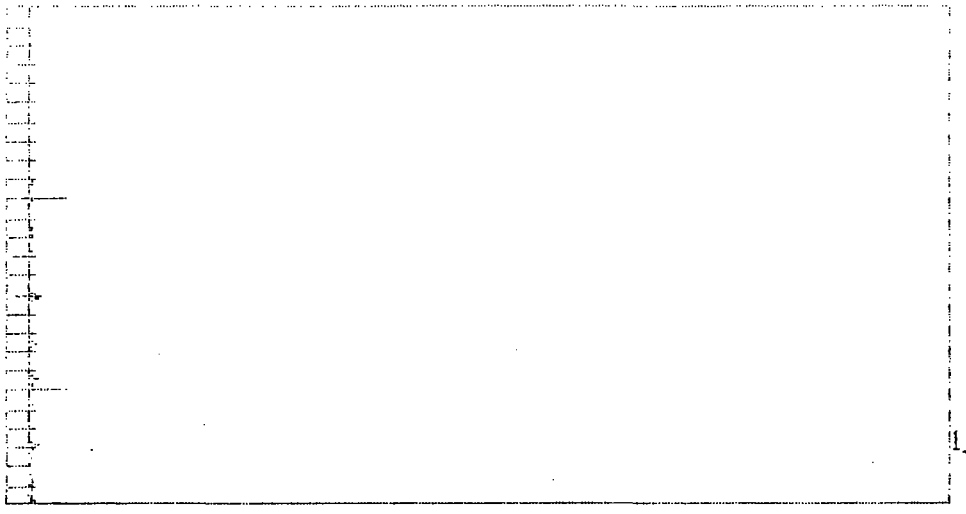
2/8/96
MAP

EQUIPMENT BLANK

GC #2
DELCD

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/08/1996 11:25:00
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 1data302.CHR ()
Operator : MARK PAULI

-25.600mV 1024.000mV



Component	Retention	Height	Area
1_4-DCBA (SURR)	23.133	75.633	1634.46

Component	Retention	Height	Area
1_4-DCBA (SURR)	23.133	75.633	1634.46
1			1634.46

2/9/96 msp

MW8 39'
VERTICAL PROFILE SAMPLE

GC #2
PID

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/08/1996 12:05:51
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 2DATA303.CHR ()
Operator : MARK PAULI

-25.000mV 512.000mV

Component	Retention	Height	Area
(unknown)	9.125	2.459	22.21
MEK & c1_2-DCE	11.391	2.341	22.83
BENZENE	13.291	26.959	377.47
TCE	15.033	2.354	29.09
ALPHA-TFT(SURR)	15.550	27.465	437.80
TOLUENE	17.783	7.661	81.91
PCE	19.408	3.346	42.05
C1-BENZENE	20.658	0.882	16.48
ETHYL BENZENE	21.941	2.113	35.75
STYRENE	23.091	0.889	17.96
(unknown)	25.075	1.273	21.07

Component	Retention	Height	Area
unknown)	9.125	2.459	22.21
MEK & c1_2-DCE	11.391	2.341	22.83
BENZENE	13.291	26.959	377.47
TCE	15.033	2.354	29.09
ALPHA-TFT(SURR)	15.550	27.465	437.80
TOLUENE	17.783	7.661	81.91
PCE	19.408	3.346	42.05
C1-BENZENE	20.658	0.882	16.48
ETHYL BENZENE	21.941	2.113	35.75
STYRENE	23.091	0.889	17.96
unknown)	25.075	1.273	21.07
unknown)	26.300	3.535	34.68
12			1139.30

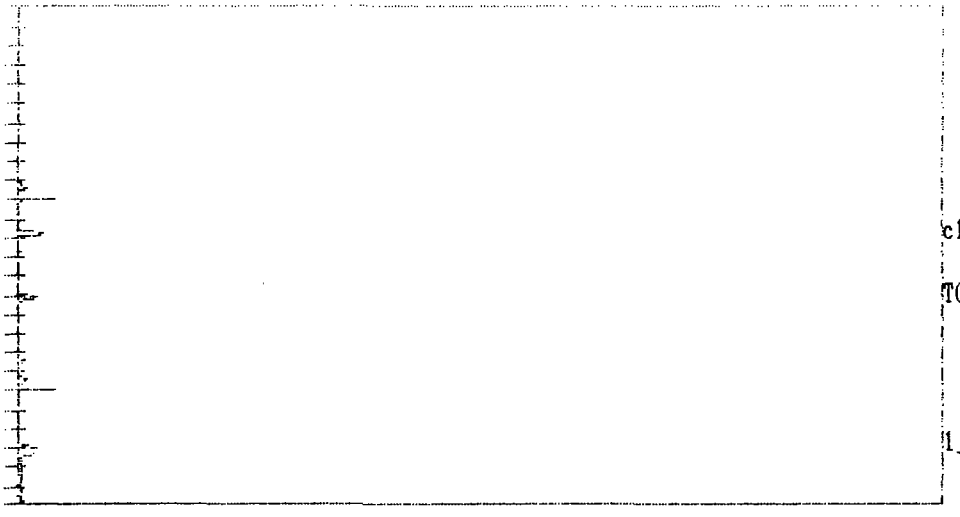
2/8/96
MP

MW8 39'
VERTICAL PROFILE SAMPLE

GC #2
DELCD

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/08/1996 12:05:51
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 1data303.CHR ()
Operator : MARK PAULI

-25.600mV 1024.000mV



Component	Retention	Height	Area
c1_2-DCE	11.750	36.346	400.63
TCE	15.116	22.778	303.10
1_4-DCBA (SURR)	23.116	52.440	1083.53

Component	Retention	Height	Area
>1_2-DCE	11.750	36.346	400.63
TCE	15.116	22.778	303.10
L_4-DCBA (SURR)	23.116	52.440	1083.53
3			1787.27

2/8/96
MSP

MW8 49'
VERTICAL PROFILE SAMPLE

GC #2

PID

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/08/1996 12:43:28
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 2DATA304.CHR ()
Operator : MARK PAULI

-25.000mV 512.000mV

Component	Retention	Height	Area
(unknown)	9.150	1.541	16.34
MEK & c1_2-DCE	11.416	1.639	15.81
BENZENE	13.300	2.180	32.90
TCE	15.025	1.822	20.02
ALPHA-TFT(SURR)	15.541	28.644	457.73
TOLUENE	17.783	8.211	88.35
PCE	19.383	2.616	33.05
ETHYL BENZENE	21.900	1.724	30.12
STYRENE	23.041	0.834	17.30
(unknown)	25.033	4.904	87.84
(unknown)	26.266	3.028	29.73
11			829.18

2/8/96 MSP

MW8 49'

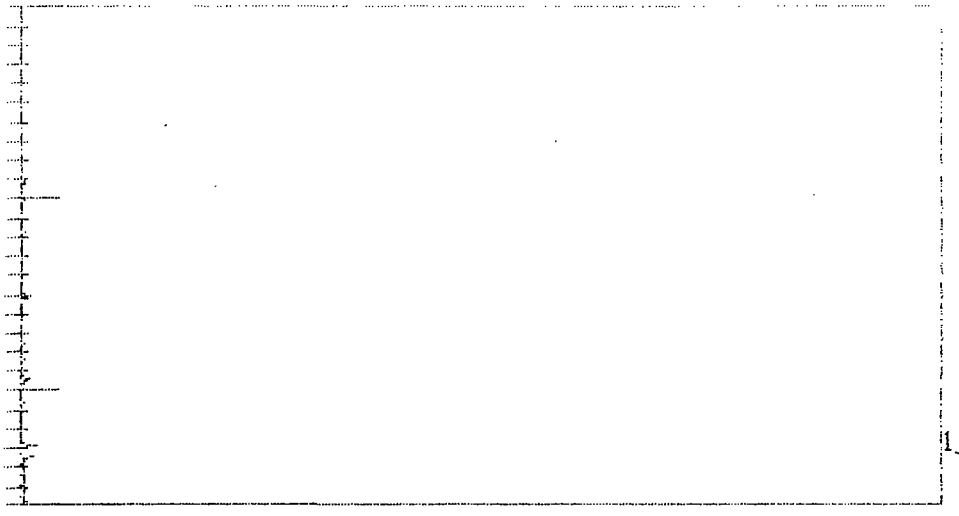
VERTICAL PROFILE SAMPLE

GC#2

DELCD

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/08/1996 12:43:28
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 1data304.CHR ( )
Operator : MARK PAULI

-25.600mV 1024.000mV



Component	Retention	Height	Area
1_4-DCBA (SURR)	23.083	77.450	1607.48

Component	Retention	Height	Area
1_4-DCBA (SURR)	23.083	77.450	1607.48
1			1607.48

2/8/96

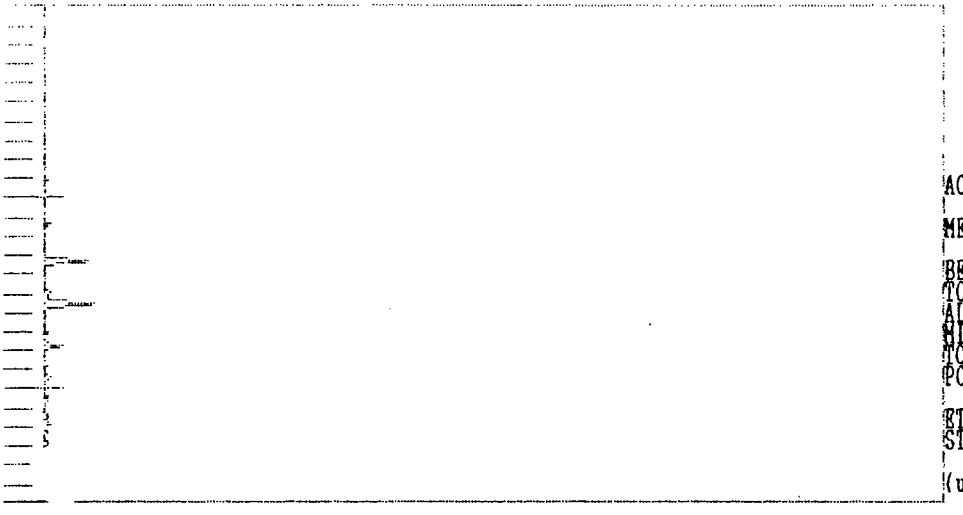
MP

MW8 39'
LAB DUP
VERTICAL PROFILE SAMPLE

GC #2
PID

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/08/1996 13:21:09
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 2DATA305.CHR ()
Operator : MARK PAULI

-25.000mV 512.000mV



Component	Retention	Height	Area
ACETONE	9.708	2.304	15.72
MEK & c1_2-DCE	11.416	2.615	25.78
BENZENE	13.300	27.353	384.21
TCE	15.041	3.031	37.33
ALPHA-TFT(SURR)	15.541	28.650	451.66
MIBK	17.100	1.637	20.07
TOLUENE	17.800	10.610	113.43
PCE	19.400	3.648	45.71
ETHYL BENZENE	21.941	2.909	46.95
STYRENE	23.091	1.184	24.35
(unknown)	25.083	1.288	22.37

Component	Retention	Height	Area
(unknown)	9.141	1.691	17.30
ACETONE	9.708	2.304	15.72 <
MEK & c1_2-DCE	11.416	2.615	25.78 <
BENZENE	13.300	27.353	384.21 <
TCE	15.041	3.031	37.33
ALPHA-TFT(SURR)	15.541	28.650	451.66
MIBK	17.100	1.637	20.07 <
TOLUENE	17.800	10.610	113.43 <
PCE	19.400	3.648	45.71
ETHYL BENZENE	21.941	2.909	46.95 <
STYRENE	23.091	1.184	24.35 <
(unknown)	25.083	1.288	22.37
(unknown)	26.291	3.296	29.66
13			1234.52

2/8/96
MP

MW8 39'

LAB DUP

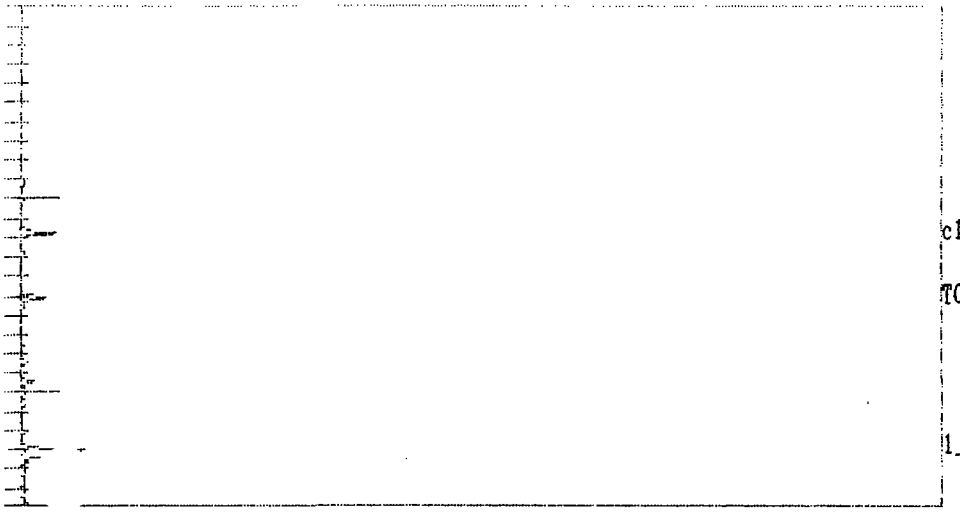
GC #2

DELCD

VERTICAL PROFILE SAMPLE

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/08/1996 13:21:09
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 1data305.CHR ( )
Operator : MARK PAULI

-25.600mV 1024.000mV



Component	Retention	Height	Area
c1_2-DCE	11.783	40.008	437.03
TCE	15.116	31.209	531.41
1_4-DCBA (SURR)	23.116	76.681	1606.34

Component	Retention	Height	Area
c1_2-DCE	11.783	40.008	437.03
TCE	15.116	31.209	531.41
1_4-DCBA (SURR)	23.116	76.681	1606.34
3			2574.78

2/8/96

MP

MW8 59'

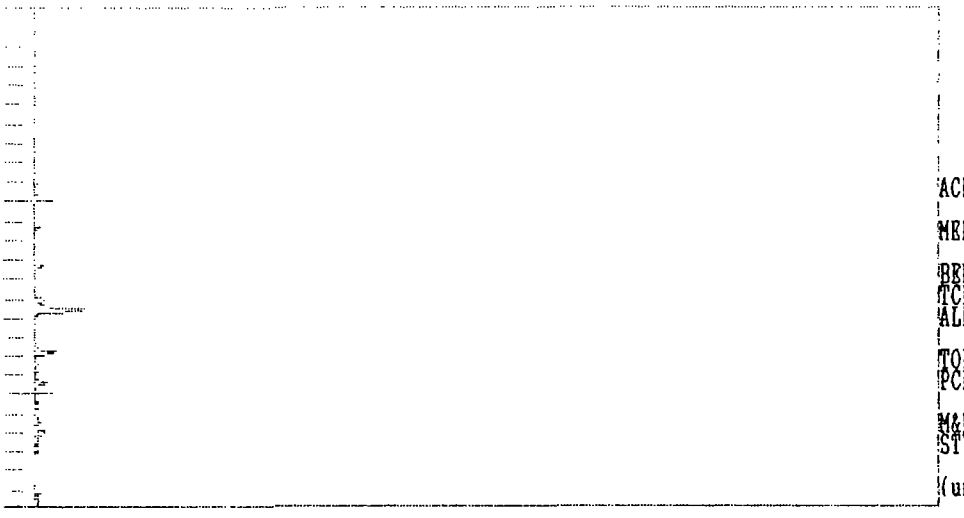
GC #2

VERTICAL PROFILE SAMPLE

PID

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/08/1996 15:56:55
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 2DATA308.CHR ( )
Operator : MARK PAULI

-25.000mV 512.000mV



Component	Retention	Height	Area
ACETONE	9.700	2.274	15.16
MEK & c1_2-DCE	11.433	3.343	32.11
BENZENE	13.341	4.229	62.01
TCE	15.083	5.078	65.61
ALPHA-TFT(SURR)	15.591	28.582	435.32
TOLUENE	17.833	15.139	166.37
PCE	19.450	7.144	91.60
M&P-XYLENE	21.983	5.115	77.91
STYRENE	23.158	1.897	42.22
(unknown)	25.116	3.935	68.10

Component	Retention	Height	Area
(unknown)	9.150	2.323	22.85
ACETONE	9.700	2.274	15.16
MEK & c1_2-DCE	11.433	3.343	32.11
BENZENE	13.341	4.229	62.01
TCE	15.083	5.078	65.61
ALPHA-TFT(SURR)	15.591	28.582	435.32
TOLUENE	17.833	15.139	166.37
PCE	19.450	7.144	91.60
ETHYL BENZENE	21.550	1.594	19.01
M&P-XYLENE	21.983	5.115	77.91
STYRENE	23.158	1.897	42.22
(unknown)	25.116	3.935	68.10
(unknown)	26.316	3.743	35.62
(unknown)	27.525	2.102	19.76
14			1153.64

2/8/96 MSP

MW8 59'

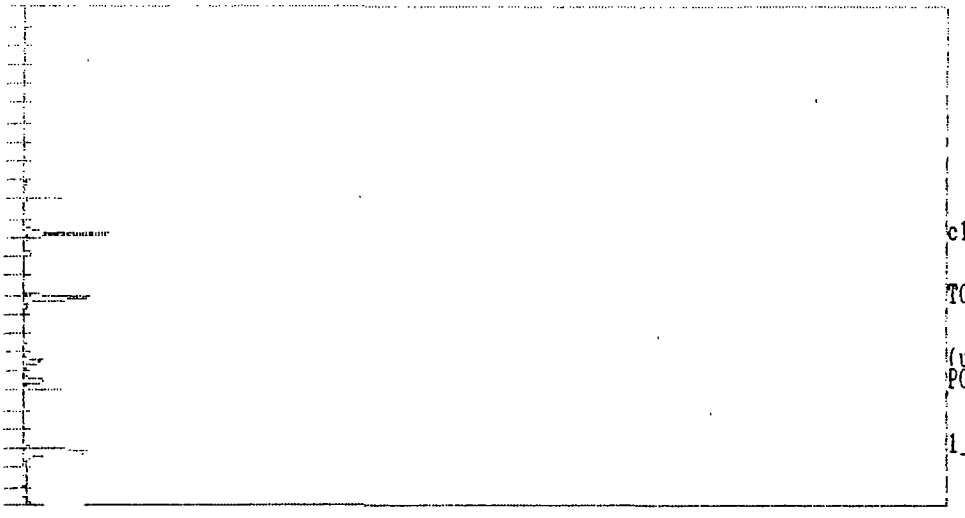
GC #2

VERTICAL PROFILE SAMPLE

DELCD

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/08/1996 15:56:55
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 1data308.CHR ()
Operator : MARK PAULI

-25.600mV 1024.000mV



Component	Retention	Height	Area
c1_2-DCE	11.800	95.850	1108.00
TCE	15.166	79.983	1398.25
(unknown)	18.516	26.814	340.33
PCE	19.516	28.239	384.35
1_4-DCBA (SURR)	23.166	71.265	1478.95

Component	Retention	Height	Area
c1_2-DCE	11.800	95.850	1108.00
TCE	15.166	79.983	1398.25
(unknown)	18.516	26.814	340.33
PCE	19.516	28.239	384.35
1_4-DCBA (SURR)	23.166	71.265	1478.95
5			4709.87

2/8/96 wsl

MW8 69'

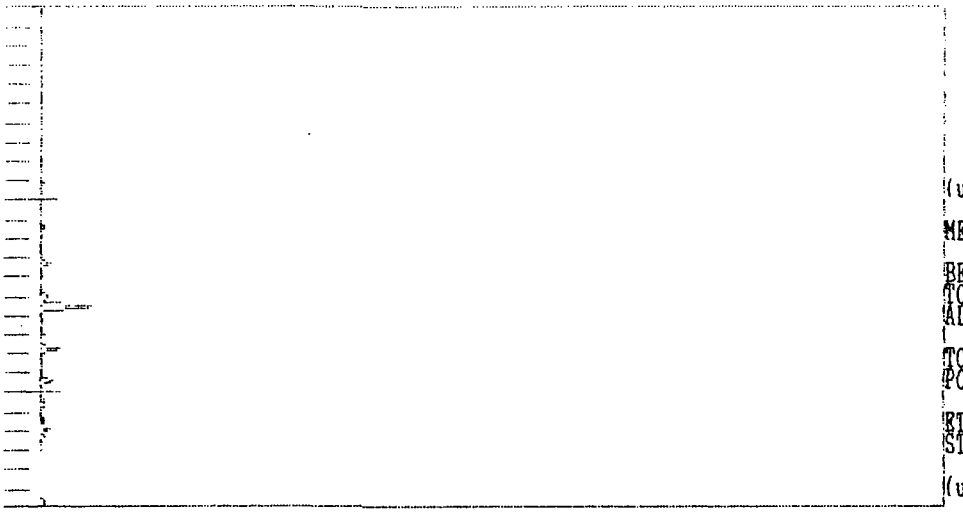
GC #2

PID

VERTICAL PROFILE SAMPLES

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/08/1996 16:36:47
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 2DATA309.CHR ()
Operator : MARK PAULI

-25.000mV 512.000mV



Component	Retention	Height	Area
(unknown)	9.150	1.785	18.68
MEK & c1_2-DCE	11.425	2.473	24.25
BENZENE	13.308	5.811	82.44
TCE	15.050	4.059	49.65
ALPHA-TFT(SURR)	15.550	28.093	440.53
TOLUENE	17.791	10.948	119.40
PCE	19.408	6.175	78.45
ETHYL BENZENE	21.941	3.865	60.72
STYRENE	23.125	1.445	27.58
(unknown)	25.075	2.474	42.90

Component	Retention	Height	Area
(unknown)	9.150	1.785	18.68
MEK & c1_2-DCE	11.425	2.473	24.25
BENZENE	13.308	5.811	82.44
TCE	15.050	4.059	49.65
ALPHA-TFT(SURR)	15.550	28.093	440.53
TOLUENE	17.791	10.948	119.40
PCE	19.408	6.175	78.45
ETHYL BENZENE	21.941	3.865	60.72
STYRENE	23.125	1.445	27.58
(unknown)	25.075	2.474	42.90
(unknown)	26.291	3.536	32.17
11			976.77

2/8/96 AWP

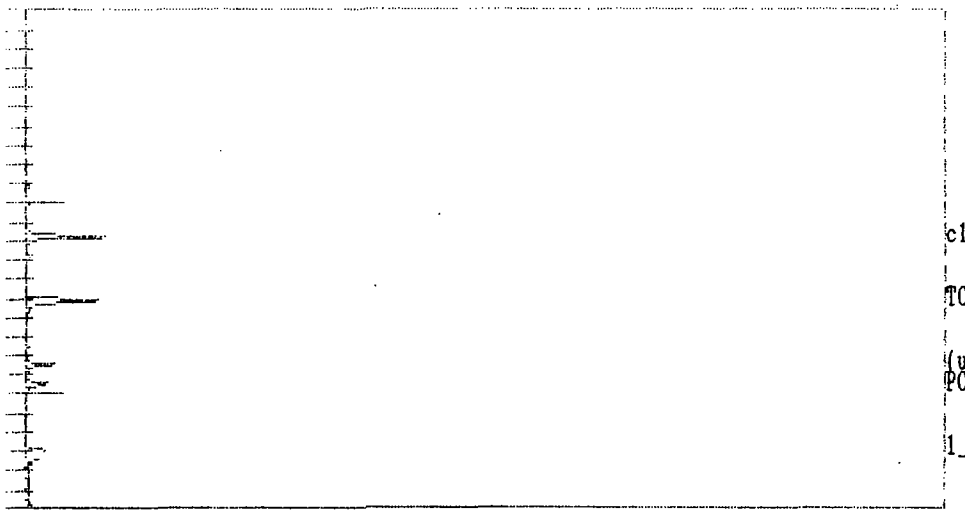
MW 8 69'

VERTICAL PROFILE SAMPLE

GC#2
D&LCD

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/08/1996 16:36:47
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 1data309.CHR ()
Operator : MARK PAULI

-25.600mV 1024.000mV



Component	Retention	Height	Area
c1_2-DCE	11.766	98.853	1145.72
TCE	15.133	81.955	1439.72
(unknown)	18.483	29.844	379.03
PCE	19.466	25.699	348.67
1_4-DCBA (SURR)	23.116	81.052	1731.21

Component	Retention	Height	Area
c1_2-DCE	11.766	98.853	1145.72
TCE	15.133	81.955	1439.72
(unknown)	18.483	29.844	379.03
PCE	19.466	25.699	348.67
1_4-DCBA (SURR)	23.116	81.052	1731.21
5			5044.36

1pt $\frac{1146}{1129} \times 5\ ug/L = 5.08\ ug/L$

2/8/96
MSP

MW8 79'

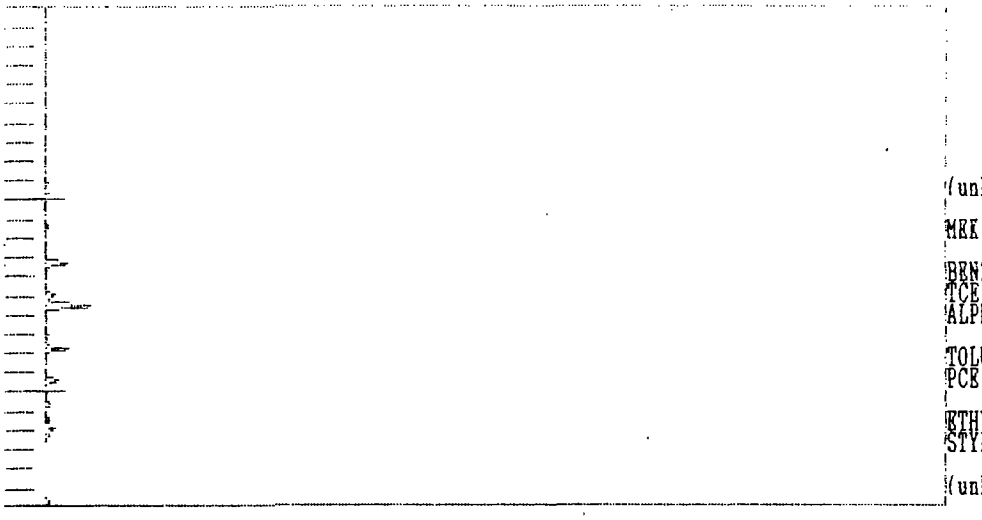
GC #2

VERTICAL PROFILE SAMPLE

PID

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/08/1996 17:18:33
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 2DATA310.CHR ()
Operator : MARK PAULI

-25.000mV 512.000mV



Component	Retention	Height	Area
(unknown)	9.150	1.798	17.66
MEK & c1_2-DCE	11.400	2.213	21.61
BENZENE	13.283	13.306	185.67
TCE	15.033	3.969	50.19
ALPHA-TFT(SURR)	15.541	24.479	387.25
TOLUENE	17.783	12.059	132.22
PCE	19.400	7.003	89.53
ETHYL BENZENE	21.941	4.091	63.20
STYRENE	23.108	1.461	30.43
(unknown)	25.091	2.981	52.11
(unknown)	26.308	3.523	32.59
(unknown)	27.508	1.687	15.50
12			1077.96

2/8/96

MSP

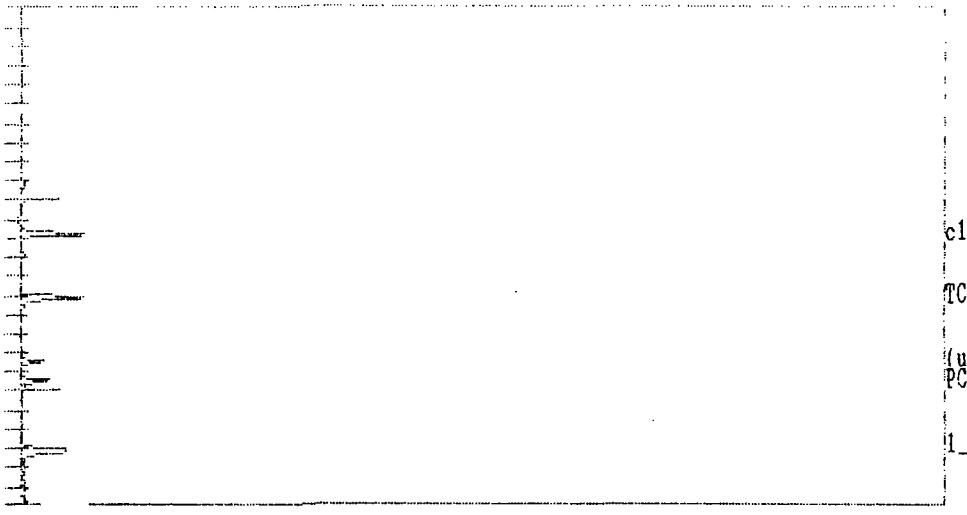
MW8 79'

GC #2 Vertical Profile Sample

DELCD

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/08/1996 17:18:33
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 1data310.CHR ()
Operator : MARK PAULI

-25.600mV 1024.000mV



Component	Retention	Height	Area
c1_2-DCE	11.766	83.858	968.00
TCE	15.116	72.597	1243.90
(unknown)	18.483	24.395	311.02
PCE	19.466	30.708	417.19
1_4-DCBA (SURR)	23.116	56.939	1196.46

Component	Retention	Height	Area
:1_2-DCE	11.766	83.858	968.00 <
'CE	15.116	72.597	1243.90 <
(unknown)	18.483	24.395	311.02
>CE	19.466	30.708	417.19 <
i_4-DCBA (SURR)	23.116	56.939	1196.46
5			4136.57

2/8/96

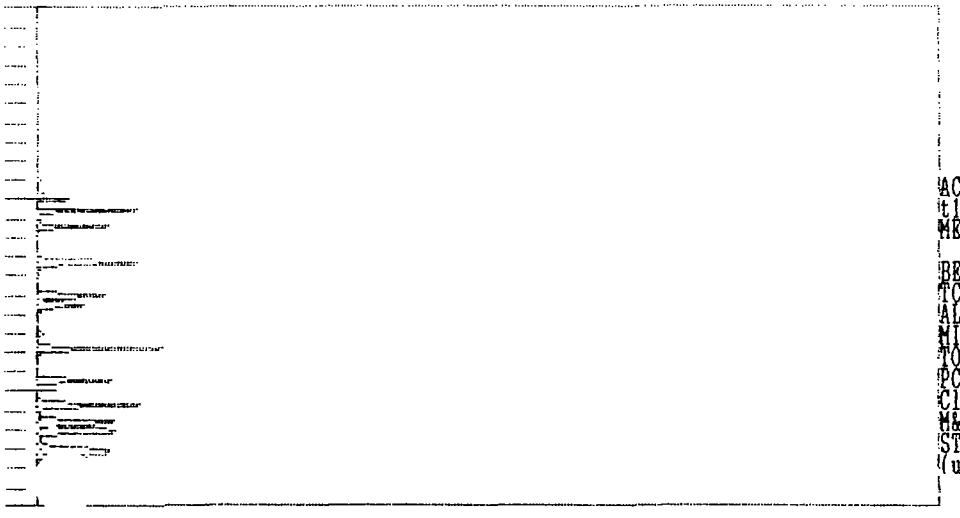
MOP

10 ug/L
(CCV)

GC #2
PID

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/08/1996 17:57:31
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 2DATA311.CHR ( )
Operator : MARK PAULI

-25.000mV 512.000mV



Component	Retention	Height	Area	
ACETONE	9.683	3.688	22.29	
c1_2-DCE	10.591	73.852	563.91	
MEK & c1_2-DCE	11.408	44.168	437.19	
BENZENE	13.291	62.561	873.98	
TCE	15.025	42.223	625.71	M
ALPHA-TFT(SURR)	15.533	26.766	440.17	M
MIBK	17.091	3.962	49.75	
TOLUENE	17.783	76.632	876.36	
PCE	19.425	43.599	576.54	
C1-BENZENE	20.708	59.073	839.79	
M&P-XYLENE	22.025	50.575	855.83	
STYRENE	23.050	40.697	581.89	
(unknown)	23.200	41.268	706.32	

Component	Retention	Height	Area	
unknown)	9.050	4.291	22.70	
ACETONE	9.683	3.688	22.29	
_1-DCE	9.950	22.298	153.53	
c1_2-DCE	10.591	73.852	563.91	
MEK & c1_2-DCE	11.408	44.168	437.19	
BENZENE	13.291	62.561	873.98	
TCE	15.025	42.223	625.71	M
ALPHA-TFT(SURR)	15.533	26.766	440.17	M
MIBK	17.091	3.962	49.75	
TOLUENE	17.783	76.632	876.36	
PCE	19.425	43.599	576.54	
C1-BENZENE	20.708	59.073	839.79	
ETHYL BENZENE	21.558	47.506	739.21	
M&P-XYLENE	22.025	50.575	855.83	
STYRENE	23.050	40.697	581.89	
~~unknown)~~ O-XYLENE	23.200	41.268	706.32	
unknown)	26.391	3.197	29.77	
17			8394.93	

2/8/96
MP

10 ug/L
(CCV)

GC #2
DELCD

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/08/1996 17:57:31
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 1data311.CHR ( )
Operator : MARK PAULI

-25.600mV 1024.000mV

Component	Retention	Height	Area
1_1-DCA	10.783	166.893	1725.15 M
cI_2-DCE	11.466	155.008	1792.67
1_1_1-TCA	12.766	90.878	1372.60
CCl4	13.516	157.035	2873.05
TCE	15.100	180.820	3197.53
1_1_2-TCA	17.583	158.437	2020.86
PCE	19.483	195.332	2792.25
Cl-BENZENE	20.766	83.405	1169.30
1_4-DCBA (SURR)	23.216	73.586	1595.82

Component	Retention	Height	Area
1_1-DCE	10.016	119.521	940.64
tI_2-DCE	10.650	183.776	1271.16 M
1_1-DCA	10.783	166.893	1725.15 M
cI_2-DCE	11.466	155.008	1792.67
1_2-DCA	12.533	120.316	1413.52
1_1_1-TCA	12.766	90.878	1372.60
CCl4	13.516	157.035	2873.05
TCE	15.100	180.820	3197.53
1_1_2-TCA	17.583	158.437	2020.86
PCE	19.483	195.332	2792.25
Cl-BENZENE	20.766	83.405	1169.30
1_4-DCBA (SURR)	23.216	73.586	1595.82
12			22164.57

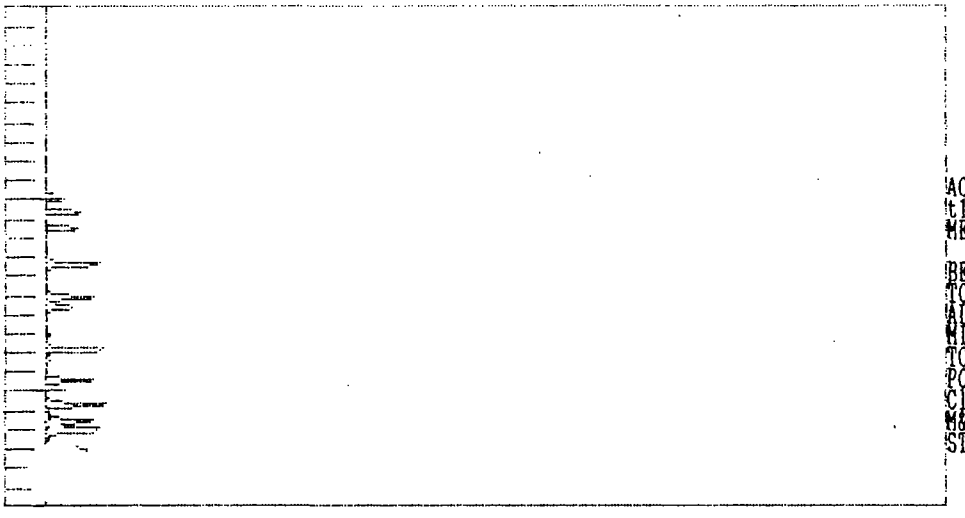
2/8/96 MDP

5 ug/L
(DLV)

GC #2
PID

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/08/1996 18:36:57
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 2DATA312.CHR ( )
Operator : MARK PAULI

-25.000mV 512.000mV



Component	Retention	Height	Area	
ACETONE	9.716	2.812	17.81	
t1_2-DCE	10.616	41.695	330.14	
MEK & c1_2-DCE	11.466	26.251	263.06	
BENZENE	13.375	37.167	540.82	
TCE	15.116	26.433	395.31	M
ALPHA-TFT(SURR)	15.633	15.677	246.65	M
MIBK	17.150	2.597	31.02	
TOLUENE	17.833	48.960	550.94	
PCE	19.450	27.029	350.56	
C1-BENZENE	20.708	34.679	491.14	
M&P-XYLENE	22.008	34.066	577.09	
STYRENE	23.175	23.806	421.96	M

Component	Retention	Height	Area	
ACETONE	9.716	2.812	17.81	
1_1-DCE	9.983	11.662	76.73	
t1_2-DCE	10.616	41.695	330.14	
MEK & c1_2-DCE	11.466	26.251	263.06	
BENZENE	13.375	37.167	540.82	
TCE	15.116	26.433	395.31	M
ALPHA-TFT(SURR)	15.633	15.677	246.65	M
MIBK	17.150	2.597	31.02	
TOLUENE	17.833	48.960	550.94	
PCE	19.450	27.029	350.56	
C1-BENZENE	20.708	34.679	491.14	
ETHYL BENZENE	21.558	28.371	435.61	
M&P-XYLENE	22.008	34.066	577.09	
STYRENE	23.025	22.463	290.58	M
~~STYRENE~~ O-XYLENE	23.175	23.806	421.96	M
(unknown)	26.375	3.162	25.90	
(unknown)	27.566	4.911	40.57	

17 5085.91

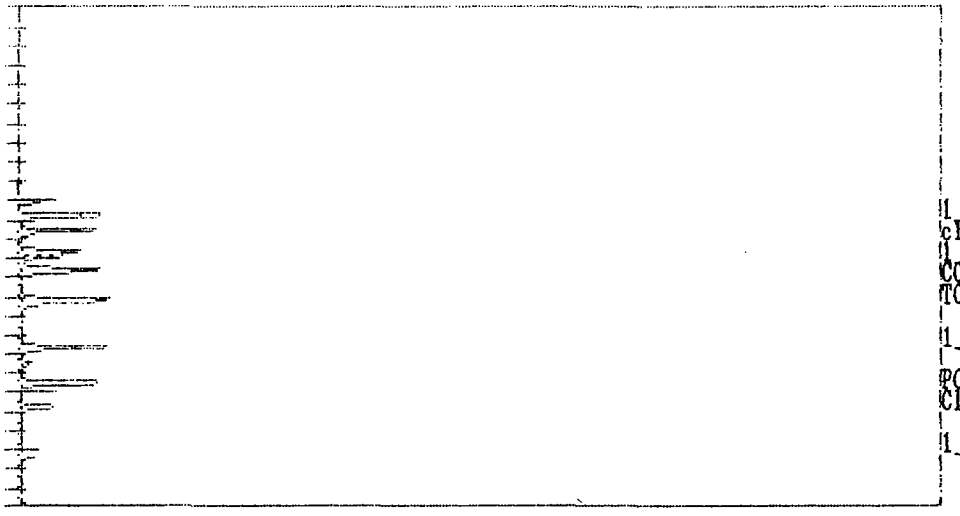
2/8/96
MSP

5 ug/L

GC#2
DELCD

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/08/1996 18:36:57
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 1data312.CHR ()
Operator : MARK PAULI

-25.600mV 1024.000mV



Component	Retention	Height	Area
1_1-DCA	10.833	92.043	952.31 M
c1_2-DCE	11.533	85.605	1044.23
1_1_1-TCA	12.850	53.339	816.78
CCl4	13.633	89.584	1655.62
TCE	15.200	116.755	1991.21
1_1_2-TCA	17.633	95.567	1195.16
PCE	19.516	119.178	1667.25
Cl-BENZENE	20.766	45.406	661.86
1_4-DCBA (SURR)	23.183	42.212	895.22

Component	Retention	Height	Area
1_1-DCE	10.050	53.932	444.97
c1_2-DCE	10.700	91.331	647.64 M
1_1-DCA	10.833	92.043	952.31 M
c1_2-DCE	11.533	85.605	1044.23
1_2-DCA	12.633	68.170	794.87
1_1_1-TCA	12.850	53.339	816.78
CCl4	13.633	89.584	1655.62
TCE	15.200	116.755	1991.21
1_1_2-TCA	17.633	95.567	1195.16
PCE	19.516	119.178	1667.25
Cl-BENZENE	20.766	45.406	661.86
1_4-DCBA (SURR)	23.183	42.212	895.22
12			12767.11

2/8/96
mop

2-9-96

GC #2

Lower Aquifer/Upper Aquifer

ACS Field GC #2 2/8/96 curve

Compound Date 2/9/96	PK #	RT	STD1 50 *Run #*	STD2 10 *Run #*	STD3 5 *Run #*	Linear Regression CC	 Slope	 Int.	ICB 10.0 g. *run#*	 ug/kg	10 ICV	%D ICV/STD	1 GP118 5.00 mL	 ug/L	2 MW8 89' 5.00 mL	 ug/L
Acetone	1	11.2	74	28	20	0.999	8.5E-01	-12.7			21	75.0%				
1,1,-DCE	2	11.5	632	141	76	1.000	8.1E-02	-1.3			141	100.0%				
trans-1,2-DCE	3	12.6	2,452	635	370	1.000	2.2E-02	-3.4			578	91.0%				
MEK/cis 1,2-DCE	4	14.1	1,817	519	304	1.000	3.0E-02	-4.8			436	84.0%				
Benzene	6	16.7	3,497	1,024	606	0.999	1.6E-02	-5.3			922	90.0%				
TCE	7	18.1	2,494	716	417	0.999	2.2E-02	-4.9			624	87.2%				
MIBK	8	19.8	274	86	43	0.997	2.0E-01	-5.2			52	60.5%				
Toluene	9	20.6	3,225	988	608	0.999	1.7E-02	-6.3			844	85.4%				
PCE	10	21.9	2,056	595	360	1.000	2.7E-02	-5.3			534	89.7%				
Chlorobenzene	11	23.7	3,249	986	573	0.999	1.7E-02	-5.7			831	84.3%				
Ethylbenzene	12	24.0	2,977	835	472	0.999	1.8E-02	-4.3			726	86.9%				
m+p-Xylene	13	24.2	3,389	976	574	1.000	1.6E-02	-5.0			839	86.0%				
Styrene	14	25.5	3,142	777	377	0.999	1.6E-02	-2.0			599	77.1%				
o-Xylene	15		2,428	767	457	0.999	2.3E-02	-6.6			667	87.0%				
1,1,-DCE	1	11.5	3,321	818	452	1.000	1.6E-02	-2.5			978	119.6%				
t-1,2-DCE	2	12.6	3,648	1,175	723	0.999	1.6E-02	-7.3			1,264	107.6%				
1,1-DCA	3	13.4	5,540	1,626	985	1.000	1.0E-02	-5.5			1,773	109.0%				
cis-1,2-DCE	4	14.5	5,726	1,791	1,129	0.999	9.9E-03	-6.9			1,840	102.7%				
1,2-DCA	5	14.9	4,884	1,801	1,023	0.996	1.2E-02	-9.2			1,510	83.8%				
1,1,1-TCA	6	15.9	4,286	1,060	687	1.000	1.2E-02	-3.4			1,105	104.2%				
Carbon Tet.	7	16.6	9,589	2,606	1,622	1.000	5.7E-03	-4.5			2,943	112.9%				
TCE	8	18.2	9,780	3,025	2,064	1.000	5.9E-03	-7.4			3,212	106.2%				
1,1,2-TCA	9	21.2	6,316	2,428	1,450	0.996	9.5E-03	-10.8			2,116	87.1%				
PCE	10	21.9	7,667	2,488	1,577	0.999	7.5E-03	-7.7			3,012	121.1%				
Chlorobenzene	11	23.7	4,968	1,366	782	1.000	1.1E-02	-4.1			1,436	105.1%				
a,a,a-TFT	8	18.5	1,754	**478**	278				438	92%	432	90%	414	87%	394	82%
1,4-DCBA	12	26.8	4,564	**1,881**	1,064				1,983	105%	1,447	77%	1335	71%	1327	71%
TOTAL VOCs (PPM)														**0.0**		**0.0**

Analyst _____

Check _____

Lower Aquifer

ACS Field GC #2	3		4		5		6		7					
Compound **Date** **2/9/96**	**MW8 69DUP** 5.00 mL	ug/L	**GP-2/9/96-FB** 5.00 mL	ug/L	**GP120** 1.00 mL	ug/L	**GP122** 0.50 mL	ug/L	**GP122** 5.00 mL	ug/L	**10** **CCV**	**%D** CCV/STD	**5** **DLV**	**%D** 5 STD
Acetone					100	718.5	97	1,386.2	508	833.8	28	100.0%	21	105.0%
1,1,-DCE											137	97.2%	67	88.2%
trans-1,2-DCE											570	89.8%	313	84.6%
MEK/cis 1,2-DCE											433	83.4%	248	81.6%
Benzene					2001	131.4					895	87.4%	536	88.4%
TCE											588	82.1%	340	81.5%
MIBK											61	70.9%	33	76.7%
Toluene											821	83.1%	491	80.8%
PCE											500	84.0%	294	81.7%
Chlorobenzene											823	83.5%	470	82.0%
Ethylbenzene											728	87.2%	406	86.0%
m+p-Xylene					3335	245.0					833	85.3%	473	82.4%
Styrene											640	82.4%	302	80.1%
o-Xylene											658	84.7%	396	86.7%
1,1,-DCE											828	101.2%	408	90.3%
t-1,2-DCE											1192	101.4%	616	85.2%
1,1-DCA											1680	103.3%	1045	106.1%
cis-1,2-DCE											1635	91.3%	980	86.8%
1,2-DCA											1450	80.5%	809	79.1%
1,1,1-TCA											1273	120.1%	837	121.8%
Carbon Tet.											2752	105.6%	1634	100.7%
TCE											2756	91.1%	1780	86.2%
1,1,2-TCA											2010	82.8%	1198	82.6%
PCE											2258	90.8%	1361	86.3%
Chlorobenzene											1220	89.3%	662	84.7%
a,a,a-TFT	408	85%	409	86%	379	79%	419	88%	415	87%	416.0	87%	236.0	85%
1,4-DCBA	1550	82%	2090	111%	1717	91%	1721	91%	1553	83%	1,594.0	85%	904.0	85%
TOTAL VOCs (PPM		**0.0**		**0.0**		**1.1**		**1.4**		**0.8**				

Analyst _____

Check _____

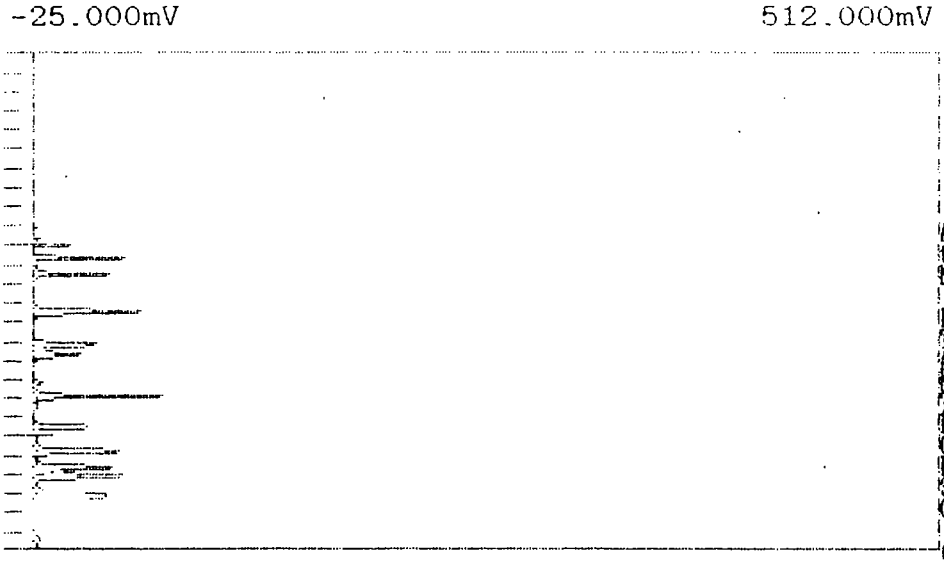
10 ug/L

(CCV)

GC #2

PID

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/09/1996 08:26:19
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 2DATA316.CHR ()
Operator : MARK PAULI



Component	Retention	Height	Area	
ACETONE	9.725	3.427	21.47	
t1_2-DCE	10.641	73.111	577.84	
MEK & c1_2-DCE	11.516	43.050	436.29	
BENZENE	13.450	62.219	921.87	
TCE	15.191	42.072	623.52	M
ALPHA-TFT(SURR)	15.691	27.299	432.30	M
MIBK	17.200	4.307	52.47	
TOLUENE	17.900	74.717	843.96	
PCE	19.516	41.127	534.29	
C1-BENZENE	20.766	58.422	830.68	
ETHYL BENZENE	21.633	46.792	725.55	
STYRENE	23.066	40.717	598.58	
O-XYLENE	23.233	40.438	667.47	
(unknown)	25.425	2.874	96.39	

Component	Retention	Height	Area	
unknown)	9.075	4.756	25.03	
ACETONE	9.725	3.427	21.47	
1-DCE	10.008	21.036	140.72	
t1_2-DCE	10.641	73.111	577.84	
MEK & c1_2-DCE	11.516	43.050	436.29	
BENZENE	13.450	62.219	921.87	
TCE	15.191	42.072	623.52	M
ALPHA-TFT(SURR)	15.691	27.299	432.30	M
MIBK	17.200	4.307	52.47	
TOLUENE	17.900	74.717	843.96	
PCE	19.516	41.127	534.29	
C1-BENZENE	20.766	58.422	830.68	
ETHYL BENZENE	21.633	46.792	725.55	
M&P-XYLENE	22.083	49.405	839.22	
STYRENE	23.066	40.717	598.58	
O-XYLENE	23.233	40.438	667.47	
unknown)	25.425	2.874	96.39	
unknown)	26.366	4.011	40.29	
unknown)	27.241	3.763	37.03	
19			8444.98	

2/9/96

mt

10 ug/L

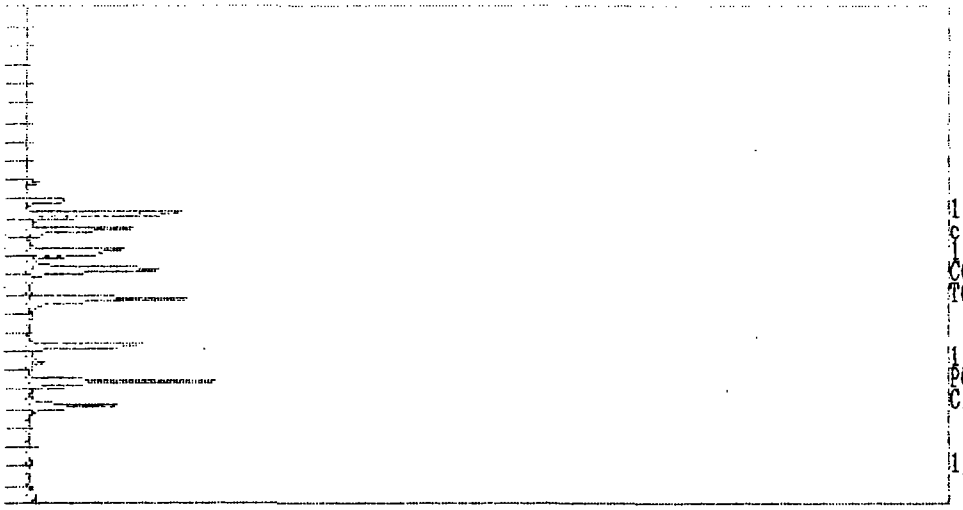
(CCV)

GC #2

DELCD

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/09/1996 08:26:19
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 1data316.CHR ()
Operator : MARK PAULI

-25.600mV 1024.000mV



Component	Retention	Height	Area	
1_1-DCA	10.866	155.140	1773.41	
cl_2-DCE	11.583	154.247	1839.62	
1_1_1-TCA	12.916	76.351	1104.60	M
CCl4	13.700	152.394	2942.72	
TCE	15.250	185.479	3212.25	
1_1_2-TCA	17.700	169.515	2116.06	
PCE	19.566	210.246	3012.27	
Cl-BENZENE	20.833	96.511	1436.04	
1_4-DCBA (SURR)	23.250	69.726	1446.95	

Component	Retention	Height	Area	
1_1-DCE	10.066	119.387	978.27	
tl_2-DCE	10.716	177.545	1263.60	
1_1-DCA	10.866	155.140	1773.41	
cl_2-DCE	11.583	154.247	1839.62	
1_2-DCA	12.683	121.948	1510.08	M
1_1_1-TCA	12.916	76.351	1104.60	M
CCl4	13.700	152.394	2942.72	
TCE	15.250	185.479	3212.25	
1_1_2-TCA	17.700	169.515	2116.06	
PCE	19.566	210.246	3012.27	
Cl-BENZENE	20.833	96.511	1436.04	
1_4-DCBA (SURR)	23.250	69.726	1446.95	
12			22635.88	

2/9/96

MP

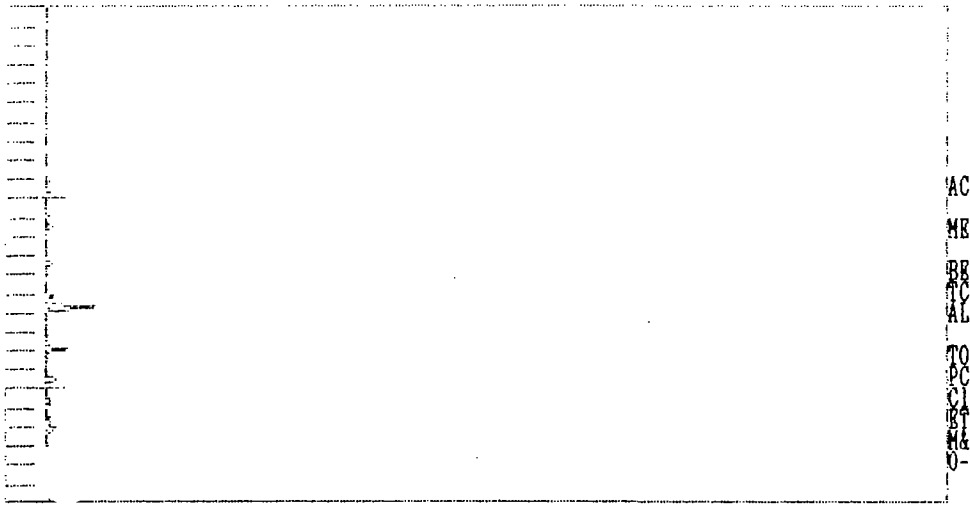
BLANK (CCB)

GC#2

PID

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/09/1996 09:05:04
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 2DATA317.CHR ( )
Operator : MARK PAULI

-25.000mV 512.000mV



Component	Retention	Height	Area
ACETONE	9.716	2.138	15.11
MEK & c1_2-DCE	11.475	3.097	31.42
BENZENE	13.441	2.552	39.42
TCE	15.200	3.745	47.14
ALPHA-TFT(SURR)	15.700	28.565	438.18
TOLUENE	17.916	11.742	128.64
PCE	19.533	4.648	59.42
C1-BENZENE	20.808	1.014	21.66
ETHYL BENZENE	21.658	1.266	15.01
M&P-XYLENE	22.108	4.112	63.62
O-XYLENE	23.291	1.553	30.71

Component	Retention	Height	Area
(unknown)	9.150	1.526	16.39
ACETONE	9.716	2.138	15.11
MEK & c1_2-DCE	11.475	3.097	31.42
BENZENE	13.441	2.552	39.42
TCE	15.200	3.745	47.14
ALPHA-TFT(SURR)	15.700	28.565	438.18
TOLUENE	17.916	11.742	128.64
PCE	19.533	4.648	59.42
C1-BENZENE	20.808	1.014	21.66
ETHYL BENZENE	21.658	1.266	15.01
M&P-XYLENE	22.108	4.112	63.62
O-XYLENE	23.291	1.553	30.71
(unknown)	26.383	2.736	27.37
(unknown)	27.575	3.064	38.82
14			972.93

2/9/96
mp

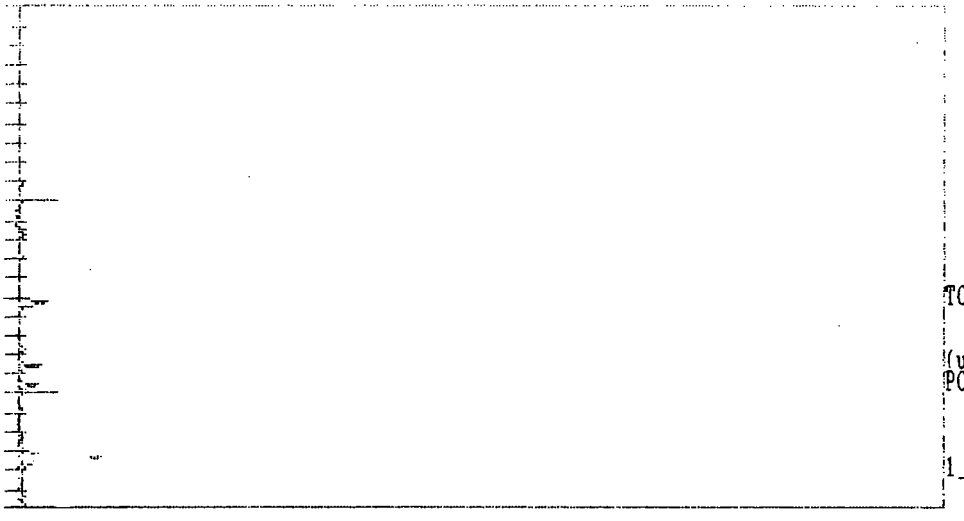
BLANK (CCB)

GC#2

DELCD

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/09/1996 09:05:04
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : ldata317.CHR ( )
Operator : MARK PAULI

-25.600mV 1024.000mV



Component	Retention	Height	Area
TCE	15.283	34.079	582.31
(unknown)	18.616	22.261	286.75
PCE	19.600	19.465	270.52
1_4-DCBA (SURR)	23.300	92.548	1982.64

Component	Retention	Height	Area
TCE	15.283	34.079	582.31
(unknown)	18.616	22.261	286.75
PCE	19.600	19.465	270.52
1_4-DCBA (SURR)	23.300	92.548	1982.64
4			3122.22

2/9/96 MP

GC#2

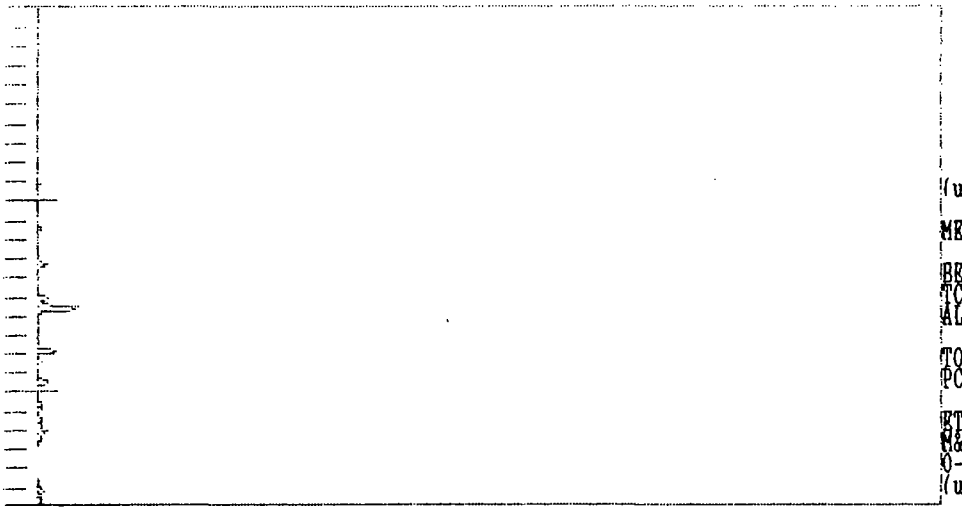
PID

MW8 89'

LAB DUP MSP

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/09/1996 10:38:19
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 2DATA319.CHR ()
Operator : MARK PAULI

-25.000mV 512.000mV



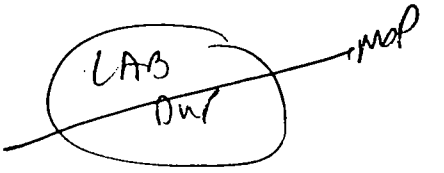
Component	Retention	Height	Area
(unknown)	9.158	1.895	18.68
MEK & c1_2-DCE	11.425	2.586	24.20
BENZENE	13.341	4.183	61.32
TCE	15.108	4.197	53.91
ALPHA-TFT(SURR)	15.600	25.152	393.80
TOLUENE	17.858	12.752	141.84
PCE	19.508	6.099	79.63
ETHYL BENZENE	21.650	1.453	16.74
M&P-XYLENE	22.100	4.711	73.85
O-XYLENE	23.300	1.571	32.46
(unknown)	25.275	2.816	47.86

Component	Retention	Height	Area
(unknown)	9.158	1.895	18.68
MEK & c1_2-DCE	11.425	2.586	24.20
BENZENE	13.341	4.183	61.32
TCE	15.108	4.197	53.91
ALPHA-TFT(SURR)	15.600	25.152	393.80
TOLUENE	17.858	12.752	141.84
PCE	19.508	6.099	79.63
ETHYL BENZENE	21.650	1.453	16.74
M&P-XYLENE	22.100	4.711	73.85
O-XYLENE	23.300	1.571	32.46
(unknown)	25.275	2.816	47.86
(unknown)	26.416	3.766	37.92
(unknown)	27.583	1.783	16.71
13			998.92

2/9/96 MSP

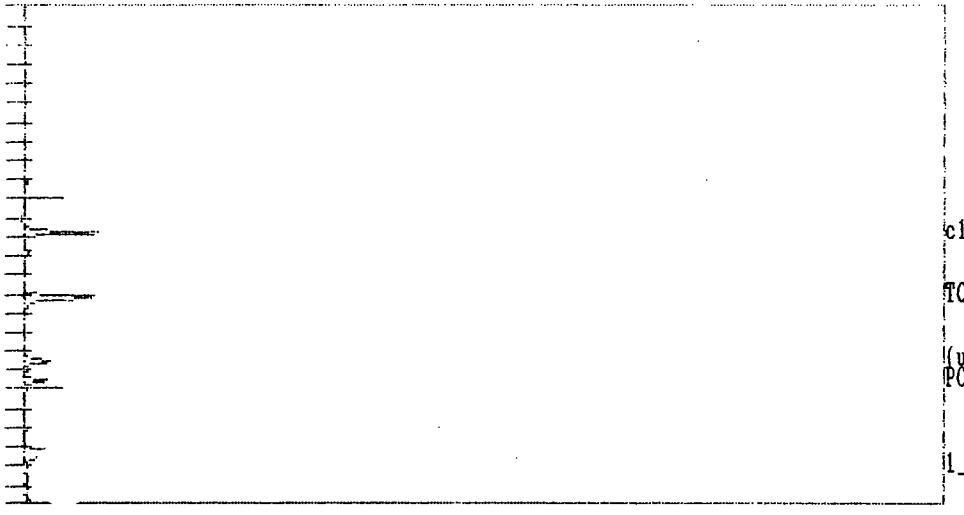
MW8 89'

GC#2
DELCD



Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/09/1996 10:38:19
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 1data319.CHR ()
Operator : MARK PAULI

-25.600mV 1024.000mV



Component	Retention	Height	Area
c1_2-DCE	11.766	88.439	1030.61
TCE	15.183	85.036	1524.49
(unknown)	18.566	32.529	427.52
PCE	19.566	25.300	357.31
1_4-DCBA (SURR)	23.316	61.442	1326.52

Component	Retention	Height	Area
c1_2-DCE	11.766	88.439	1030.61
TCE	15.183	85.036	1524.49
(unknown)	18.566	32.529	427.52
PCE	19.566	25.300	357.31
1_4-DCBA (SURR)	23.316	61.442	1326.52
5			4666.45

2/8/96 mol

GC #2

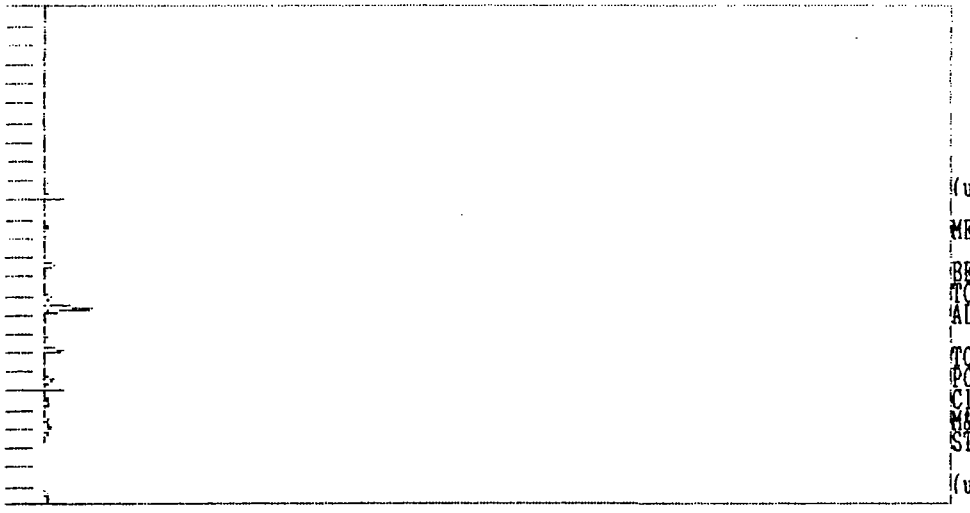
MW8 89'

CAB DUP

PID

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/09/1996 11:21:51
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 2DATA320.CHR ()
Operator : MARK PAULI

-25.000mV 512.000mV



Component	Retention	Height	Area
(unknown)	9.158	2.131	20.73
MEK & c1_2-DCE	11.475	2.802	27.58
BENZENE	13.416	5.768	84.85
TCE	15.158	3.558	44.25
ALPHA-TFT(SURR)	15.675	26.338	407.72
TOLUENE	17.875	10.644	116.30
PCE	19.483	5.006	63.41
C1-BENZENE	20.750	0.826	17.24
M&P-XYLENE	22.016	3.819	59.82
STYRENE	23.183	1.434	29.66
(unknown)	25.150	1.846	30.70

Component	Retention	Height	Area
(unknown)	9.158	2.131	20.73
MEK & c1_2-DCE	11.475	2.802	27.58
BENZENE	13.416	5.768	84.85
TCE	15.158	3.558	44.25
ALPHA-TFT(SURR)	15.675	26.338	407.72
TOLUENE	17.875	10.644	116.30
PCE	19.483	5.006	63.41
C1-BENZENE	20.750	0.826	17.24
M&P-XYLENE	22.016	3.819	59.82
STYRENE	23.183	1.434	29.66
(unknown)	25.150	1.846	30.70
(unknown)	26.333	3.642	37.22
(unknown)	27.525	1.626	15.87
13			955.37

ORIGINAL SAMPLE ANALYZED ON 2/8/96

2/9/96 MDP

MW8 69'

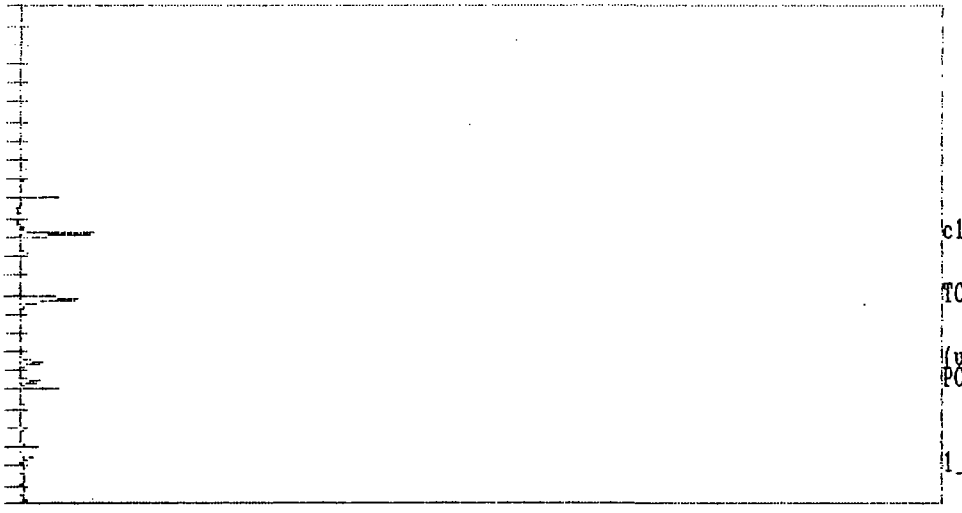
GC #2

DELCD

LAB DUP

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/09/1996 11:21:51
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 1data320.CHR ()
Operator : MARK PAULI

-25.600mV 1024.000mV



Component	Retention	Height	Area
c1_2-DCE	11.833	83.057	977.79
TCE	15.250	69.337	1221.13
(unknown)	18.566	24.787	322.32
PCE	19.566	21.165	285.95
1_4-DCBA (SURR)	23.216	73.526	1549.69

Component	Retention	Height	Area
:1_2-DCE	11.833	83.057	977.79
ICE	15.250	69.337	1221.13
(unknown)	18.566	24.787	322.32
PCE	19.566	21.165	285.95
1_4-DCBA (SURR)	23.216	73.526	1549.69
5			4356.89

2/9/96 MP

GC #2

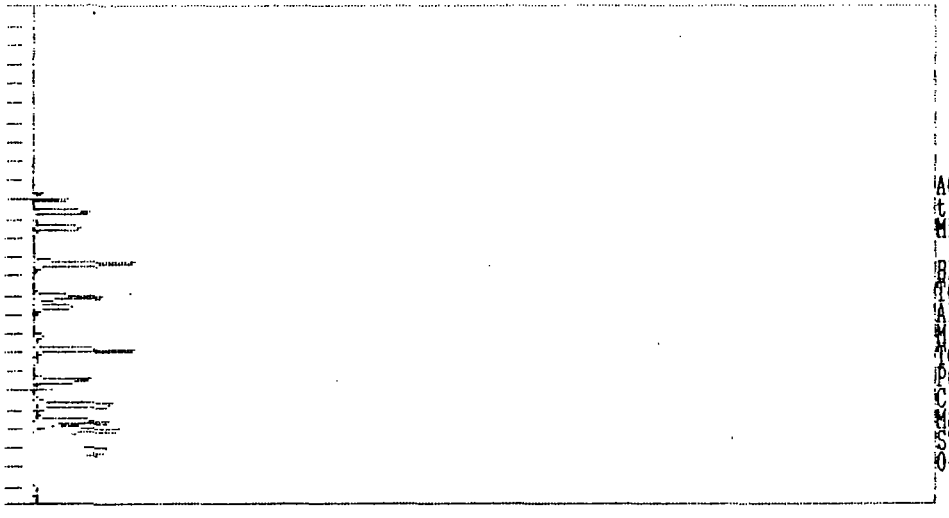
PID

10 ug/L

(CCV)

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/09/1996 14:50:18
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 2DATA325.CHR ()
Operator : MARK PAULI

-25.000mV 512.000mV



Component	Retention	Height	Area	
ACETONE	9.716	4.695	27.52	
t1_2-DCE	10.616	73.526	569.60	
MEK & c1_2-DCE	11.450	43.145	432.88	
BENZENE	13.366	61.731	894.72	
TCE	15.116	39.935	588.14	M
ALPHA-TFT(SURR)	15.625	25.775	415.63	M
MIBK	17.166	4.960	60.70	
TOLUENE	17.866	72.400	821.48	
PCE	19.483	38.125	499.74	
C1-BENZENE	20.750	58.209	823.30	
M&P-XYLENE	22.075	48.683	833.10	
STYRENE	23.075	41.496	640.48	
O-XYLENE	23.241	40.799	658.13	

Component	Retention	Height	Area	
unknown)	9.083	3.756	21.07	
ACETONE	9.716	4.695	27.52	
_1-DCE	9.983	20.407	136.91	
c1_2-DCE	10.616	73.526	569.60	
MEK & c1_2-DCE	11.450	43.145	432.88	
BENZENE	13.366	61.731	894.72	
TCE	15.116	39.935	588.14	M
ALPHA-TFT(SURR)	15.625	25.775	415.63	M
MIBK	17.166	4.960	60.70	
TOLUENE	17.866	72.400	821.48	
PCE	19.483	38.125	499.74	
C1-BENZENE	20.750	58.209	823.30	
ETHYL BENZENE	21.616	45.984	728.03	
M&P-XYLENE	22.075	48.683	833.10	
STYRENE	23.075	41.496	640.48	
O-XYLENE	23.241	40.799	658.13	
unknown)	26.383	4.148	40.62	
unknown)	27.566	1.751	19.59	
18			8211.64	

2/1/96

MSP

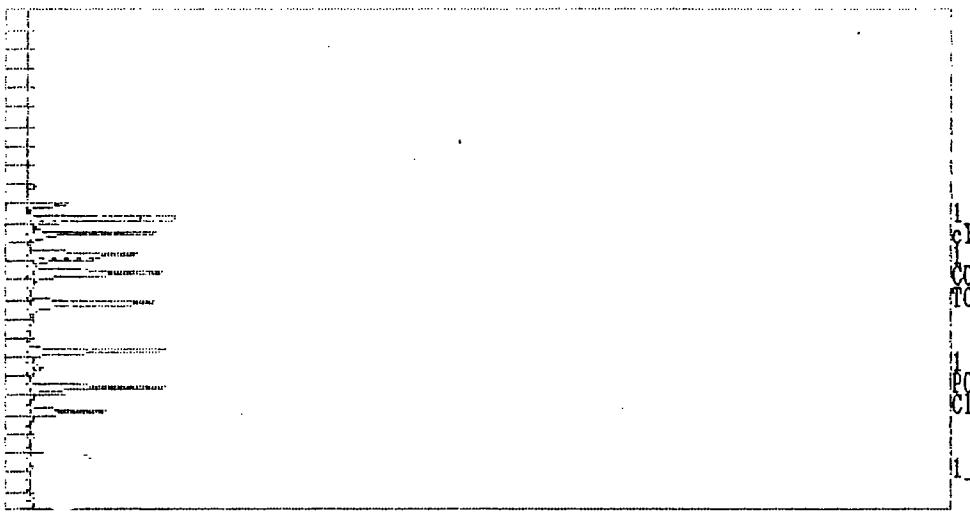
GC#2

DELCD

10 ug/L (CCV)

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/09/1996 14:50:18
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 1data325.CHR ()
Operator : MARK PAULI

-25.600mV 1024.000mV



Component	Retention	Height	Area	
1_1-DCA	10.833	164.785	1679.81	M
cl_2-DCE	11.516	139.656	1635.36	
1_1_1-TCA	12.850	84.435	1272.51	
CCl4	13.616	146.964	2751.96	
TCE	15.200	165.027	2755.72	
1_1_2-TCA	17.666	157.244	2009.98	
PCE	19.550	158.745	2258.25	
Cl-BENZENE	20.833	82.933	1220.10	
1_4-DCBA (SURR)	23.266	75.466	1594.42	

Component	Retention	Height	Area	
1_1-DCE	10.050	103.376	828.00	
tl_2-DCE	10.683	166.333	1191.70	M
1_1-DCA	10.833	164.785	1679.81	M
cl_2-DCE	11.516	139.656	1635.36	
1_2-DCA	12.616	121.374	1450.41	
1_1_1-TCA	12.850	84.435	1272.51	
CCl4	13.616	146.964	2751.96	
TCE	15.200	165.027	2755.72	
1_1_2-TCA	17.666	157.244	2009.98	
PCE	19.550	158.745	2258.25	
Cl-BENZENE	20.833	82.933	1220.10	
1_4-DCBA (SURR)	23.266	75.466	1594.42	
12			20648.23	

2/2/96 MSP

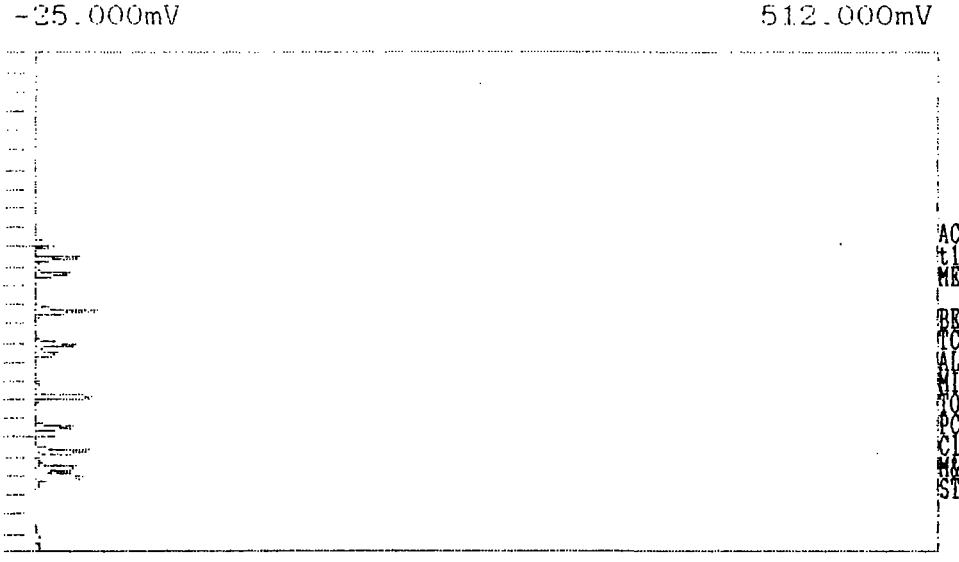
5 ug/L

(DLV)

GC#2

pID

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/09/1996 15:31:03
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 2DATA326.CHR ()
Operator : MARK PAULI



Component	Retention	Height	Area	
ACETONE	9.700	3.454	20.68	
t1_2-DCE	10.608	40.908	313.46	
MEK & c1_2-DCE	11.441	25.005	247.93	
BENZENE	13.358	37.480	536.25	
TCE	15.100	23.489	339.77	M
ALPHA-TFT(SURR)	15.616	14.747	235.57	M
MIBK	17.141	2.709	32.84	
TOLUENE	17.841	43.379	490.84	
PCE	19.475	22.684	293.57	
Cl-BENZENE	20.725	33.501	470.07	
M&P-XYLENE	22.041	28.245	472.76	M
STYRENE	23.191	22.916	396.25	M

Component	Retention	Height	Area	
ACETONE	9.700	3.454	20.68	
t_1-DCE	9.975	10.373	66.61	
c1_2-DCE	10.608	40.908	313.46	
MEK & c1_2-DCE	11.441	25.005	247.93	
BENZENE	13.358	37.480	536.25	
TCE	15.100	23.489	339.77	M
ALPHA-TFT(SURR)	15.616	14.747	235.57	M
MIBK	17.141	2.709	32.84	
TOLUENE	17.841	43.379	490.84	
PCE	19.475	22.684	293.57	
Cl-BENZENE	20.725	33.501	470.07	
ETHYL BENZENE	21.591	26.426	405.91	M
M&P-XYLENE	22.041	28.245	472.76	M
~~STYRENE~~ o-XYLENE	23.025	22.225	301.83	M
STYRENE	23.191	22.916	396.25	M
(unknown)	26.358	4.007	33.34	
(unknown)	27.541	1.545	17.20	
17			4674.89	

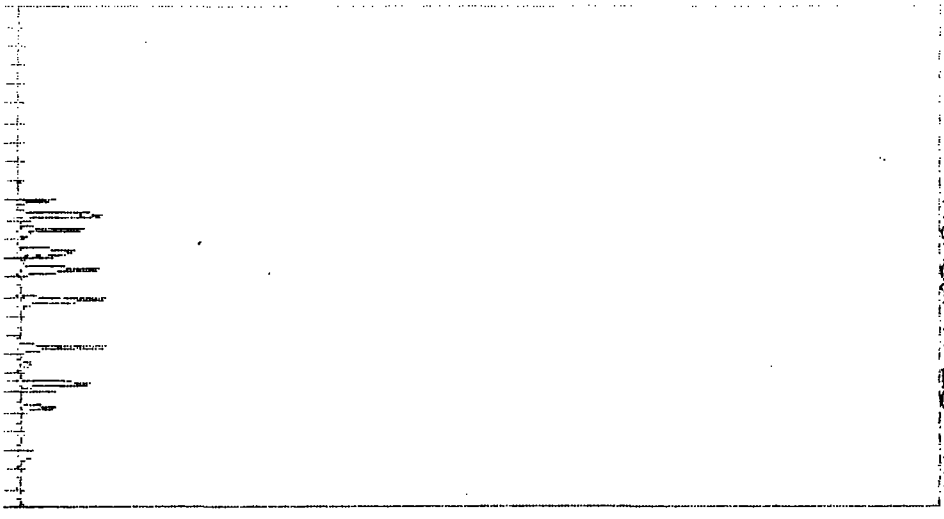
2/9/96

5 ug/L
(DCV)

GC #2
DELCD

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/09/1996 15:31:03
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 1data326.CHR ()
Operator : MARK PAULI

-25.600mV 1024.000mV



Component	Retention	Height	Area	
1_1-DCA	10.816	100.939	1044.99	M
cI_2-DCE	11.500	81.878	980.37	
1_1_1-TCA	12.816	54.889	837.10	
CCl4	13.600	89.118	1633.87	
TCE	15.166	103.482	1779.74	
1_1_2-TCA	17.633	95.241	1197.61	
PCE	19.533	96.516	1360.93	
Cl-BENZENE	20.800	44.892	661.87	
1_4-DCBA (SURR)	23.216	43.514	903.89	

Component	Retention	Height	Area	
_1-DCE	10.033	50.404	407.79	
:l_2-DCE	10.666	91.126	616.21	M
_1-DCA	10.816	100.939	1044.99	M
:l_2-DCE	11.500	81.878	980.37	
_2-DCA	12.600	68.844	808.90	
_1_1-TCA	12.816	54.889	837.10	
CCl4	13.600	89.118	1633.87	
TCE	15.166	103.482	1779.74	
_1_2-TCA	17.633	95.241	1197.61	
PCE	19.533	96.516	1360.93	
l-BENZENE	20.800	44.892	661.87	
_4-DCBA (SURR)	23.216	43.514	903.89	
12			12233.27	

2/9/96

2-20-96

GC #2

Lower Aquifer

ACS Field GC #2

Compound Date 2/20/96	PK #	RT	STD1 50 *Run #*	STD2 10 *Run #*	STD3 5 *Run #*	Linear Regression CC	 Slope	 Int.	ICB 10.0 g. *run#*	 ug/kg	10 ICV	%D ICV/STD	1 VP2 39' 5.00 mL	 ug/L	2 VP2 29' 0.50 mL	 ug/L
Acetone	1	11.2	47	19	15	1.000	1.4	-16.5			19	100.0%				
1,1,-DCE	2	11.5	415	111	62	1.000	0.1	-3.6			119	107.2%				
trans-1,2-DCE	3	12.6	1,699	472	265	0.999	0.0	-4.2			492	104.2%				
MEK/cis 1,2-DCE	4	14.1	1,257	346	214	1.000	0.0	-4.6			338	97.7%				
Benzene	6	16.7	2,499	696	429	1.000	0.0	-4.8			725	104.2%				
TCE	7	18.1	1,742	480	283	1.000	0.0	-4.3			486	101.3%				
MIBK	8	19.8	176	41	30	0.999	0.3	-3.3			43	104.9%				
Toluene	9	20.6	2,332	680	402	0.999	0.0	-5.2			676	99.4%				
PCE	10	21.9	1,458	404	236	1.000	0.0	-4.4			405	100.2%				
Chlorobenzene	11	23.7	2,358	650	407	1.000	0.0	-4.7			648	99.7%				
Ethylbenzene	12	24.0	2,167	583	339	1.000	0.0	-3.9			584	100.2%				
m+p-Xylene	13	24.2	2,435	665	387	1.000	0.0	-4.1			680	102.3%				
Styrene	14	25.5	2,284	458	270	1.000	0.0	-0.6			518	113.1%				
o-Xylene	15	25.6	1,670	562	342	0.999	0.0	-8.0			512	91.1%				
1,1,-DCE	1	11.5	3,887	958	557	1.000	0.0	-2.8			828	86.4%				
t-1,2-DCE	2	12.6	4,900	1,343	885	1.000	0.0	-5.0			1,168	87.0%				
1,1-DCA	3	13.4	5,905	2,091	1,244	0.998	0.0	-8.9			1,627	77.8%				
cis-1,2-DCE	4	14.5	6,591	1,943	1,432	1.000	0.0	-7.2			1,590	81.8%				
1,2-DCA	5	14.9	4,984	1,609	1,274	1.000	0.0	-9.8			1,378	85.6%				
1,1,1-TCA	6	15.9	4,524	1,533	734	0.995	0.0	-6.1			1,118	72.9%				
Carbon Tet.	7	16.6	10,402	3,262	2,014	0.999	0.0	-6.8			2,715	83.2%				
TCE	8	18.2	10,284	3,207	2,334	1.000	0.0	-8.2			2,758	86.0%				
1,1,2-TCA	9	21.2	6,515	2,072	1,680	1.000	0.0	-9.8			1,759	84.9%				
PCE	10	21.9	8,092	2,525	1,617	1.000	0.0	-7.0			2,076	82.2%				
Chlorobenzene	11	23.7	5,599	1,346	861	1.000	0.0	-3.0			1,113	82.7%				
a,a,a-TFT	8	18.5		325	194				330	102%	334	103%	306	94%	319	98%
1,4-DCBA	12	26.8		1,622	1,258				1,955	121%	1,399	86%	1993	123%	1712	106%
TOTAL VOCs (PPM)														0.0		0.0

Analyst _____

Check _____

Lower Aquifer

ACS Field GC #2	3		4		5		6		7		8		9		10
Compound	VP2 29'		VP2 52'		VP2 59'		VP2 29' LAB DUP		VP2 72'		GP52A		GW		G
Date	5.00 mL		5.00 mL		5.00 mL		5.00 mL		5.00 mL		5.00 mL		5.00 mL		5.00
2/20/96		ug/L		ug/L		ug/L		ug/L		ug/L		ug/L		ug/L	
Acetone	25	37.7					20	23.5							
1,1,-DCE															
trans-1,2-DCE															
MEK/cis 1,2-DCE															
Benzene															
TCE															
MIBK															
Toluene															
PCE															
Chlorobenzene															
Ethylbenzene															
m+p-Xylene															
Styrene															
o-Xylene															
1,1,-DCE															
t-1,2-DCE															
1,1-DCA															
cis-1,2-DCE															
1,2-DCA															
1,1,1-TCA															
Carbon Tet.															
TCE															
1,1,2-TCA															
PCE															
Chlorobenzene															
a,a,a-TFT	330	102%	346	106%	330	102%	242	74%	294	90%	318	98%			
1,4-DCBA	1880	116%	2101	130%	2094	129%	1557	96%	1531	94%	2053	127%			
TOTAL VOCs (PPM)		0.0		0.0		0.0		0.0		0.0		0.0		0.0	

Analyst _____

Check _____

Lower Aquifer

ACS Field GC #2

Compound Date 2/20/96	W mL ug/L	10 CCV	%D CCV/STD	5 DLV	%D STD
Acetone		23	121.1%	13	86.7%
1,1,-DCE		121	109.0%	65	104.8%
trans-1,2-DCE		481	101.9%	259	97.7%
MEK/cis 1,2-DCE		368	106.4%	188	87.9%
Benzene		746	107.2%	394	91.8%
TCE		491	102.3%	262	92.6%
MIBK		59	143.9%	23	76.7%
Toluene		689	101.3%	398	99.0%
PCE		401	99.3%	228	96.6%
Chlorobenzene		702	108.0%	358	88.0%
Ethylbenzene		599	102.7%	314	92.6%
m+p-Xylene		687	103.3%	375	96.9%
Styrene		600	131.0%	234	86.7%
o-Xylene		520	113.5%	309	90.4%
1,1,-DCE		963	100.5%	464	83.3%
t-1,2-DCE		1425	106.1%	638	72.1%
1,1-DCA		1722	82.4%	1012	81.4%
cis-1,2-DCE		1965	101.1%	1056	73.7%
1,2-DCA		2025	125.9%	869	68.2%
1,1,1-TCA		993	64.8%	665	90.6%
Carbon Tet.		2863	87.8%	1689	83.9%
TCE		3104	96.8%	1811	77.6%
1,1,2-TCA		2422	116.9%	1115	66.4%
PCE		2226	88.2%	1317	81.4%
Chlorobenzene		1328	98.7%	633	73.5%

a,a,a-TFT		327.0	101%	180.0	93%
1,4-DCBA		1,918.0	118%	837.0	67%

TOTAL VOCs (PPM)	0.0	

Analyst _____

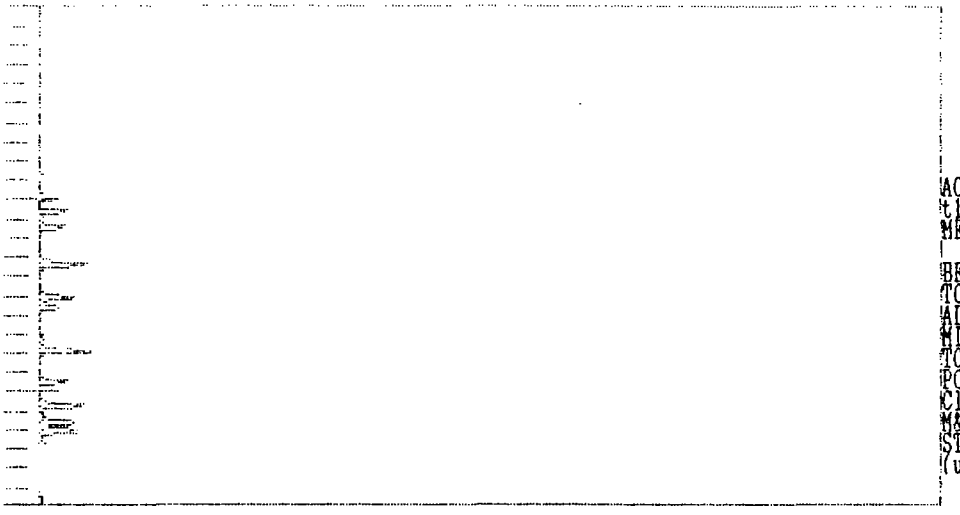
Check _____

GC #2 PID

5 ug/L

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/20/1996 08:06:17
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 2DATA384.CHR ( )
Operator : MARK PAULI

-25.000mV 512.000mV



Component	Retention	Height	Area	
ACETONE	9.700	2.440	14.86	
c1_2-DCE	10.616	34.482	265.04	
MEK & c1_2-DCE	11.450	21.333	214.01	
BENZENE	13.375	29.659	428.72	
TCE	15.116	19.041	283.15	M
ALPHA-TFT(SURR)	15.616	12.033	193.62	M
MIBK	17.158	2.437	29.78	
TOLUENE	17.850	35.595	402.34	
PCE	19.475	18.202	235.79	
Cl-BENZENE	20.741	28.950	407.43	
M&P-XYLENE	22.041	23.076	387.21	M
STYRENE	23.025	19.414	270.34	M
(unknown)	23.200	19.592	342.30	M

Component	Retention	Height	Area	
(unknown)	9.066	2.246	11.69	
ACETONE	9.700	2.440	14.86	
1_1-DCE	9.983	9.165	61.57	
c1_2-DCE	10.616	34.482	265.04	
MEK & c1_2-DCE	11.450	21.333	214.01	
BENZENE	13.375	29.659	428.72	
TCE	15.116	19.041	283.15	M
ALPHA-TFT(SURR)	15.616	12.033	193.62	M
MIBK	17.158	2.437	29.78	
TOLUENE	17.850	35.595	402.34	
PCE	19.475	18.202	235.79	
Cl-BENZENE	20.741	28.950	407.43	
ETHYL BENZENE	21.608	21.887	338.96	M
M&P-XYLENE	22.041	23.076	387.21	M
STYRENE	23.025	19.414	270.34	M
~~(unknown)~~ o-XYLENE	23.200	19.592	342.30	M
(unknown)	26.358	2.674	21.89	

17 3908.69

~~2/19~~ MSP 2/20/96

2/20/96 MSP

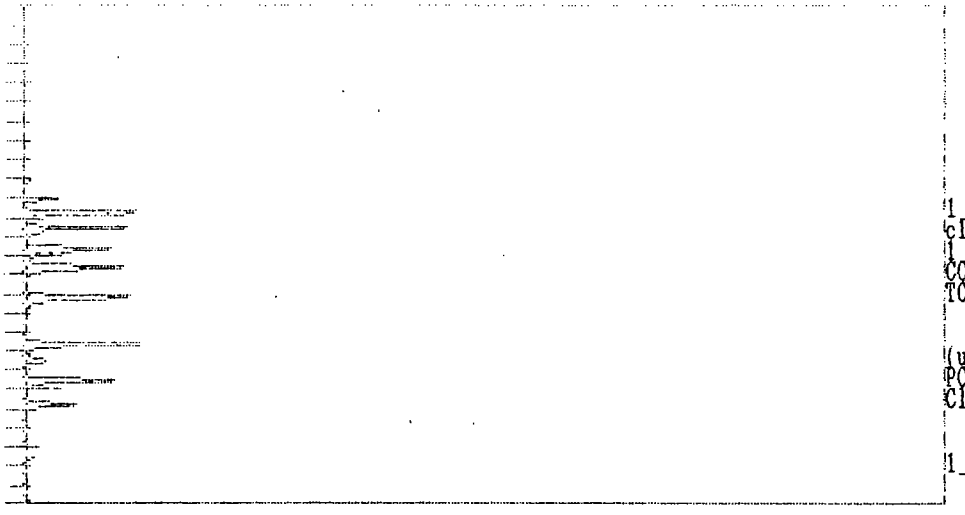
5µg/L

GC#2

DELCD

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/20/1996 08:06:17
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 1data384.CHR ()
Operator : MARK PAULI

-25.600mV 1024.000mV



Component	Retention	Height	Area	
1_1-DCA	10.816	117.415	1244.48	M
cl_2-DCE	11.516	117.338	1431.55	
1_1_1-TCA	12.816	54.261	734.13	M
CCl4	13.616	108.101	2013.70	
TCE	15.183	135.253	2333.99	
(unknown)	18.550	26.898	330.34	
PCE	19.533	114.946	1616.62	
Cl-BENZENE	20.800	59.211	860.83	
1_4-DCBA (SURR)	23.250	59.190	1258.32	

Component	Retention	Height	Area	
1_1-DCE	10.050	69.409	556.56	
t1_2-DCE	10.683	129.968	885.21	M
1_1-DCA	10.816	117.415	1244.48	M
c1_2-DCE	11.516	117.338	1431.55	
1_2-DCA	12.600	101.126	1274.48	M
1_1_1-TCA	12.816	54.261	734.13	M
CCl4	13.616	108.101	2013.70	
TCE	15.183	135.253	2333.99	
1_1_2-TCA	17.650	132.743	1680.30	
(unknown)	18.550	26.898	330.34	
PCE	19.533	114.946	1616.62	
Cl-BENZENE	20.800	59.211	860.83	
1_4-DCBA (SURR)	23.250	59.190	1258.32	
13			16220.52	

2/20/96 MOP

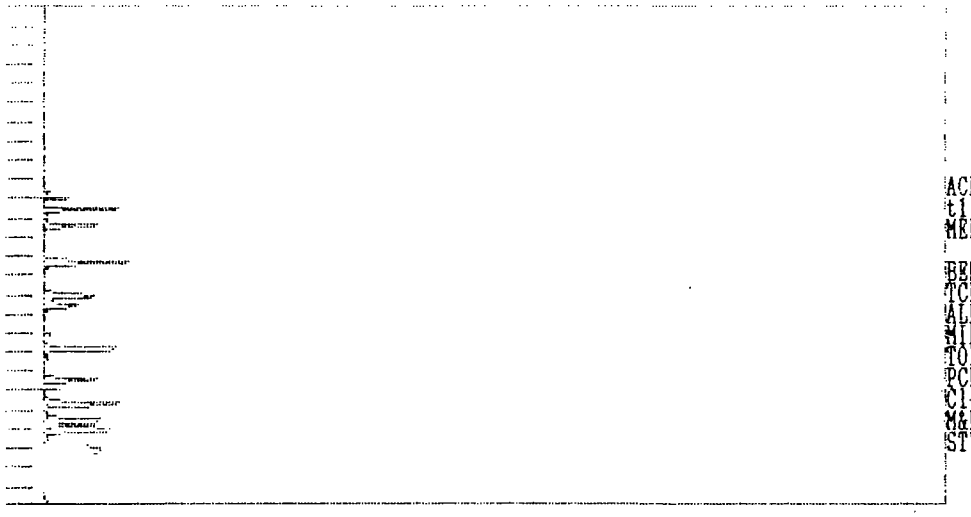
10 ug/L

GC #2

PID

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/20/1996 08:47:48
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 2DATA385.CHR ()
Operator : MARK PAULI

-25.000mV 512.000mV



Component	Retention	Height	Area	
ACETONE	9.691	3.245	19.32	
t1_2-DCE	10.591	60.818	472.29	
MEK & c1_2-DCE	11.425	34.813	346.23	
BENZENE	13.333	48.768	696.00	
TCE	15.091	31.950	479.85	M
ALPHA-TFT(SURR)	15.591	20.640	325.35	M
MIBK	17.141	3.339	41.35	
TOLUENE	17.841	60.000	680.34	
PCE	19.458	31.108	403.82	
C1-BENZENE	20.725	46.217	650.08	
M&P-XYLENE	22.041	39.334	664.97	
STYRENE	23.183	32.448	562.10	

Component	Retention	Height	Area	
(unknown)	9.058	2.179	11.44	
ACETONE	9.691	3.245	19.32	
1_1-DCE	9.958	16.880	110.55	
t1_2-DCE	10.591	60.818	472.29	
MEK & c1_2-DCE	11.425	34.813	346.23	
BENZENE	13.333	48.768	696.00	
TCE	15.091	31.950	479.85	M
ALPHA-TFT(SURR)	15.591	20.640	325.35	M
MIBK	17.141	3.339	41.35	
TOLUENE	17.841	60.000	680.34	
PCE	19.458	31.108	403.82	
C1-BENZENE	20.725	46.217	650.08	
ETHYL BENZENE	21.591	37.342	583.31	
M&P-XYLENE	22.041	39.334	664.97	
STYRENE	23.025	32.699	458.22	
~~STYRENE~~ O-XYLENE	23.183	32.448	562.10	
(unknown)	26.341	3.040	32.13	
17			6537.34	

2/20/96 MSP

10 ug/L

GC #2

D&LCD

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/20/1996 08:47:48
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 1data385.CHR ( )
Operator : MARK PAULI

-25.600mV 1024.000mV

Component	Retention	Height	Area
1_1-DCA	10.800	198.437	2091.34 M
cI_2-DCE	11.466	163.424	1942.96
1_1_1-TCA	12.816	102.321	1533.18
CCl4	13.583	175.934	3261.96
TCE	15.150	185.302	3206.75
1_1_2-TCA	17.633	162.764	2071.61
(unknown)	18.533	18.841	224.41
PCE	19.516	180.432	2525.24
Cl-BENZENE	20.783	93.320	1345.61
1_4-DCBA (SURR)	23.233	77.205	1622.41

Component	Retention	Height	Area
_1-DCE	10.016	125.097	958.48
1_2-DCE	10.650	203.021	1342.71 M
_1-DCA	10.800	198.437	2091.34 M
:1_2-DCE	11.466	163.424	1942.96
_2-DCA	12.583	132.819	1609.40
_1_1-TCA	12.816	102.321	1533.18
;Cl4	13.583	175.934	3261.96
'CE	15.150	185.302	3206.75
_1_2-TCA	17.633	162.764	2071.61
unknown)	18.533	18.841	224.41
'CE	19.516	180.432	2525.24
:l-BENZENE	20.783	93.320	1345.61
_4-DCBA (SURR)	23.233	77.205	1622.41

13 23736.04

2/20/96 MSP

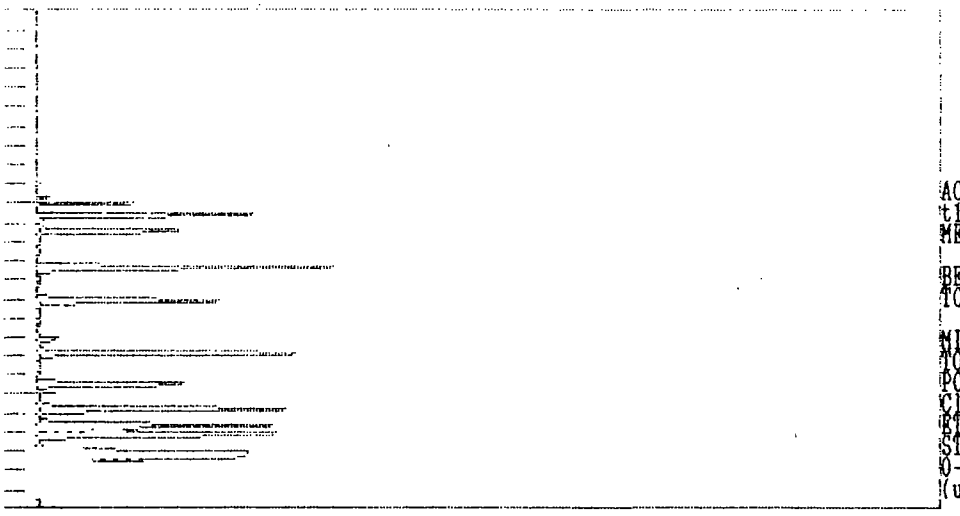
50 ug/L

GC #2

PID

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/20/1996 09:28:35
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 2DATA386.CHR ( )
Operator : MARK PAULI

-25.000mV 512.000mV



Component	Retention	Height	Area
ACETONE	9.708	7.779	46.76
t1_2-DCE	10.616	214.778	1699.02
MEK & c1_2-DCE	11.450	123.920	1257.45
BENZENE	13.350	171.882	2498.69
TCE	15.091	114.909	1742.28
MIBK	17.125	14.102	176.21
TOLUENE	17.841	197.142	2332.16
PCE	19.500	110.029	1458.16
C1-BENZENE	20.783	163.218	2358.10
ETHYL BENZENE	21.650	134.027	2167.09
STYRENE	23.100	127.972	2283.99
O-XYLENE	23.300	117.520	1670.29
(unknown)	25.283	0.825	13.23

Component	Retention	Height	Area
(unknown)	9.075	8.960	39.06
ACETONE	9.708	7.779	46.76
L_1-DCE	9.975	60.107	414.66
C1_2-DCE	10.616	214.778	1699.02
MEK & c1_2-DCE	11.450	123.920	1257.45
BENZENE	13.350	171.882	2498.69
TCE	15.091	114.909	1742.28
MIBK	17.125	14.102	176.21
TOLUENE	17.841	197.142	2332.16
PCE	19.500	110.029	1458.16
C1-BENZENE	20.783	163.218	2358.10
ETHYL BENZENE	21.650	134.027	2167.09
M&P-XYLENE	22.116	140.518	2434.55
STYRENE	23.100	127.972	2283.99
O-XYLENE	23.300	117.520	1670.29
(unknown)	25.283	0.825	13.23
(unknown)	26.416	4.791	50.05
(unknown)	27.591	1.385	11.88
18			22653.65

2/20/96
mp

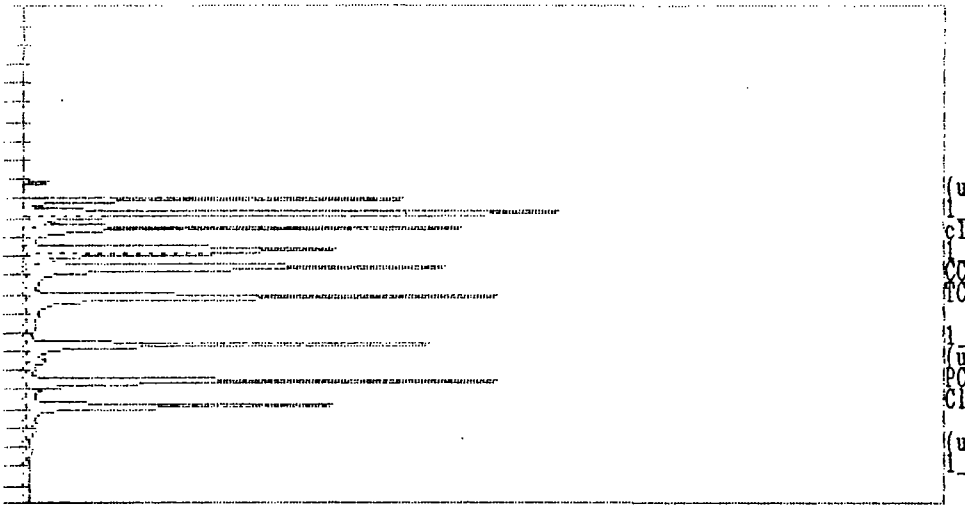
50 ug/L

GC #2

DELCD

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/20/1996 09:28:35
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 1data386.CHR ()
Operator : MARK PAULI

-25.600mV 1024.000mV



Component	Retention	Height	Area	
(unknown)	9.116	81.010	417.76	
1_1-DCA	10.800	531.310	5904.66	M
cl_2-DCE	11.500	515.198	6591.30	M
1_1_1-TCA	12.816	285.703	4523.92	M
CCl4	13.583	478.714	10401.60	M
TCE	15.150	530.141	10284.31	M
1_1_2-TCA	17.633	454.732	6515.36	M
(unknown)	18.550	26.677	726.32	M
PCE	19.550	547.881	8092.04	M
Cl-BENZENE	20.850	344.996	5599.01	M
(unknown)	22.233	10.917	347.88	M
1_4-DCBA (SURR)	23.300	5.217	218.98	M

Component	Retention	Height	Area	
(unknown)	9.116	81.010	417.76	
1_1-DCE	10.016	493.005	3887.43	M
tl_2-DCE	10.650	628.826	4900.38	M
1_1-DCA	10.800	531.310	5904.66	M
cl_2-DCE	11.500	515.198	6591.30	M
1_2-DCA	12.600	388.700	4983.69	M
1_1_1-TCA	12.816	285.703	4523.92	M
CCl4	13.583	478.714	10401.60	M
TCE	15.150	530.141	10284.31	M
1_1_2-TCA	17.633	454.732	6515.36	M
(unknown)	18.550	26.677	726.32	M
PCE	19.550	547.881	8092.04	M
Cl-BENZENE	20.850	344.996	5599.01	M
(unknown)	22.233	10.917	347.88	M
1_4-DCBA (SURR)	23.300	5.217	218.98	M

15 73394.62

2/21/96
msp

BLANK (ICB)

GC#2 PID

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/20/1996 10:10:07
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 2DATA387.CHR ()
Operator : MARK PAULI

-25.000mV 512.000mV

Component	Retention	Height	Area
ACETONE	9.725	1.698	11.84
MEK & c1_2-DCE	11.458	1.901	20.45
BENZENE	13.383	2.581	38.73
TCE	15.125	2.047	25.49
ALPHA-TFT(SURR)	15.633	21.398	329.83
TOLUENE	17.858	8.501	94.38
PCE	19.491	2.606	33.16
C1-BENZENE	20.758	2.590	41.95
M&P-XYLENE	22.066	3.025	47.59
O-XYLENE	23.266	1.893	50.36

Component	Retention	Height	Area
(unknown)	9.158	0.994	10.47
ACETONE	9.725	1.698	11.84
MEK & c1_2-DCE	11.458	1.901	20.45
BENZENE	13.383	2.581	38.73
TCE	15.125	2.047	25.49
ALPHA-TFT(SURR)	15.633	21.398	329.83
TOLUENE	17.858	8.501	94.38
PCE	19.491	2.606	33.16
C1-BENZENE	20.758	2.590	41.95
ETHYL BENZENE	21.633	1.320	16.55
M&P-XYLENE	22.066	3.025	47.59
O-XYLENE	23.266	1.893	50.36
(unknown)	27.575	1.315	10.66
13			731.46

2/20/96 mdp

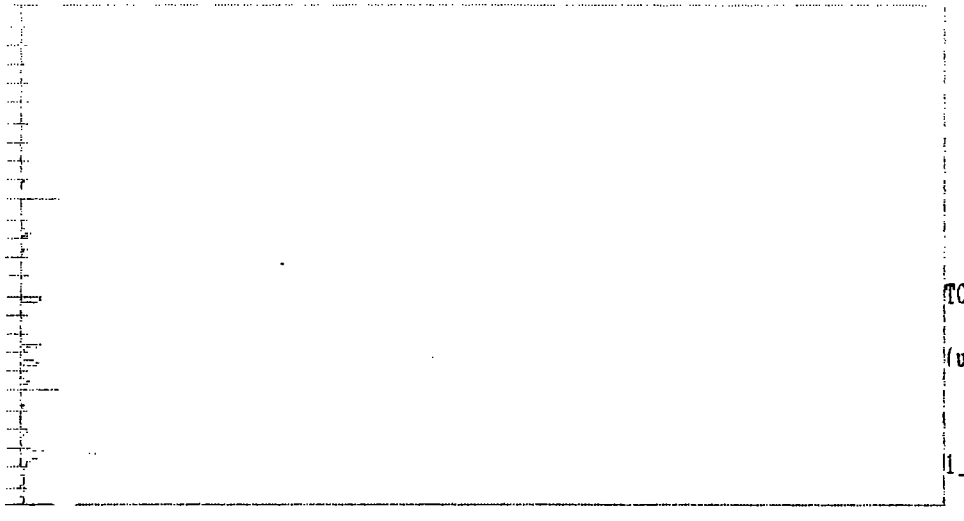
BLANK (ICB)

GC #2

DELCD

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/20/1996 10:10:07
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 1data387.CHR ( )
Operator : MARK PAULI

-25.600mV 1024.000mV



Component	Retention	Height	Area
TCE	15.216	26.639	356.41
(unknown)	18.550	26.268	338.93
1_4-DCBA (SURR)	23.283	90.456	1954.92

Component	Retention	Height	Area
TCE	15.216	26.639	356.41 <
1_1_2-TCA	17.666	21.227	261.16 <
(unknown)	18.550	26.268	338.93
1_4-DCBA (SURR)	23.283	90.456	1954.92
4			2911.42

2/20/96 MSP

10 ug/L

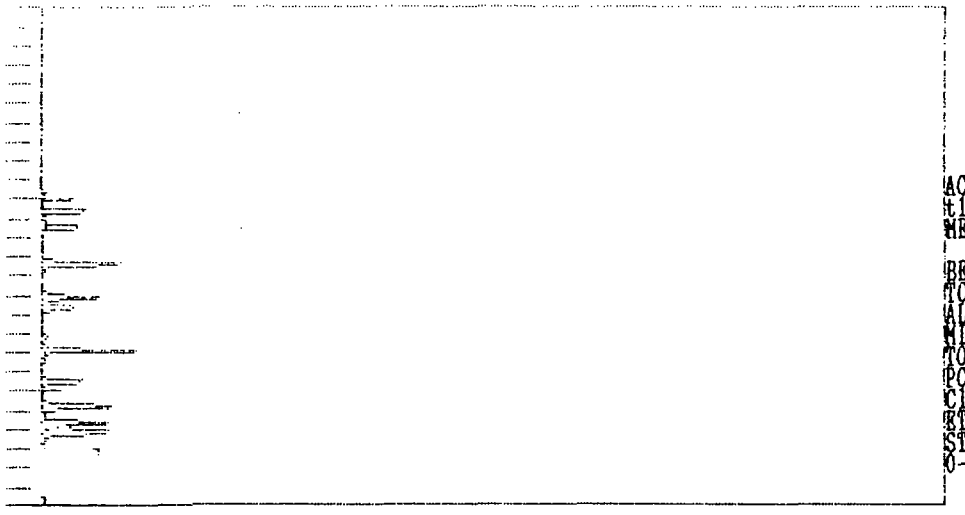
GC #2

(ICV)

PID

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/20/1996 10:51:28
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 2DATA388.CHR ()
Operator : MARK PAULI

-25.000mV 512.000mV



Component	Retention	Height	Area	
ACETONE	9.708	3.017	18.87	
t1_2-DCE	10.625	61.522	491.75	
MEK & c1_2-DCE	11.458	33.998	338.48	
BENZENE	13.383	49.022	725.30	
TCE	15.125	32.384	485.81	M
ALPHA-TFT(SURR)	15.641	20.646	333.72	M
MIBK	17.183	3.452	42.66	
TOLUENE	17.883	59.320	675.57	
PCE	19.516	31.095	405.28	
C1-BENZENE	20.783	45.791	647.56	
ETHYL BENZENE	21.650	37.200	584.23	
STYRENE	23.108	32.887	517.78	
O-XYLENE	23.275	32.218	511.76	

Component	Retention	Height	Area	
(unknown)	9.075	3.484	17.71	
ACETONE	9.708	3.017	18.87	
1_1-DCE	9.975	17.421	118.68	
t1_2-DCE	10.625	61.522	491.75	
MEK & c1_2-DCE	11.458	33.998	338.48	
BENZENE	13.383	49.022	725.30	
TCE	15.125	32.384	485.81	M
ALPHA-TFT(SURR)	15.641	20.646	333.72	M
MIBK	17.183	3.452	42.66	
TOLUENE	17.883	59.320	675.57	
PCE	19.516	31.095	405.28	
C1-BENZENE	20.783	45.791	647.56	
ETHYL BENZENE	21.650	37.200	584.23	
M&P-XYLENE	22.100	39.539	679.55	
STYRENE	23.108	32.887	517.78	
O-XYLENE	23.275	32.218	511.76	
(unknown)	26.400	3.114	32.66	
(unknown)	27.583	1.442	12.55	
18			6639.91	

2/20/96 mdp

10 ug/L

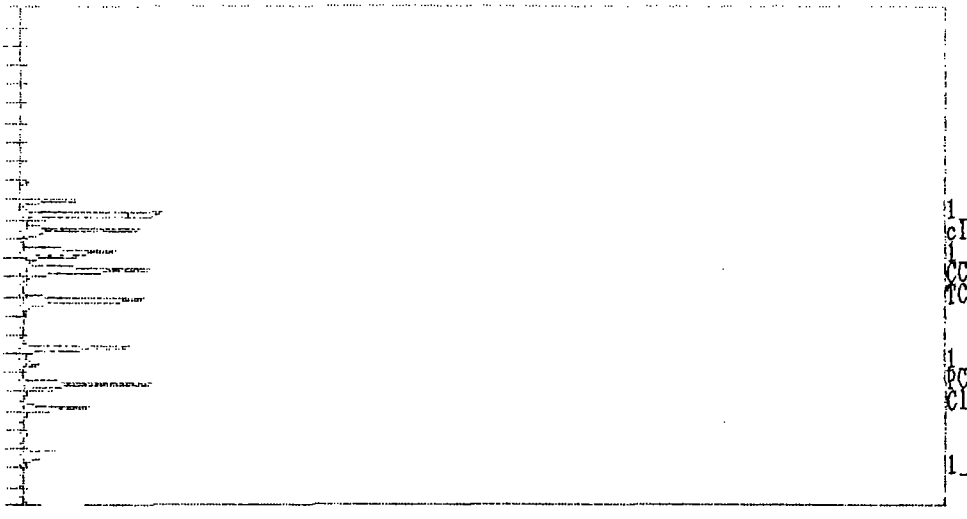
GC #2

(ICV)

DELCD

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/20/1996 10:51:28
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 1data388.CHR ()
Operator : MARK PAULI

-25.600mV 1024.000mV



Component	Retention	Height	Area	
1_1-DCA	10.816	155.701	1626.82	M
c1_2-DCE	11.516	136.722	1589.68	
1_1_1-TCA	12.833	76.515	1117.97	M
CC14	13.633	144.140	2715.25	
TCE	15.183	156.964	2758.15	
1_1_2-TCA	17.683	137.974	1758.82	
PCE	19.583	146.856	2076.00	
C1-BENZENE	20.850	76.155	1113.01	
1_4-DCBA (SURR)	23.300	65.890	1398.95	

Component	Retention	Height	Area	
1_1-DCE	10.033	103.817	827.72	
c1_2-DCE	10.683	169.440	1168.34	M
1_1-DCA	10.816	155.701	1626.82	M
c1_2-DCE	11.516	136.722	1589.68	
1_2-DCA	12.616	112.232	1377.62	M
1_1_1-TCA	12.833	76.515	1117.97	M
CC14	13.633	144.140	2715.25	
TCE	15.183	158.964	2758.15	
1_1_2-TCA	17.683	137.974	1758.82	
PCE	19.583	146.856	2076.00	
C1-BENZENE	20.850	76.155	1113.01	
1_4-DCBA (SURR)	23.300	65.890	1398.95	
12			19528.33	

2/20/96 mp

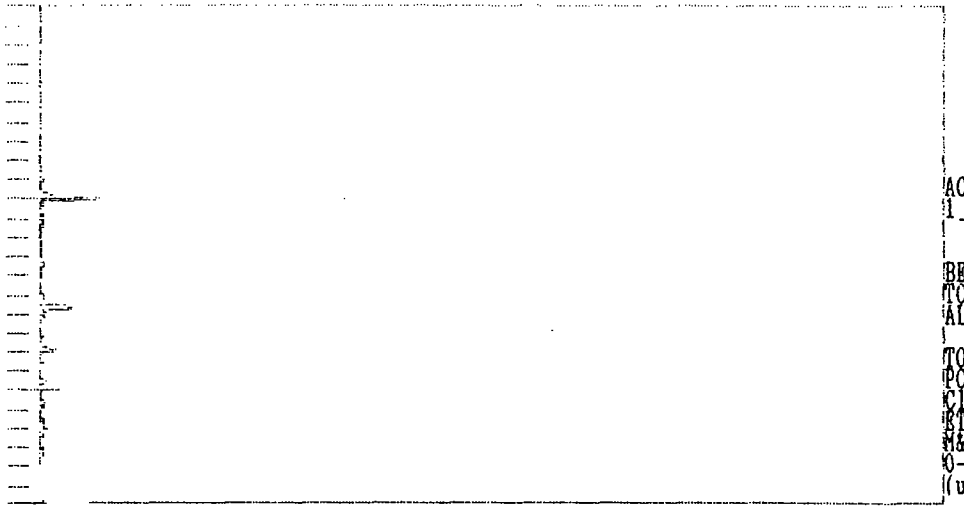
VP2 39'

GC #2

PID

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/20/1996 13:16:38
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 2DATA390.CHR ( )
Operator : MARK PAULI

-25.000mV 512.000mV



Component	Retention	Height	Area
ACETONE	9.700	2.253	13.21
1_1-DCE	9.941	51.167	363.09
BENZENE	13.391	1.901	29.15
TCE	15.141	1.843	22.64
ALPHA-TFT(SURR)	15.658	20.820	305.51
TOLUENE	17.891	8.914	96.11
PCE	19.525	2.746	35.27
C1-BENZENE	20.816	0.552	13.96
ETHYL BENZENE	21.666	0.832	10.25
M&P-XYLENE	22.116	2.707	43.65
O-XYLENE	23.316	1.080	24.65
(unknown)	25.275	1.054	17.14

Component	Retention	Height	Area
unknown)	9.083	3.882	31.86
ACETONE	9.700	2.253	13.21<
~~1_1-DCE~~ NOT IN DELCD	9.941	51.167	363.09 (unknown)
BENZENE	13.391	1.901	29.15<
TCE	15.141	1.843	22.64
ALPHA-TFT(SURR)	15.658	20.820	305.51
TOLUENE	17.891	8.914	96.11<
~~PCE~~	19.525	2.746	35.27
~~C1-BENZENE~~	20.816	0.552	13.96
ETHYL BENZENE	21.666	0.832	10.25<
M&P-XYLENE	22.116	2.707	43.65<
O-XYLENE	23.316	1.080	24.65<
unknown)	25.275	1.054	17.14
unknown)	26.416	2.902	29.78
unknown)	27.583	1.380	13.27
15			1049.53

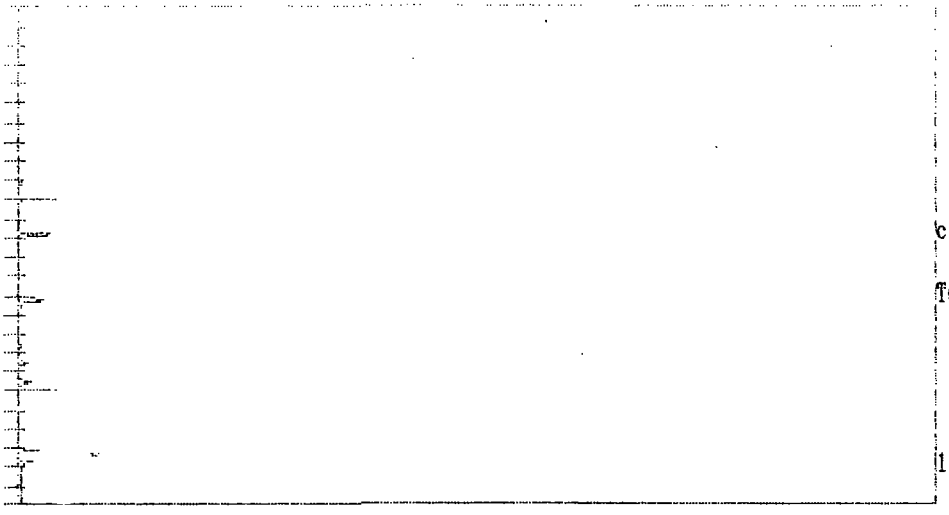
2/20/96 MSP

VP2 39'

GC #2
DELCD

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/20/1996 13:16:38
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 1data390.CHR ( )
Operator : MARK PAULI

-25.600mV 1024.000mV



Component	Retention	Height	Area
c1_2-DCE	11.833	35.496	410.82
TCE	15.233	31.962	554.26
1_4-DCBA (SURR)	23.333	92.046	1993.32

Component	Retention	Height	Area
:1_2-DCE	11.833	35.496	410.82
'CE	15.233	31.962	554.26
L_4-DCBA (SURR)	23.333	92.046	1993.32
3			2958.40

2/20/96
MSP

VP2 29'

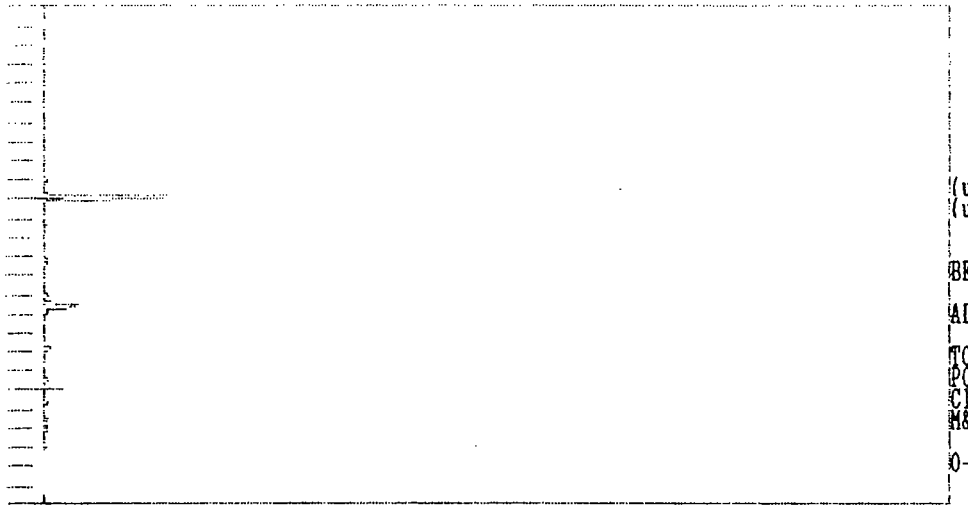
GC#2

PID

1/10

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/20/1996 14:01:39
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 2DATA391.CHR ()
Operator : MARK PAULI

-25.000mV 512.000mV



Component	Retention	Height	Area
(unknown)	9.058	2.693	21.20
(unknown)	9.908	150.634	1051.71
BENZENE	13.333	1.919	28.97
ALPHA-TFT(SURR)	15.591	20.428	319.12
TOLUENE	17.833	4.572	50.24
PCE	19.466	1.416	17.61
C1-BENZENE	20.733	0.838	14.91
M&P-XYLENE	22.033	1.107	20.47
O-XYLENE	23.225	0.515	10.18

Component	Retention	Height	Area
(unknown)	9.058	2.693	21.20
(unknown)	9.908	150.634	1051.71 — UNKNOWN
BENZENE	13.333	1.919	28.97
ALPHA-TFT(SURR)	15.591	20.428	319.12
TOLUENE	17.833	4.572	50.24
~~PCE~~	19.466	1.416	17.61
~~C1-BENZENE~~	20.733	0.838	14.91
M&P-XYLENE	22.033	1.107	20.47
O-XYLENE	23.225	0.515	10.18
(unknown)	26.366	2.878	26.85

10 1561.25

2/20/96 MOP

VP2 29'

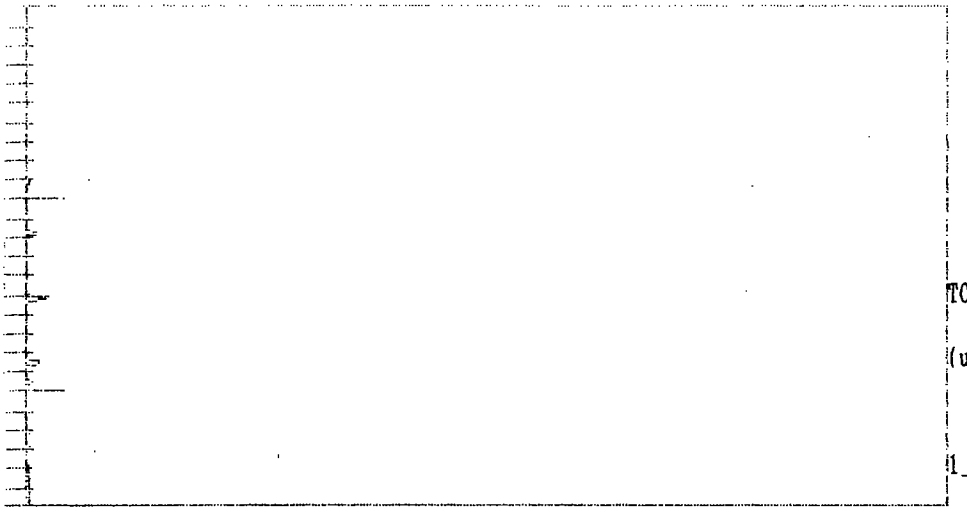
GC#2

DELCD

1/10

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/20/1996 14:01:39
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 1data391.CHR ( )
Operator : MARK PAULI

-25.600mV 1024.000mV



Component	Retention	Height	Area
TCE	15.166	23.870	301.04
(unknown)	18.533	23.058	297.81
1_4-DCBA (SURR)	23.233	79.736	1712.01

Component	Retention	Height	Area
TCE	15.166	23.870	301.04 <
(unknown)	18.533	23.058	297.81 <
1_4-DCBA (SURR)	23.233	79.736	1712.01
3			2310.85

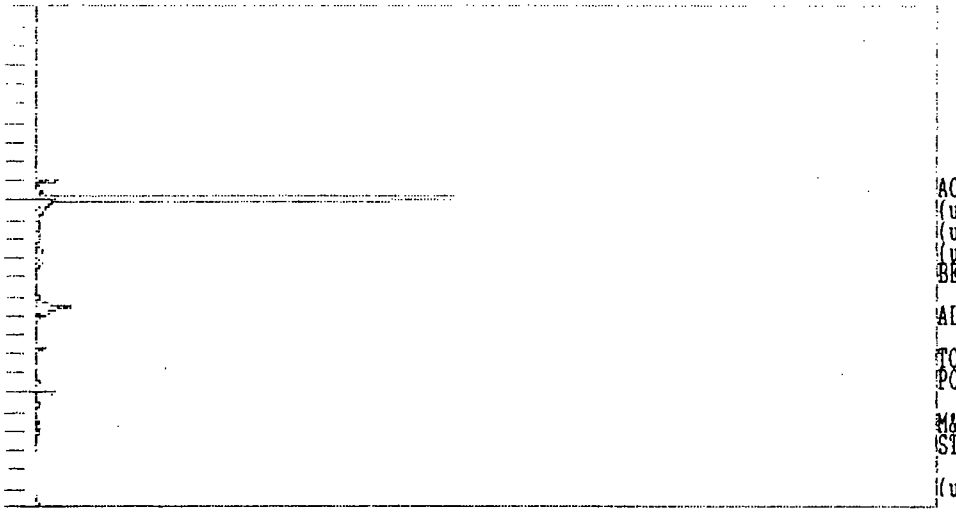
2/20/96 MSP

VP2 29'

GC #2
PID

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/20/1996 14:40:40
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 2DATA392.CHR ()
Operator : MARK PAULI

-25.000mV 512.000mV



Component	Retention	Height	Area
ACETONE	9.566	3.188	25.01
(unknown)	10.216	8.209	164.34 M
(unknown)	11.983	1.112	11.28
(unknown)	12.683	4.101	51.09
BENZENE	13.325	3.691	52.74
ALPHA-TFT(SURR)	15.891	10.054	140.14 M
TOLUENE	17.816	4.947	53.84
PCE	19.441	0.831	10.41
M&P-XYLENE	22.008	0.804	15.97
STYRENE	23.141	0.507	10.97
(unknown)	25.150	1.806	30.55

Component	Retention	Height	Area
(unknown)	9.050	23.823	114.82
ACETONE	9.566	3.188	25.01
~~1-DCE~~	9.933	409.456	3812.59 M
(unknown)	10.216	8.209	164.34 M
(unknown)	11.983	1.112	11.28
(unknown)	12.683	4.101	51.09
BENZENE	13.325	3.691	52.74
ALPHA-TFT(SURR)	15.575	21.292	330.14 M
~~ALPHA-TFT(SURR)~~	15.891	10.054	140.14 M
TOLUENE	17.816	4.947	53.84
~~PCE~~	19.441	0.831	10.41
M&P-XYLENE	22.008	0.804	15.97
STYRENE	23.141	0.507	10.97
(unknown)	25.150	1.806	30.55
(unknown)	26.333	3.141	36.61

15 4860.50

NOT W DELCO (UNKNOWN)

2/20/96
MSP

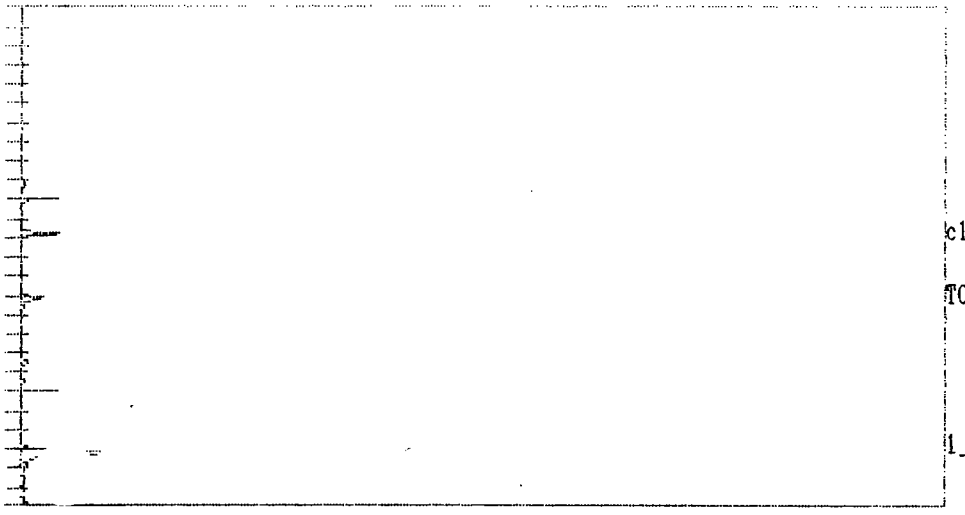
VP2 29'

GC #2

DELCD

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/20/1996 14:40:40
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 1data392.CHR ( )
Operator : MARK PAULI

-25.600mV 1024.000mV



Component	Retention	Height	Area
c1_2-DCE	11.783	43.918	540.75
TCE	15.166	25.330	329.49
1_4-DCBA (SURR)	23.183	87.364	1880.00

Component	Retention	Height	Area
c1_2-DCE	11.783	43.918	540.75
TCE	15.166	25.330	329.49
1_4-DCBA (SURR)	23.183	87.364	1880.00
3			2750.24

2/20/96 WOP

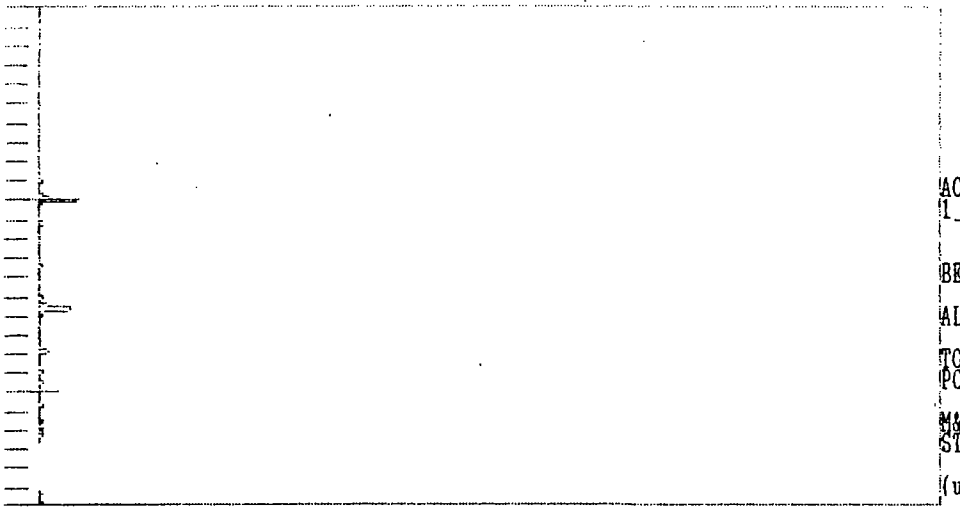
VP2 52'

GC #2

PID

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/20/1996 15:20:08
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 2DATA393.CHR ()
Operator : MARK PAULI

-25.000mV 512.000mV



Component	Retention	Height	Area
ACETONE	9.716	1.812	10.32
1_1-DCE	9.950	41.055	289.04
BENZENE	13.366	1.564	24.84
ALPHA-TFT(SURR)	15.608	21.364	346.32
TOLUENE	17.866	6.748	74.32
PCE	19.483	1.145	14.10
M&P-XYLENE	22.050	1.087	19.65
STYRENE	23.175	0.668	13.80
(unknown)	25.216	3.216	53.59

Component	Retention	Height	Area
(unknown)	9.075	2.456	23.13
ACETONE	9.716	1.812	10.32 <
~~1_1-DCE~~ (UNKNOWN)	9.950	41.055	289.04 ——— NOT IN DECCO (UNKNOWN)
BENZENE	13.366	1.564	24.84 <
ALPHA-TFT(SURR)	15.608	21.364	346.32
TOLUENE	17.866	6.748	74.32 <
~~PCE~~	19.483	1.145	14.10
M&P-XYLENE	22.050	1.087	19.65 <
STYRENE	23.175	0.668	13.80 <
(unknown)	25.216	3.216	53.59
(unknown)	26.383	2.591	24.58
11			893.68

2/20/96 MSP

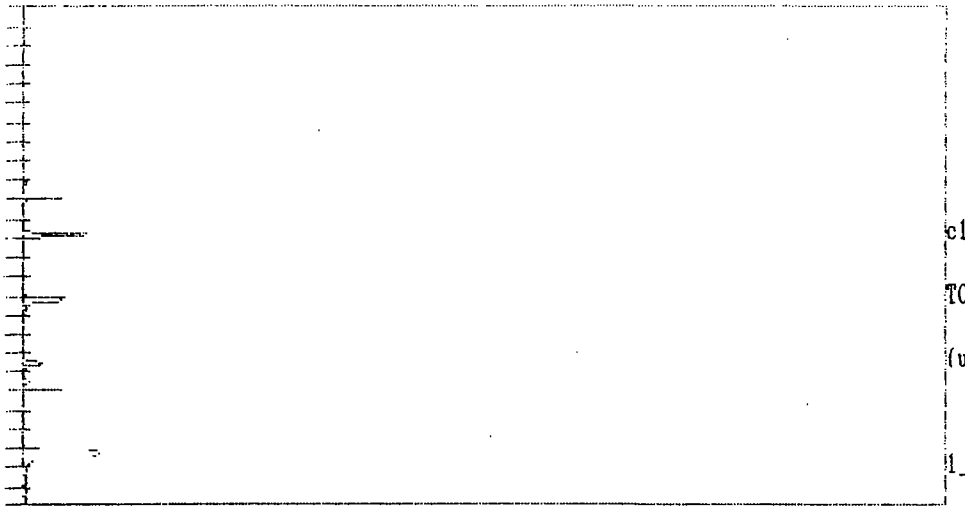
VP2 52'

GC#2

DELCO

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/20/1996 15:20:08
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 1data393.CHR ()
Operator : MARK PAULI

-25.600mV 1024.000mV



Component	Retention	Height	Area
c1_2-DCE	11.816	72.700	916.79
TCE	15.200	57.557	1022.96
(unknown)	18.550	24.431	317.37
1_4-DCBA (SURR)	23.266	96.592	2101.47

Component	Retention	Height	Area
c1_2-DCE	11.816	72.700	916.79
TCE	15.200	57.557	1022.96
(unknown)	18.550	24.431	317.37
1_4-DCBA (SURR)	23.266	96.592	2101.47
4			4358.58

2/20/96 mop

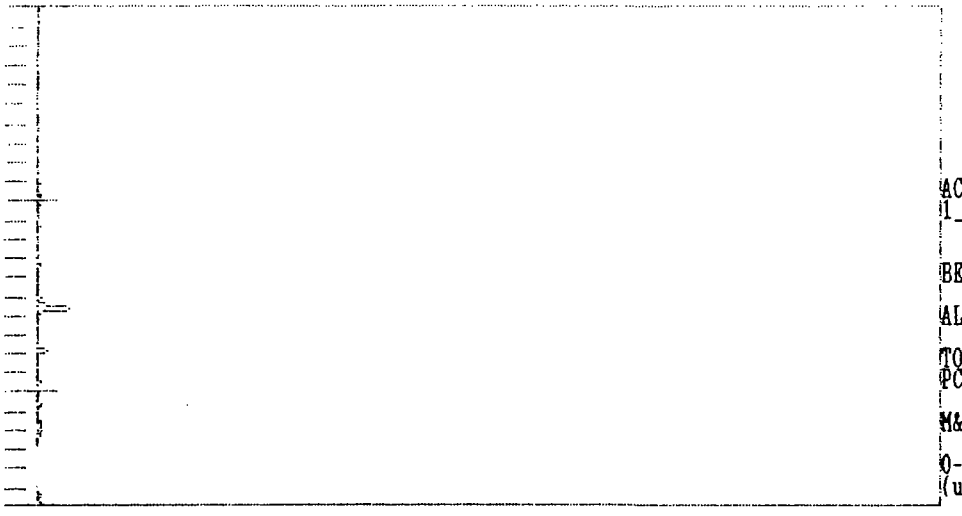
GC#2

PID

VP2 59'

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/20/1996 15:59:51
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 2DATA394.CHR ()
Operator : MARK PAULI

-25.000mV 512.000mV



Component	Retention	Height	Area
ACETONE	9.708	2.199	13.37
1_1-DCE	9.941	2.939	19.46
BENZENE	13.383	1.385	22.19
ALPHA-TFT(SURR)	15.625	21.531	330.25
TOLUENE	17.858	6.481	70.16
PCE	19.483	1.279	16.64
M&P-XYLENE	22.066	1.436	24.43
O-XYLENE	23.233	0.783	16.67
(unknown)	25.225	2.991	51.13

Component	Retention	Height	Area
(unknown)	9.091	2.309	19.84
ACETONE	9.708	2.199	13.37
~~1_1-DCE~~	9.941	2.939	19.46
BENZENE	13.383	1.385	22.19
ALPHA-TFT(SURR)	15.625	21.531	330.25
TOLUENE	17.858	6.481	70.16
~~PCE~~	19.483	1.279	16.64
M&P-XYLENE	22.066	1.436	24.43
O-XYLENE	23.233	0.783	16.67
(unknown)	25.225	2.991	51.13
(unknown)	26.400	2.436	20.63
11			604.77

2/20/96
MSP

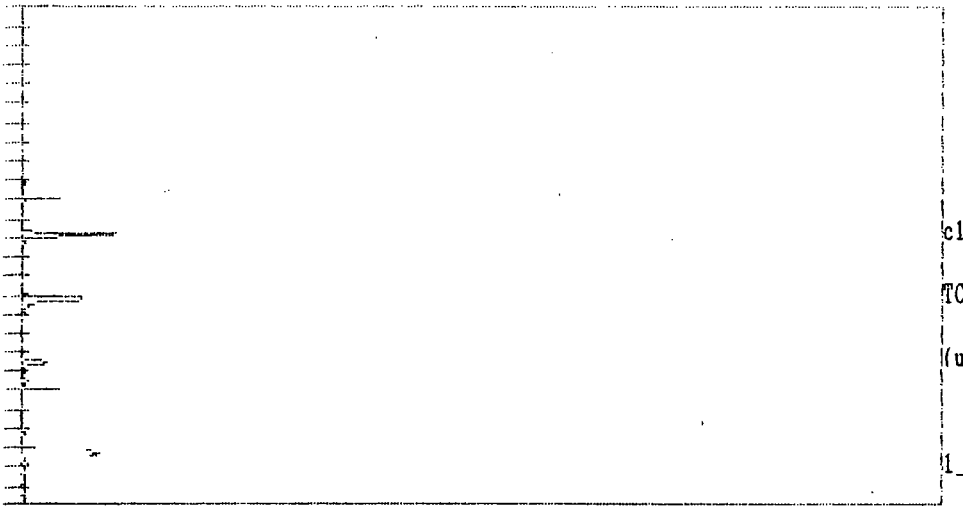
VP2 59'

GC #2

DELCD

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/20/1996 15:59:51
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 1data394.CHR ()
Operator : MARK PAULI

-25.600mV 1024.000mV



Component	Retention	Height	Area
c1_2-DCE	11.816	106.948	1354.13
TCE	15.200	83.127	1532.13
(unknown)	18.550	37.037	484.60
1_4-DCBA (SURR)	23.283	96.784	2093.94

Component	Retention	Height	Area
~~c1_2-DCE~~ MOTINPID	11.816	106.948	1354.13
TCE	15.200	83.127	1532.13 <
(unknown)	18.550	37.037	484.60
1_4-DCBA (SURR)	23.283	96.784	2093.94
4			5464.81

2/20/96 MP

VPZ 29'

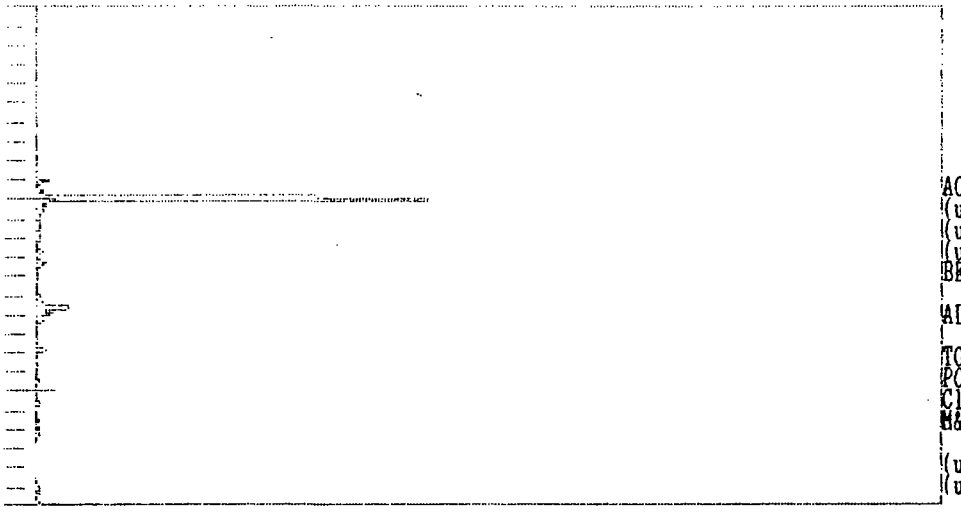
GC#2

PID

LAB DUP

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/20/1996 16:40:16
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 2DATA395.CHR ()
Operator : MARK PAULI

-25.000mV 512.000mV



Component	Retention	Height	Area
ACETONE	9.533	3.580	19.63
(unknown)	10.350	2.310	27.53
(unknown)	12.016	1.181	12.52
(unknown)	12.733	3.190	39.33
BENZENE	13.366	4.361	63.09
ALPHA-TFT(SURR)	15.625	17.817	241.79
TOLUENE	17.866	5.929	65.50
PCE	19.483	1.634	20.61
C1-BENZENE	20.758	0.889	15.19
M&P-XYLENE	22.058	1.038	19.04
(unknown)	23.208	0.502	10.72
(unknown)	25.200	1.742	29.19

Component	Retention	Height	Area
unknown)	9.058	16.477	85.98
ACETONE	9.533	3.580	19.63
~~1-DCE~~ NOT IN DOLLCD	9.933	398.268	3516.76
unknown)	10.350	2.310	27.53
unknown)	12.016	1.181	12.52
unknown)	12.733	3.190	39.33
BENZENE	13.366	4.361	63.09
ALPHA-TFT(SURR)	15.625	17.817	241.79
TOLUENE	17.866	5.929	65.50
~~PCE~~	19.483	1.634	20.61
~~C1-BENZENE~~	20.758	0.889	15.19
M&P-XYLENE	22.058	1.038	19.04
unknown)	23.208	0.502	10.72
unknown)	25.200	1.742	29.19
unknown)	26.375	3.219	30.56

15 4197.42

(unknown)

2/20/96 MSP

VP2 29'

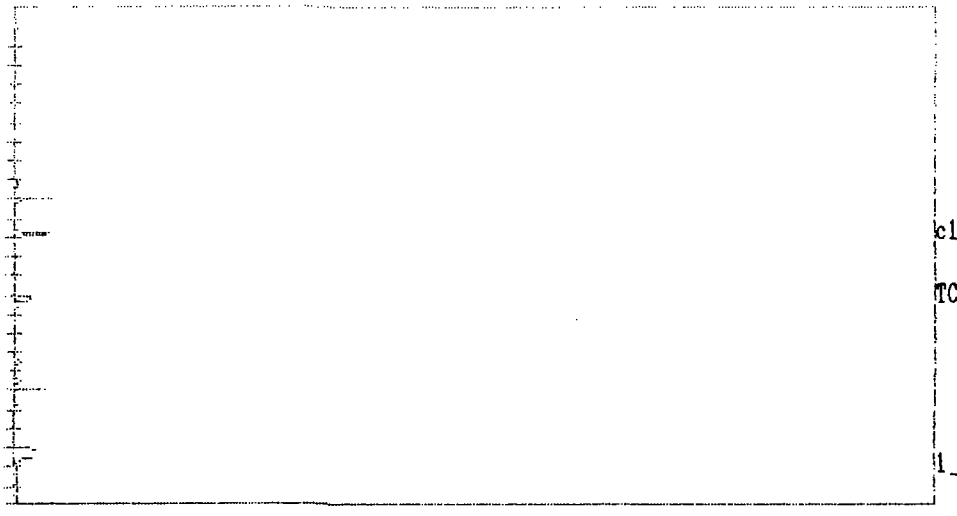
GC#2

DELCD

LAB ONLY

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/20/1996 16:40:16
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 1data395.CHR ()
Operator : MARK PAULI

-25.600mV 1024.000mV



Component	Retention	Height	Area
c1_2-DCE	11.816	40.682	497.62
TCE	15.200	22.813	276.28
1_4-DCBA (SURR)	23.250	71.420	1556.90

Component	Retention	Height	Area
~~1_2-DCE~~ NOT INPID	11.816	40.682	497.62
CE	15.200	22.813	276.28
_4-DCBA (SURR)	23.250	71.420	1556.90
3			2330.79

2/20/96 MP

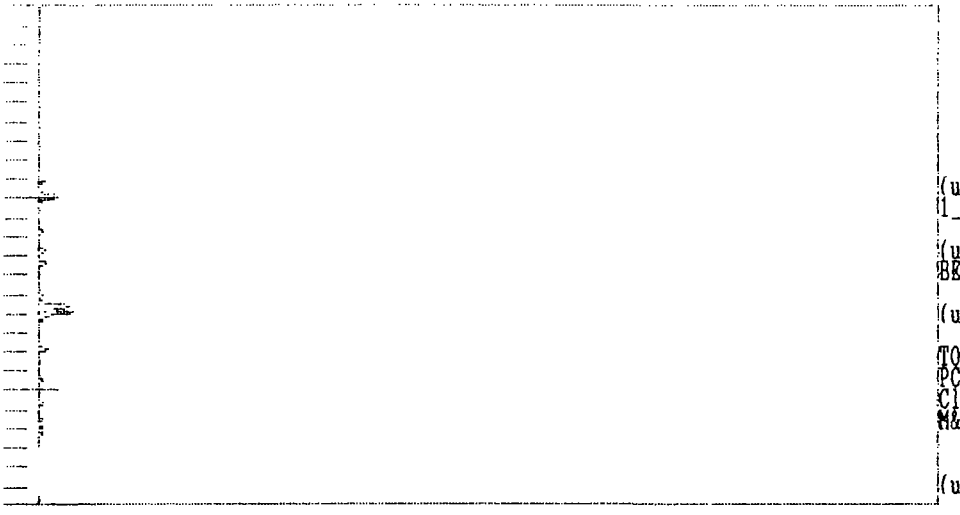
VP2 72'

GC #2

PID

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/20/1996 17:35:14
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 2DATA396.CHR ()
Operator : MARK PAULI

-25.000mV 512.000mV



Component	Retention	Height	Area
(unknown)	9.108	12.451	68.25
1_1-DCE	9.925	26.487	182.97
(unknown)	12.733	3.399	41.75
BENZENE	13.400	3.099	58.57
(unknown)	15.950	20.344	299.97
TOLUENE	17.875	4.967	54.67
PCE	19.500	1.415	17.81
Cl-BENZENE	20.775	0.892	15.98
M&P-XYLENE	22.066	1.224	21.66
(unknown)	25.191	1.310	21.51

Component	Retention	Height	Area
(unknown)	9.108	12.451	68.25
~~1_1-DCE~~ NOT IN OELCO	9.925	26.487	182.97 — UNKNOWN
(unknown)	12.733	3.399	41.75
BENZENE	13.400	3.099	58.57 <
ALPHA-TFT(SURR)	15.641	19.681	294.16 —
(unknown)	15.950	20.344	299.97
TOLUENE	17.875	4.967	54.67 <
~~PCE~~	19.500	1.415	17.81
~~Cl-BENZENE~~	20.775	0.892	15.98
M&P-XYLENE	22.066	1.224	21.66 <
(unknown)	25.191	1.310	21.51
(unknown)	26.366	3.161	33.51
12			1110.82

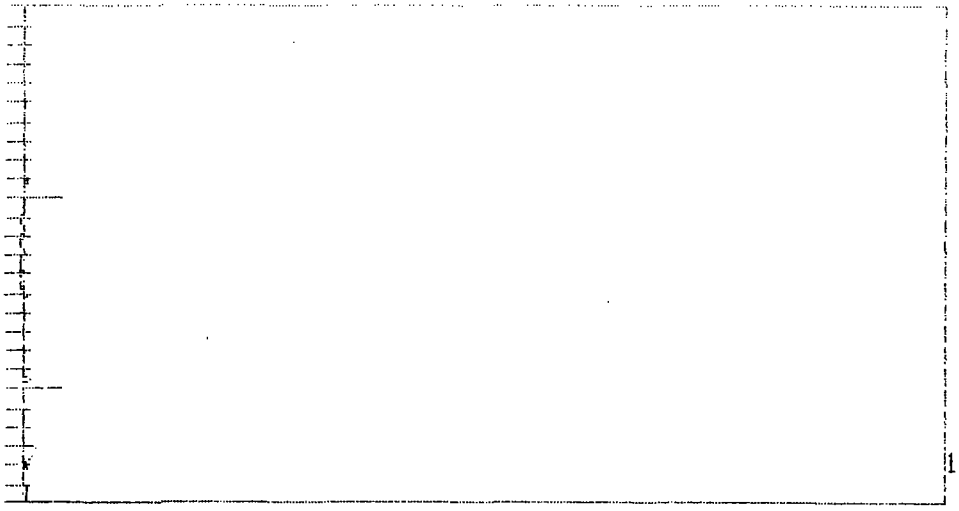
2/20/96
MSP

VP2 72'

GC#2
DELCO

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/20/1996 17:35:14
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 1data396.CHR ( )
Operator : MARK PAULI

-25.600mV 1024.000mV



Component	Retention	Height	Area
1_4-DCBA (SURR)	23.266	70.968	1531.42

Component	Retention	Height	Area
1_4-DCBA (SURR)	23.266	70.968	1531.42
1			1531.42

2/20/96 MOP

10 ug/L

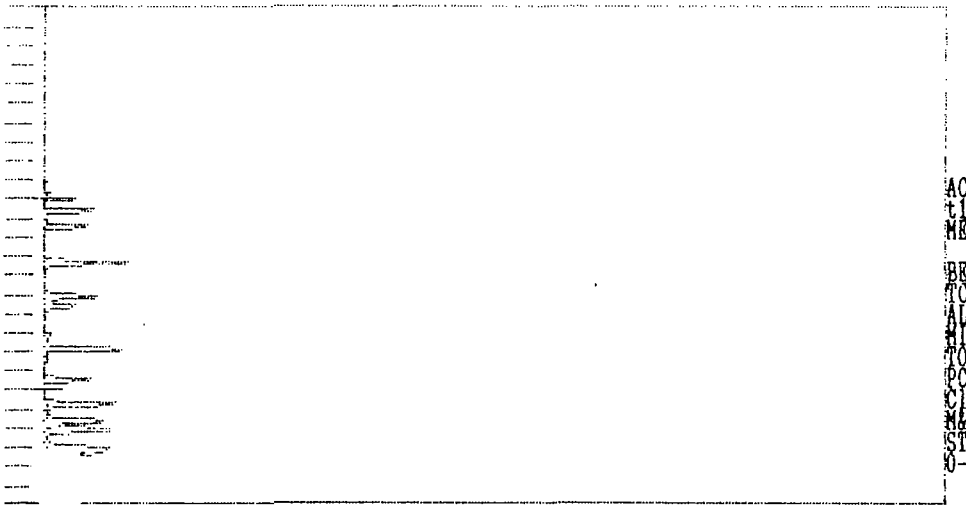
GC #2

PID

(CCV)

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/20/1996 18:57:02
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 2DATA398.CHR ( )
Operator : MARK PAULI

-25.000mV 512.000mV



Component	Retention	Height	Area	
ACETONE	9.708	3.891	22.92	
t1_2-DCE	10.608	61.630	481.33	
MEK & c1_2-DCE	11.441	36.429	368.40	
BENZENE	13.341	50.862	746.31	
TCE	15.108	32.571	490.64	M
ALPHA-TFT(SURR)	15.608	20.677	327.27	M
MIBK	17.141	4.724	58.73	
TOLUENE	17.841	60.559	688.88	
PCE	19.475	30.631	401.05	
C1-BENZENE	20.750	49.522	701.53	
M&P-XYLENE	22.050	40.751	687.43	
STYRENE	23.050	36.296	599.85	
O-XYLENE	23.216	34.983	519.65	

Component	Retention	Height	Area	
(unknown)	9.075	4.764	24.05	
ACETONE	9.708	3.891	22.92	
1_1-DCE	9.975	17.279	121.00	
t1_2-DCE	10.608	61.630	481.33	
MEK & c1_2-DCE	11.441	36.429	368.40	
BENZENE	13.341	50.862	746.31	
TCE	15.108	32.571	490.64	M
ALPHA-TFT(SURR)	15.608	20.677	327.27	M
MIBK	17.141	4.724	58.73	
TOLUENE	17.841	60.559	688.88	
PCE	19.475	30.631	401.05	
C1-BENZENE	20.750	49.522	701.53	
ETHYL BENZENE	21.600	38.148	599.13	
M&P-XYLENE	22.050	40.751	687.43	
STYRENE	23.050	36.296	599.85	
O-XYLENE	23.216	34.983	519.65	
(unknown)	26.366	3.239	29.27	
(unknown)	27.566	1.453	12.76	
18			6880.20	

2/20/96 mp

10 ug/L

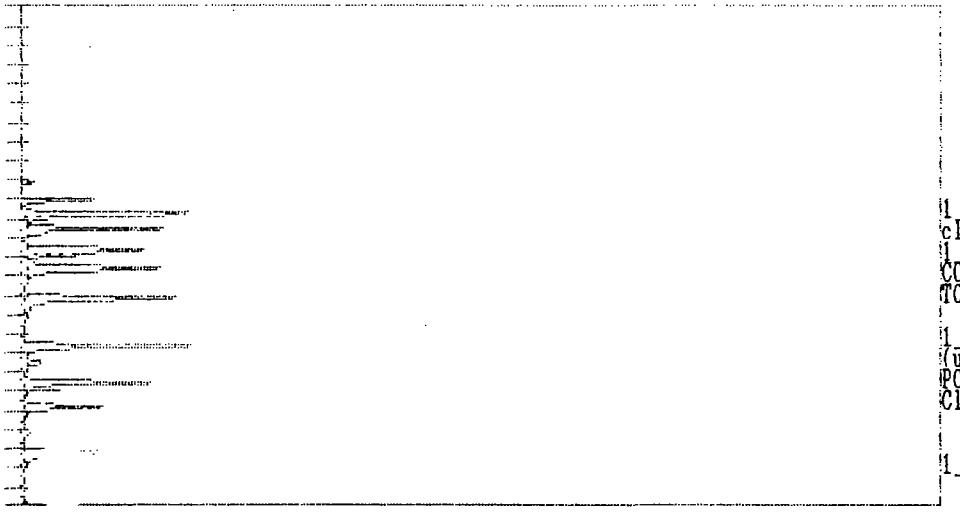
(CCV)

GC#2

DELCD

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/20/1996 18:57:02
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 1data398.CHR ()
Operator : MARK PAULI

-25.600mV 1024.000mV



Component	Retention	Height	Area	
1_1-DCA	10.816	168.291	1722.11	M
c1_2-DCE	11.500	167.948	1964.57	
1_1_1-TCA	12.800	77.635	992.83	M
CCl4	13.600	149.678	2863.03	
TCE	15.166	178.013	3104.11	
1_1_2-TCA	17.633	188.238	2421.50	
(unknown)	18.533	22.129	268.25	
PCE	19.550	155.925	2225.73	
Cl-BENZENE	20.816	91.340	1328.19	
1_4-DCBA (SURR)	23.250	89.785	1917.72	

Component	Retention	Height	Area	
1_1-DCE	10.033	120.034	963.25	
c1_2-DCE	10.666	197.789	1425.31	M
1_1-DCA	10.816	168.291	1722.11	M
c1_2-DCE	11.500	167.948	1964.57	
1_2-DCA	12.583	153.310	2024.57	M
1_1_1-TCA	12.800	77.635	992.83	M
CCl4	13.600	149.678	2863.03	
TCE	15.166	178.013	3104.11	
1_1_2-TCA	17.633	188.238	2421.50	
(unknown)	18.533	22.129	268.25	
PCE	19.550	155.925	2225.73	
Cl-BENZENE	20.816	91.340	1328.19	
1_4-DCBA (SURR)	23.250	89.785	1917.72	
13			23221.18	

2/20/96

MSP

5 ug/L

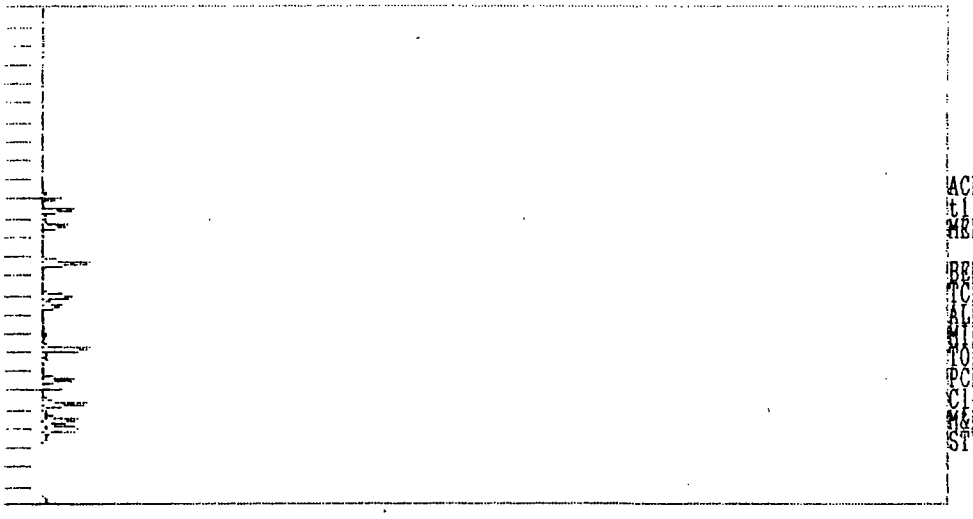
GC #2

PID

(DLV)

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/20/1996 19:37:55
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 2DATA399.CHR ()
Operator : MARK PAULI

-25.000mV 512.000mV



Component	Retention	Height	Area	
ACETONE	9.708	2.218	12.67	
t1_2-DCE	10.608	32.735	258.96	
MEK & c1_2-DCE	11.441	19.027	188.17	
BENZENE	13.341	27.747	394.38	
TCE	15.091	17.838	261.50	M
ALPHA-TFT(SURR)	15.600	11.223	180.02	M
MIBK	17.125	1.831	22.71	
TOLUENE	17.825	34.961	397.57	
PCE	19.450	17.568	227.71	
C1-BENZENE	20.716	25.642	357.83	
M&P-XYLENE	22.016	22.121	374.61	M
STYRENE	23.166	17.723	308.76	M

Component	Retention	Height	Area	
(unknown)	9.075	2.247	12.52	
ACETONE	9.708	2.218	12.67	
1_1-DCE	9.975	9.591	64.62	
t1_2-DCE	10.608	32.735	258.96	
MEK & c1_2-DCE	11.441	19.027	188.17	
BENZENE	13.341	27.747	394.38	
TCE	15.091	17.838	261.50	M
ALPHA-TFT(SURR)	15.600	11.223	180.02	M
MIBK	17.125	1.831	22.71	
TOLUENE	17.825	34.961	397.57	
PCE	19.450	17.568	227.71	
C1-BENZENE	20.716	25.642	357.83	
ETHYL BENZENE	21.566	20.488	313.61	M
M&P-XYLENE	22.016	22.121	374.61	M
STYRENE	23.000	17.322	233.59	M
~~STYRENE~~ O-XYLENE	23.166	17.723	308.76	M
(unknown)	26.333	2.766	28.06	
(unknown)	27.533	1.507	13.17	

18 3650.45

2/20/96 mp

5ug/L

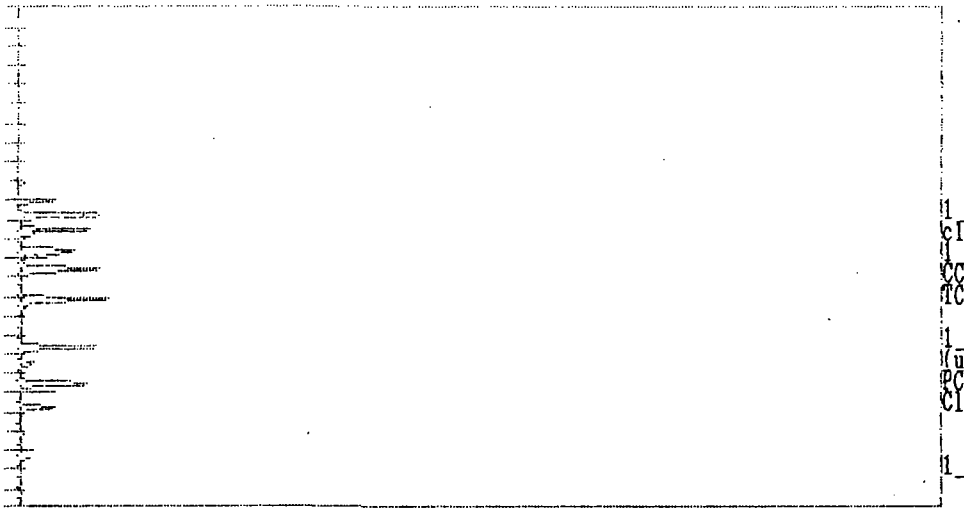
GC #2

DELCD

(DLV)

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/20/1996 19:37:55
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 1data399.CHR ()
Operator : MARK PAULI

-25.600mV 1024.000mV



Component	Retention	Height	Area	
1_1-DCA	10.816	94.826	1012.09	M
c1_2-DCE	11.500	87.274	1055.81	
1_1_1-TCA	12.800	47.461	664.71	M
CCl4	13.583	89.877	1688.53	
TCE	15.166	104.279	1810.50	
1_1_2-TCA	17.616	87.675	1114.90	
(unknown)	18.516	18.290	228.03	
PCE	19.516	93.023	1316.52	
Cl-BENZENE	20.783	43.364	633.45	
1_4-DCBA (SURR)	23.200	39.495	836.82	

Component	Retention	Height	Area	
1_1-DCE	10.033	58.515	463.94	
c1_2-DCE	10.666	97.567	638.11	M
1_1-DCA	10.816	94.826	1012.09	M
c1_2-DCE	11.500	87.274	1055.81	
1_2-DCA	12.583	70.163	868.57	M
1_1_1-TCA	12.800	47.461	664.71	M
CCl4	13.583	89.877	1688.53	
TCE	15.166	104.279	1810.50	
1_1_2-TCA	17.616	87.675	1114.90	
(unknown)	18.516	18.290	228.03	
PCE	19.516	93.023	1316.52	
Cl-BENZENE	20.783	43.364	633.45	
1_4-DCBA (SURR)	23.200	39.495	836.82	
13			12331.97	

2/20/96 MP

2-21-96

GC #2

Lower Aquifer

ACS Field GC #2

Compound Date 2/21/96	PK #	RT	STD1 50 *Run #*	STD2 10 *Run #*	STD3 5 *Run #*	Linear Regression CC	 Slope	 Int.	ICB 10.0 g. *run#*	 ug/L	10 ICV	% D ICV/STD	1 VP2 79' 5.00 mL	 ug/L	2 VP2 86' 5.00 mL	 ug/L
Acetone	1	11.2	60	22	16	1.000	1.0E+00	-12.1			24	109.1%				
1,1,-DCE	2	11.5	499	113	60	1.000	1.0E-01	-1.4			130	115.0%				
trans-1,2-DCE	3	12.6	1,186	473	264	0.993	5.1E-02	-10.8			410	86.7%				
MEK/cis 1,2-DCE	4	14.1	1,266	369	208	0.999	4.3E-02	-4.9			367	99.5%				
Benzene	6	16.7	2,512	751	417	0.999	2.2E-02	-5.2			740	98.5%				
TCE	7	18.1	1,696	483	278	0.999	3.2E-02	-4.7			482	99.8%				
MIBK	8	19.8	178	55	30	0.998	3.1E-01	-5.6			59	107.3%				
Toluene	9	20.6	2,332	681	401	0.999	2.4E-02	-5.2			699	102.6%				
PCE	10	21.9	1,445	396	227	1.000	3.7E-02	-4.1			395	99.7%				
Chlorobenzene	11	23.7	2,363	693	394	0.999	2.3E-02	-5.0			699	100.9%				
Ethylbenzene	12	24.0	2,157	590	327	0.999	2.5E-02	-3.9			595	100.8%				
m+p-Xylene	13	24.2	2,471	684	374	0.999	2.2E-02	-4.0			677	99.0%				
Styrene	14	25.5	2,292	559	252	0.999	2.2E-02	-1.5			592	105.9%				
o-Xylene	15	25.6	1,737	551	334	0.999	3.3E-02	-6.9			520	94.4%				
1,1,-DCE	1	11.5	3,848	1,000	532	1.000	1.4E-02	-3.0			916	91.6%				
t-1,2-DCE	2	12.6	3,479	1,515	853	0.990	1.8E-02	-13.2			1,134	74.9%				
1,1-DCA	3	13.4	6,260	1,966	1,321	1.000	9.2E-03	-7.6			1,598	81.3%				
cis-1,2-DCE	4	14.5	6,315	2,149	1,392	0.999	9.3E-03	-8.9			1,894	88.1%				
1,2-DCA	5	14.9	5,095	2,006	1,302	0.997	1.2E-02	-12.5			1,952	97.3%				
1,1,1-TCA	6	15.9	4,859	1,252	830	1.000	1.1E-02	-4.1			936	74.8%				
Carbon Tet.	7	16.6	10,795	3,425	2,209	1.000	5.3E-03	-7.4			2,641	77.1%				
TCE	8	18.2	10,126	3,364	2,340	1.000	5.8E-03	-9.1			2,996	89.1%				
1,1,2-TCA	9	21.2	6,415	2,543	1,678	0.997	9.8E-03	-12.9			2,410	94.8%				
PCE	10	21.9	7,820	2,509	1,596	0.999	7.3E-03	-7.5			2,154	85.9%				
Chlorobenzene	11	23.7	5,244	1,480	833	0.999	1.0E-02	-4.4			1,276	86.2%				

a,a,a-TFT	8	18.5	1,222	**325**	181				339	104%	333	102%	319	98%	309	95%
1,4-DCBA	12	26.8	5,088	**2,113**	1,346				2,162	102%	1,919	91%	1976	94%	1322	63%

TOTAL VOCs (PPM)	**0.0**		**0.0**

Analyst _____

Check _____

Lower Aquifer

ACS Field GC #2	3		4		5		6		7		8		9	
Compound	**VP2 79' LAB DUP**		**GP143**		**GP143**		**GP144**		**GP145**		**GP145**		**GP70A**	
Date	5.00 mL		5.00 mL		1.00 mL		1.00 mL		1.00 mL		5.00 mL		1.00 mL	
2/21/96		ug/L		ug/L		ug/L		ug/L		ug/L		ug/L		ug/L
Acetone			40	58.5										
1,1,-DCE														
trans-1,2-DCE														
MEK/cis 1,2-DCE														
Benzene			8277	176.0	2541	252.2	1810	172.2						
TCE														
MIBK														
Toluene														
PCE														
Chlorobenzene														
Ethylbenzene														
m+p-Xylene			4095	85.2	1148	105.2								
Styrene														
o-Xylene														
1,1,-DCE														
t-1,2-DCE														
1,1-DCA														
cis-1,2-DCE														
1,2-DCA														
1,1,1-TCA														
Carbon Tet.														
TCE														
1,1,2-TCA														
PCE														
Chlorobenzene														

a,a,a-TFT	313	96%	326	100%	294	90%	319	98%	304	94%	328	101%	316	97%
1,4-DCBA	1948	92%	1364	65%	1756	83%	2031	96%	1600	76%	1584	75%	2306	109%

TOTAL VOCs (PPM)		**0.0**		**0.3**		**0.4**		**0.2**		**0.0**		**0.0**		**0.0**

Analyst _____
Check _____

Lower Aquifer

ACS Field GC #2

Compound Date 2/21/96	10 CCV	%D CCV/STD
Acetone	21	95.5%
1,1,-DCE	116	102.7%
trans-1,2-DCE	199	42.1%
MEK/cis 1,2-DCE	322	87.3%
Benzene	678	90.3%
TCE	456	94.4%
MIBK	34	61.8%
Toluene	646	94.9%
PCE	380	96.0%
Chlorobenzene	605	87.3%
Ethylbenzene	557	94.4%
m+p-Xylene	638	93.3%
Styrene	469	83.9%
o-Xylene	493	88.2%
1,1,-DCE	1004	100.4%
t-1,2-DCE	1179	77.8%
1,1-DCA	1495	76.0%
cis-1,2-DCE	1928	89.7%
1,2-DCA	1482	73.9%
1,1,1-TCA	1627	130.0%
Carbon Tet.	3055	89.2%
TCE	3173	94.3%
1,1,2-TCA	1923	75.6%
PCE	2424	96.6%
Chlorobenzene	1236	83.5%

a,a,a-TFT	322.0	99%
1,4-DCBA	1,509.0	71%

TOTAL VOCs (PPM)

Analyst _____

Check _____

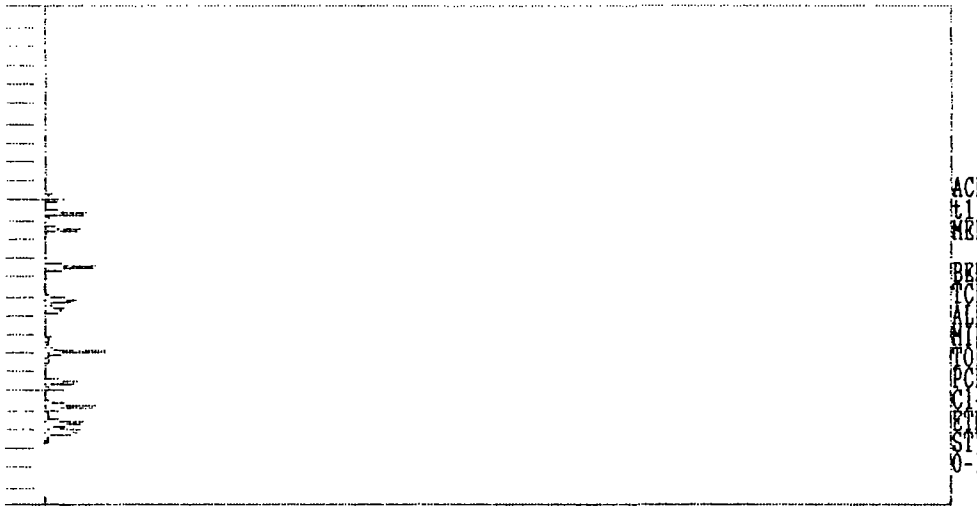
5 ug/L

GC #2

PID

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/21/1996 08:27:21
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 2DATA401.CHR ()
Operator : MARK PAULI

-25.000mV 512.000mV



Component	Retention	Height	Area	
ACETONE	9.716	2.656	15.76	
t1_2-DCE	10.650	32.940	264.09	
MEK & c1_2-DCE	11.500	20.176	208.45	
BENZENE	13.458	27.785	416.98	
TCE	15.233	18.669	277.72	M
ALPHA-TFT(SURR)	15.733	11.623	180.87	M
MIBK	17.258	2.502	29.78	
TOLUENE	17.933	35.400	401.07	
PCE	19.558	17.496	227.32	
C1-BENZENE	20.825	27.562	394.26	
ETHYL BENZENE	21.675	20.833	326.94	M
STYRENE	23.125	18.674	252.37	M
O-XYLENE	23.291	18.964	333.96	M

Component	Retention	Height	Area	
(unknown)	9.066	1.781	10.68	
ACETONE	9.716	2.656	15.76	
1_1-DCE	10.000	8.751	59.62	
t1_2-DCE	10.650	32.940	264.09	
MEK & c1_2-DCE	11.500	20.176	208.45	
BENZENE	13.458	27.785	416.98	
TCE	15.233	18.669	277.72	M
ALPHA-TFT(SURR)	15.733	11.623	180.87	M
MIBK	17.258	2.502	29.78	
TOLUENE	17.933	35.400	401.07	
PCE	19.558	17.496	227.32	
C1-BENZENE	20.825	27.562	394.26	
ETHYL BENZENE	21.675	20.833	326.94	M
M&P-XYLENE	22.125	22.165	374.22	M
STYRENE	23.125	18.674	252.37	M
O-XYLENE	23.291	18.964	333.96	M
(unknown)	26.416	1.910	16.67	

17 3790.76

2/21/96 MOP

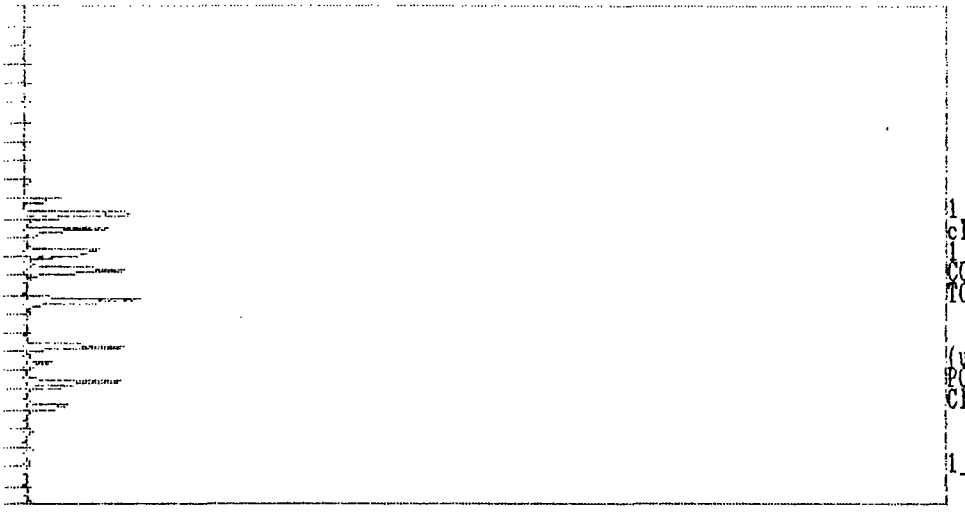
5 mg/L

GC #2

DELCD

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/21/1996 08:27:21
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 1data401.CHR ( )
Operator : MARK PAULI

-25.600mV 1024.000mV



Component	Retention	Height	Area	
1_1-DCA	10.850	123.779	1320.75	M
cl_2-DCE	11.566	111.464	1392.08	
1_1_1-TCA	12.916	60.913	830.09	M
CCl4	13.716	111.178	2208.53	
TCE	15.316	134.502	2340.26	
(unknown)	18.633	28.039	347.99	
PCE	19.616	112.969	1595.53	
Cl-BENZENE	20.883	57.122	833.48	
1_4-DCBA (SURR)	23.316	63.347	1346.21	

Component	Retention	Height	Area	
1_1-DCE	10.066	64.960	531.54	
tl_2-DCE	10.716	121.246	852.99	M
1_1-DCA	10.850	123.779	1320.75	M
cl_2-DCE	11.566	111.464	1392.08	
1_2-DCA	12.683	99.573	1301.95	M
1_1_1-TCA	12.916	60.913	830.09	M
CCl4	13.716	111.178	2208.53	
TCE	15.316	134.502	2340.26	
1_1_2-TCA	17.733	131.911	1677.80	
(unknown)	18.633	28.039	347.99	
PCE	19.616	112.969	1595.53	
Cl-BENZENE	20.883	57.122	833.48	
1_4-DCBA (SURR)	23.316	63.347	1346.21	
13			16579.21	

2/21/96
MSP

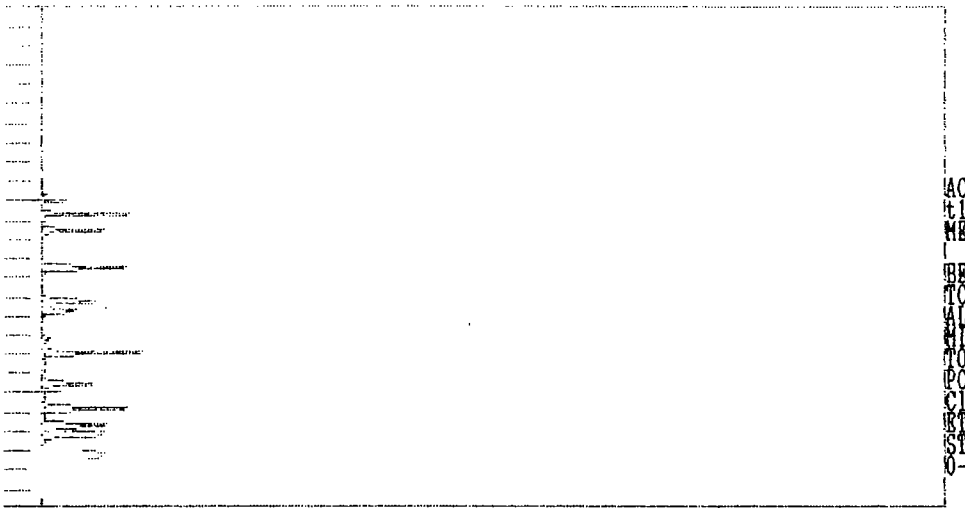
10 µg/L

GC#2

PID

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/21/1996 09:07:44
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 2DATA402.CHR ()
Operator : MARK PAULI

-25.000mV 512.000mV



Component	Retention	Height	Area	
ACETONE	9.741	3.493	21.95	
t1_2-DCE	10.658	59.368	472.72	
MEK & c1_2-DCE	11.508	35.456	369.15	
BENZENE	13.483	49.308	751.45	
TCE	15.241	32.460	482.58	M
ALPHA-TFT(SURR)	15.741	20.745	324.99	M
MIBK	17.241	4.565	55.46	
TOLUENE	17.941	59.712	681.16	
PCE	19.566	30.216	395.86	
C1-BENZENE	20.833	48.513	693.32	
ETHYL BENZENE	21.683	37.853	589.62	
STYRENE	23.133	35.671	559.10	
O-XYLENE	23.300	34.697	550.61	

Component	Retention	Height	Area	
(unknown)	9.075	3.294	17.78	
ACETONE	9.741	3.493	21.95	
1_1-DCE	10.008	16.322	112.85	
t1_2-DCE	10.658	59.368	472.72	
MEK & c1_2-DCE	11.508	35.456	369.15	
BENZENE	13.483	49.308	751.45	
TCE	15.241	32.460	482.58	M
ALPHA-TFT(SURR)	15.741	20.745	324.99	M
MIBK	17.241	4.565	55.46	
TOLUENE	17.941	59.712	681.16	
PCE	19.566	30.216	395.86	
C1-BENZENE	20.833	48.513	693.32	
ETHYL BENZENE	21.683	37.853	589.62	
M&P-XYLENE	22.133	39.756	684.20	
STYRENE	23.133	35.671	559.10	
O-XYLENE	23.300	34.697	550.61	
(unknown)	26.450	2.129	19.26	
17			6782.04	

2/21/96
mop

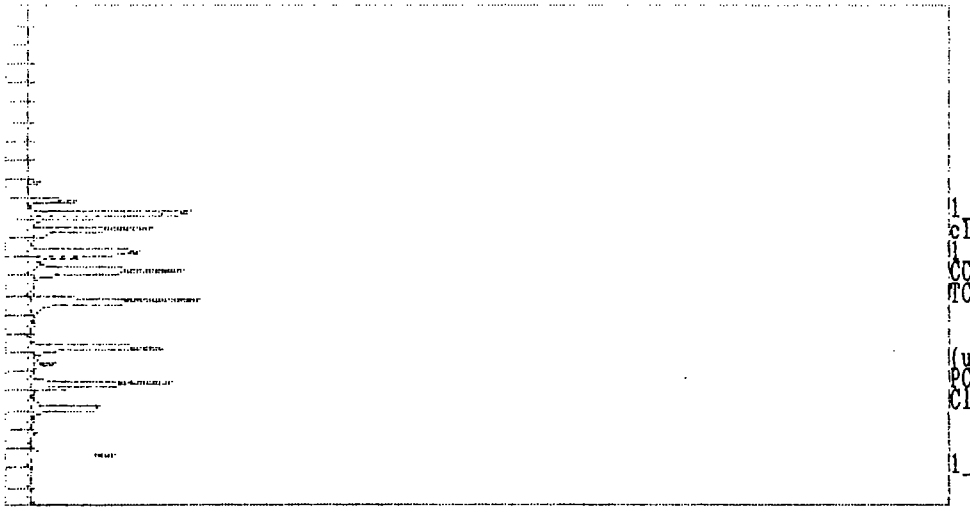
10 ug/L

GC#2

DELCD

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/21/1996 09:07:44
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 1data402.CHR ()
Operator : MARK PAULI

-25.600mV 1024.000mV



Component	Retention	Height	Area	
1_1-DCA	10.866	188.333	1965.51	M
cl_2-DCE	11.583	178.856	2149.01	
1_1_1-TCA	12.933	91.193	1252.18	M
CCl4	13.733	170.601	3425.18	
TCE	15.300	195.631	3364.18	
(unknown)	18.616	23.364	291.36	
PCE	19.616	177.926	2509.37	
Cl-BENZENE	20.900	102.038	1479.59	
1_4-DCBA (SURR)	23.333	97.870	2112.64	

Component	Retention	Height	Area	
1_1-DCE	10.066	123.426	1000.36	
tl_2-DCE	10.716	205.694	1514.97	M
1_1-DCA	10.866	188.333	1965.51	M
cl_2-DCE	11.583	178.856	2149.01	
~~(unknown)~~ 1,2DCA	12.716	155.020	2006.07	M
1_1_1-TCA	12.933	91.193	1252.18	M
CCl4	13.733	170.601	3425.18	
TCE	15.300	195.631	3364.18	
1_1_2-TCA	17.716	198.056	2542.59	
(unknown)	18.616	23.364	291.36	
PCE	19.616	177.926	2509.37	
Cl-BENZENE	20.900	102.038	1479.59	
1_4-DCBA (SURR)	23.333	97.870	2112.64	
13			25613.00	

2/21/96
mop

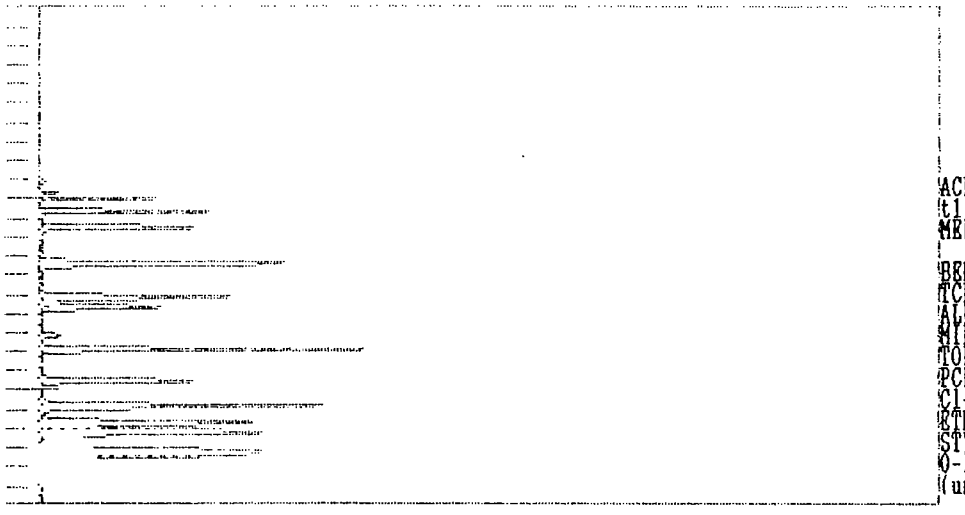
50 ug/L

GC #2

PID

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/21/1996 09:48:44
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 2DATA403.CHR ( )
Operator : MARK PAULI

-25.000mV 512.000mV



Component	Retention	Height	Area	
ACETONE	9.716	9.982	59.74	
t1_2-DCE	10.650	161.700	1185.92	
MEK & c1_2-DCE	11.466	122.475	1266.35	
BENZENE	13.383	167.425	2511.78	
TCE	15.150	112.089	1696.17	
ALPHA-TFT(SURR)	15.658	75.362	1222.01	
MIBK	17.166	13.899	177.77	
TOLUENE	17.883	197.369	2332.09	
PCE	19.533	107.594	1445.34	
C1-BENZENE	20.825	161.284	2363.04	
ETHYL BENZENE	21.708	133.187	2157.32	
STYRENE	23.175	127.972	2291.89	M
O-XYLENE	23.325	120.052	1736.77	M
(unknown)	25.333	0.878	14.39	

Component	Retention	Height	Area	
(unknown)	9.066	8.595	61.79	
ACETONE	9.716	9.982	59.74	
1_1-DCE	9.983	69.588	499.03	
t1_2-DCE	10.650	161.700	1185.92	
MEK & c1_2-DCE	11.466	122.475	1266.35	
BENZENE	13.383	167.425	2511.78	
TCE	15.150	112.089	1696.17	
ALPHA-TFT(SURR)	15.658	75.362	1222.01	
MIBK	17.166	13.899	177.77	
TOLUENE	17.883	197.369	2332.09	
PCE	19.533	107.594	1445.34	
C1-BENZENE	20.825	161.284	2363.04	
ETHYL BENZENE	21.708	133.187	2157.32	
M&P-XYLENE	22.158	139.226	2471.21	
STYRENE	23.175	127.972	2291.89	M
O-XYLENE	23.325	120.052	1736.77	M
(unknown)	25.333	0.878	14.39	
(unknown)	26.450	4.583	42.93	
18			23535.54	

2/21/96
MSP

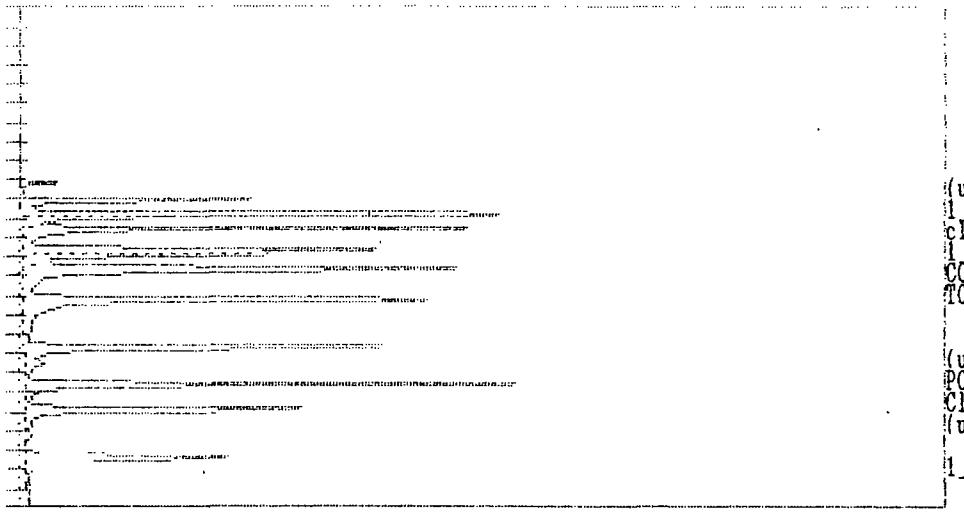
50 ug/L

GC #2

DELCD

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/21/1996 09:48:44
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : ldata403.CHR ()
Operator : MARK PAULI

-25.600mV 1024.000mV



Component	Retention	Height	Area	
(unknown)	9.133	73.604	509.61	
1_1-DCA	10.833	531.320	6259.87	M
c1_2-DCE	11.533	499.584	6315.07	M
1_1_1-TCA	12.866	303.130	4858.74	M
CCl4	13.633	491.372	10794.89	M
TCE	15.216	535.576	10126.22	M
(unknown)	18.583	25.088	617.65	M
PCE	19.583	544.213	7819.96	M
Cl-BENZENE	20.883	348.281	5243.55	M
(unknown)	21.633	8.545	208.54	M
1_4-DCBA (SURR)	23.366	230.226	5087.85	

Component	Retention	Height	Area	
(unknown)	9.133	73.604	509.61	
1_1-DCE	10.050	463.538	3848.26	M
c1_2-DCE	10.683	508.587	3479.14	M
1_1-DCA	10.833	531.320	6259.87	M
c1_2-DCE	11.533	499.584	6315.07	M
1_2-DCA	12.633	398.800	5094.74	M
1_1_1-TCA	12.866	303.130	4858.74	M
CCl4	13.633	491.372	10794.89	M
TCE	15.216	535.576	10126.22	M
1_1_2-TCA	17.683	453.853	6414.63	M
(unknown)	18.583	25.088	617.65	M
PCE	19.583	544.213	7819.96	M
Cl-BENZENE	20.883	348.281	5243.55	M
(unknown)	21.633	8.545	208.54	M
1_4-DCBA (SURR)	23.366	230.226	5087.85	
15			76678.72	

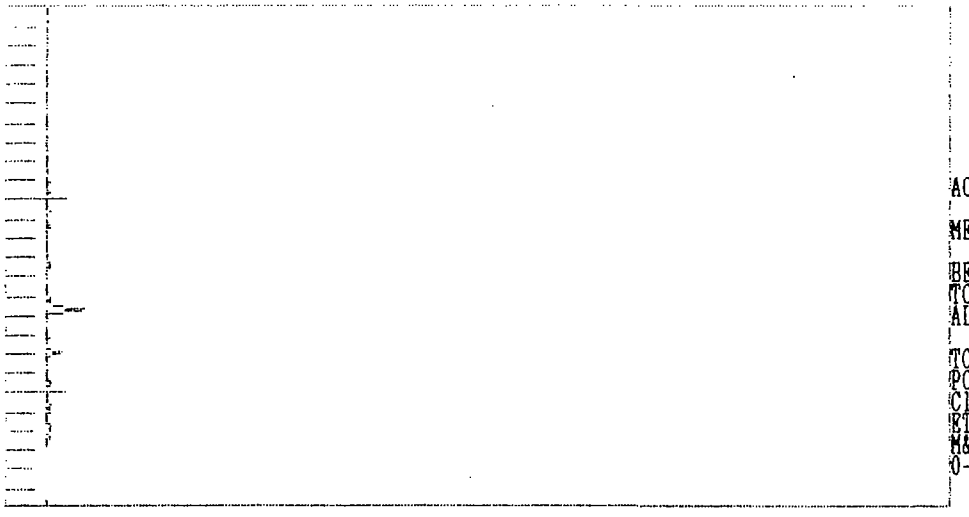
2/21/96 mop

BLANK (ICB)

GC #2 PID

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/21/1996 10:28:32
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 2DATA404.CHR ( )
Operator : MARK PAULI

-25.000mV 512.000mV



Component	Retention	Height	Area
ACETONE	9.725	1.754	10.41
MEK & c1_2-DCE	11.475	1.692	19.50
BENZENE	13.416	2.369	36.21
TCE	15.191	1.658	20.32
ALPHA-TFT(SURR)	15.691	21.434	339.24
TOLUENE	17.941	8.771	97.24
PCE	19.600	2.032	25.70
C1-BENZENE	20.883	2.193	36.22
ETHYL BENZENE	21.750	1.068	13.16
M&P-XYLENE	22.200	2.442	39.52
O-XYLENE	23.400	1.656	45.41

Component	Retention	Height	Area
(unknown)	9.158	1.189	12.95
ACETONE	9.725	1.754	10.41<
MEK & c1_2-DCE	11.475	1.692	19.50<
BENZENE	13.416	2.369	36.21<
TCE	15.191	1.658	20.32
ALPHA-TFT(SURR)	15.691	21.434	339.24
TOLUENE	17.941	8.771	97.24<
~~PCE~~	19.600	2.032	25.70
~~C1-BENZENE~~	20.883	2.193	36.22
ETHYL BENZENE	21.750	1.068	13.16<
M&P-XYLENE	22.200	2.442	39.52<
O-XYLENE	23.400	1.656	45.41<
(unknown)	26.466	2.629	22.77
13			718.65

2/21/96 MSP

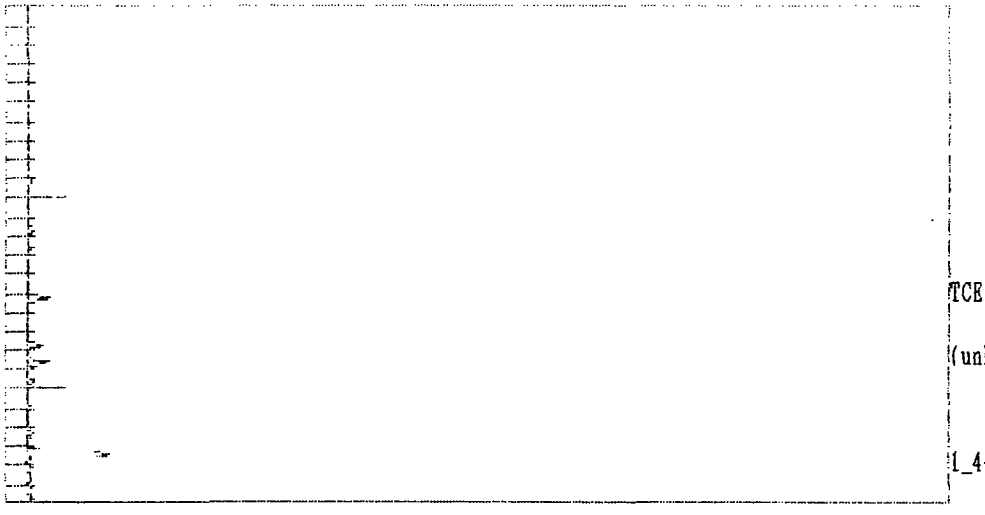
BLANK (ICB)

GC#2

DELCD

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/21/1996 10:28:32
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 1data404.CHR ()
Operator : MARK PAULI

-25.600mV 1024.000mV



Component	Retention	Height	Area
TCE	15.266	26.094	378.86
(unknown)	18.650	26.376	348.15
1_4-DCBA (SURR)	23.416	99.519	2161.68

Component	Retention	Height	Area
TCE	15.266	26.094	378.86
1_1_2-TCA	17.716	18.608	237.82
(unknown)	18.650	26.376	348.15
1_4-DCBA (SURR)	23.416	99.519	2161.68
4			3126.50

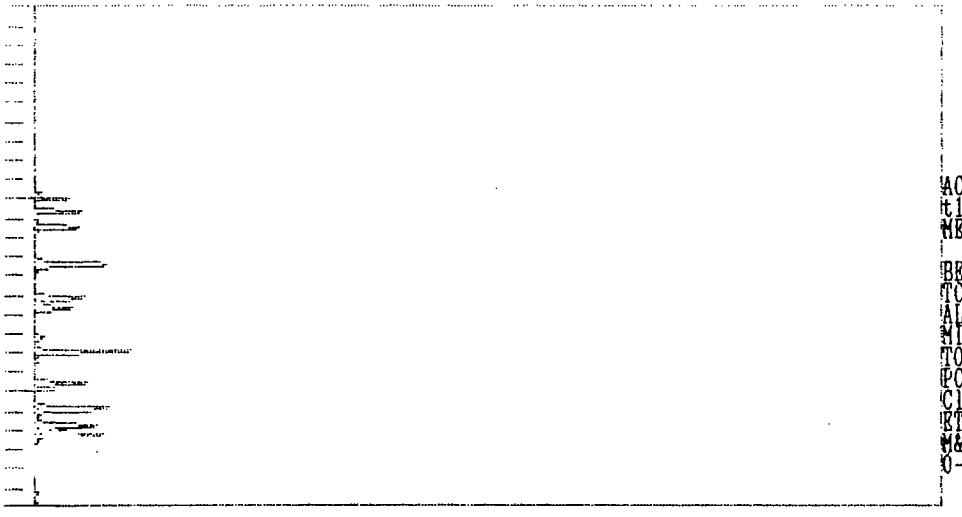
2/21/96 MP

10 ug/L
(ICV)

GC #2
PID

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/21/1996 11:09:30
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 2DATA405.CHR ()
Operator : MARK PAULI

-25.000mV 512.000mV



Component	Retention	Height	Area	
ACETONE	9.716	3.873	23.53	
t1_2-DCE	10.633	55.544	409.66	
MEK & c1_2-DCE	11.466	35.391	366.59	
BENZENE	13.400	49.151	739.65	
TCE	15.183	32.143	481.73	M
ALPHA-TFT(SURR)	15.691	20.421	332.68	M
MIBK	17.250	4.687	58.62	
TOLUENE	17.950	60.950	698.96	
PCE	19.600	29.976	395.03	
C1-BENZENE	20.883	48.425	699.09	
ETHYL BENZENE	21.758	37.227	594.60	
M&P-XYLENE	22.225	39.289	676.87	
O-XYLENE	23.408	34.306	519.50	

Component	Retention	Height	Area	
unknown)	9.066	4.227	22.16	
ACETONE	9.716	3.873	23.53	
_1-DCE	9.983	18.890	130.31	
c1_2-DCE	10.633	55.544	409.66	
MEK & c1_2-DCE	11.466	35.391	366.59	
BENZENE	13.400	49.151	739.65	
TCE	15.183	32.143	481.73	M
ALPHA-TFT(SURR)	15.691	20.421	332.68	M
MIBK	17.250	4.687	58.62	
TOLUENE	17.950	60.950	698.96	
PCE	19.600	29.976	395.03	
C1-BENZENE	20.883	48.425	699.09	
ETHYL BENZENE	21.758	37.227	594.60	
M&P-XYLENE	22.225	39.289	676.87	
~~O-XYLENE~~ STYRENE	23.225	35.772	591.57	
O-XYLENE	23.408	34.306	519.50	
unknown)	26.466	3.178	27.92	
17			6768.46	

2/21/96 MP

10 ug/L

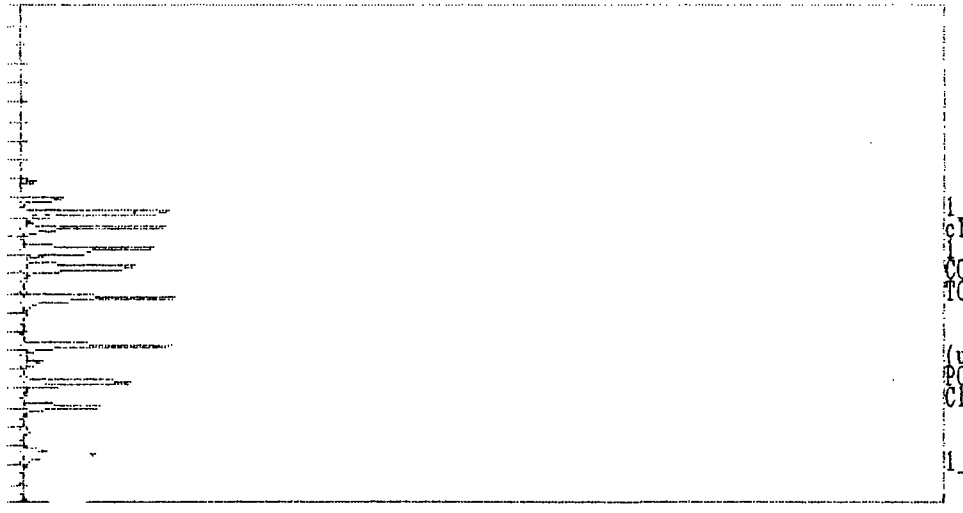
(ICV)

GC #2

DELCD

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/21/1996 11:09:30
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 1data405.CHR ( )
Operator : MARK PAULI

-25.600mV 1024.000mV



Component	Retention	Height	Area	
1_1-DCA	10.833	154.067	1598.12	M
cI_2-DCE	11.533	160.454	1894.37	
1_1_1-TCA	12.850	74.460	936.42	M
CCl4	13.666	132.957	2640.69	
TCE	15.250	175.383	2995.88	
(unknown)	18.650	21.073	259.25	
PCE	19.666	151.789	2153.79	
Cl-BENZENE	20.950	86.924	1275.79	
1_4-DCBA (SURR)	23.416	89.238	1918.94	

Component	Retention	Height	Area	
_1-DCE	10.050	114.512	916.09	
cl_2-DCE	10.700	164.136	1134.30	M
1_1-DCA	10.833	154.067	1598.12	M
cl_2-DCE	11.533	160.454	1894.37	
1_2-DCA	12.633	146.506	1952.38	M
1_1_1-TCA	12.850	74.460	936.42	M
CCl4	13.666	132.957	2640.69	
TCE	15.250	175.383	2995.88	
1_1_2-TCA	17.733	185.066	2409.59	
(unknown)	18.650	21.073	259.25	
PCE	19.666	151.789	2153.79	
Cl-BENZENE	20.950	86.924	1275.79	
1_4-DCBA (SURR)	23.416	89.238	1918.94	
13			22085.61	

2/21/96 MSP

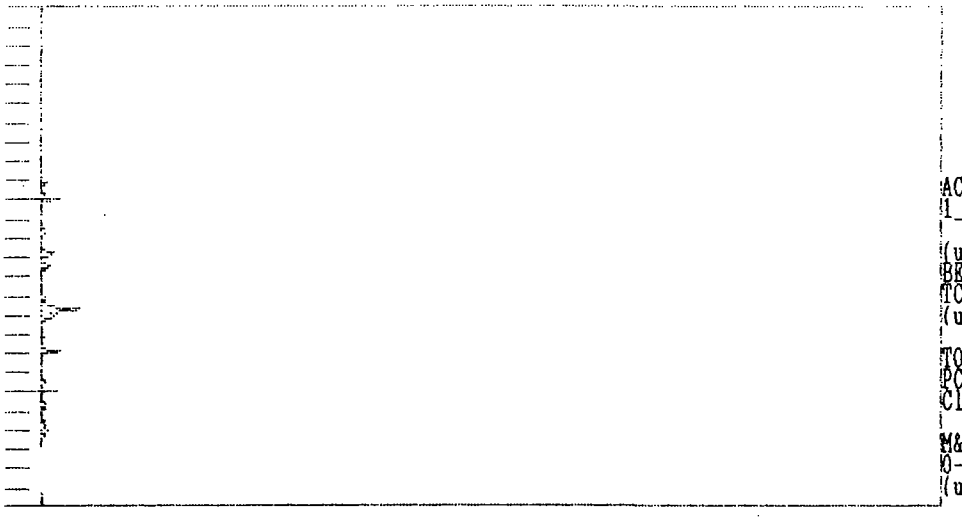
VP 2 79'

GC #2

PID

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/21/1996 11:49:37
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 2DATA406.CHR ()
Operator : MARK PAULI

-25.000mV 512.000mV



Component	Retention	Height	Area
ACETONE	9.741	2.083	11.62
1_1-DCE	9.975	7.838	54.86
(unknown)	12.808	7.731	100.73
BENZENE	13.466	4.906	77.48
TCE	15.208	1.163	13.59
(unknown)	16.016	9.265	130.02 M
TOLUENE	17.908	10.120	111.88
PCE	19.525	1.884	24.00
Cl-BENZENE	20.775	0.767	15.09
M&P-XYLENE	22.100	1.966	31.22
O-XYLENE	23.283	0.945	22.12
(unknown)	25.275	1.950	32.30

Component	Retention	Height	Area
(unknown)	9.125	4.465	30.58
ACETONE	9.741	2.083	11.62 <
~~1_1-DCE~~ NOT IN DELCD	9.975	7.838	54.86
(unknown)	12.808	7.731	100.73
BENZENE	13.466	4.906	77.48 <
TCE	15.208	1.163	13.59
ALPHA-TFT(SURR)	15.700	21.339	318.63 M
(unknown)	16.016	9.265	130.02 M
TOLUENE	17.908	10.120	111.88 <
~~PCE~~	19.525	1.884	24.00
~~Cl-BENZENE~~	20.775	0.767	15.09
M&P-XYLENE	22.100	1.966	31.22 <
O-XYLENE	23.283	0.945	22.12 <
(unknown)	25.275	1.950	32.30
(unknown)	26.441	2.114	19.07
15			993.17

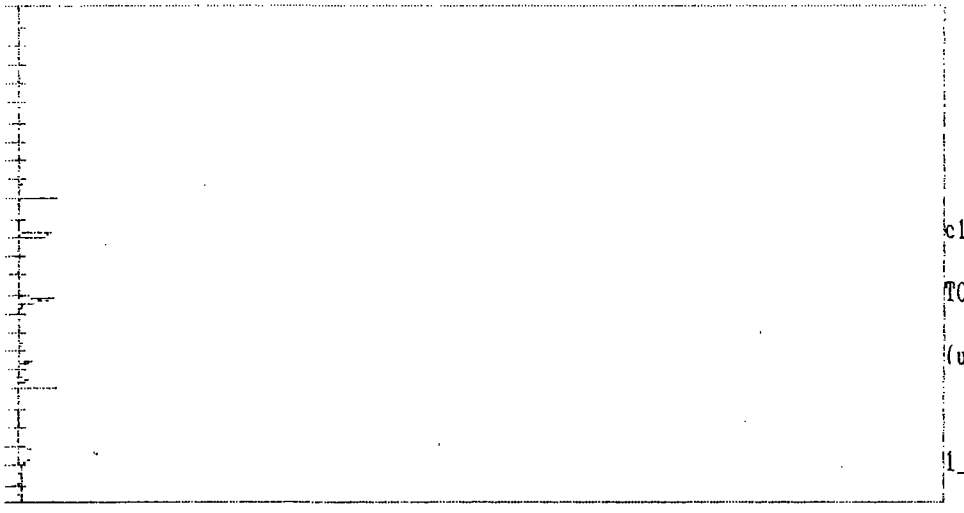
2/21/96 MSP

VP2 79'

GC#2

DELCD

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/21/1996 11:49:37
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 1data406.CHR ()
Operator : MARK PAULI



Component	Retention	Height	Area
c1_2-DCE	11.866	53.678	673.57
TCE	15.300	41.647	733.82
(unknown)	18.600	15.715	200.46
1_4-DCBA (SURR)	23.316	91.162	1975.68

Component	Retention	Height	Area
~~1_2-DCE~~ NOT IN PID	11.866	53.678	673.57
TCE	15.300	41.647	733.82
(unknown)	18.600	15.715	200.46
1_4-DCBA (SURR)	23.316	91.162	1975.68
4			3583.52

2/21/96 MP

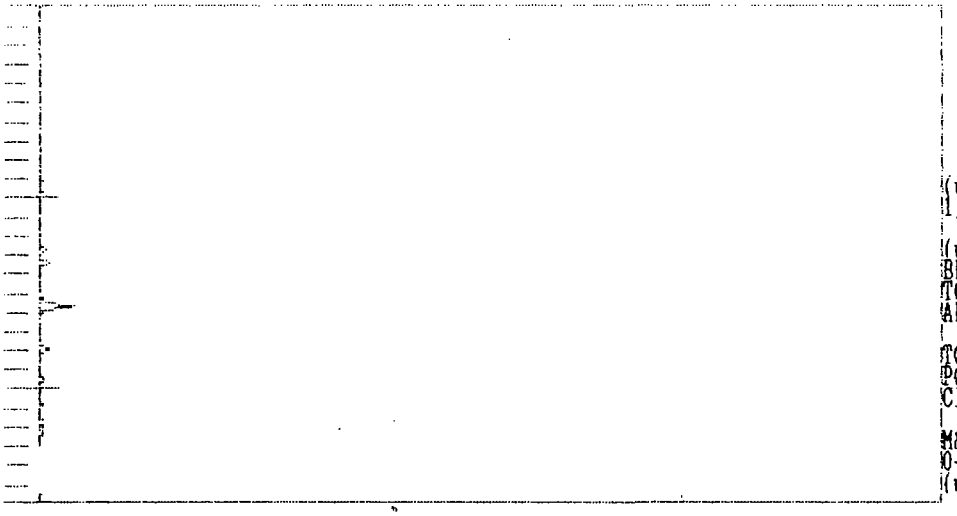
VP2 86

GC #2

PID

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/21/1996 12:30:00
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 2DATA407.CHR ()
Operator : MARK PAULI

-25.000mV 512.000mV



Component	Retention	Height	Area
(unknown)	9.125	1.498	14.60
1_1-DCE	9.950	1.855	12.67
(unknown)	12.766	3.548	44.07
BENZENE	13.400	5.203	76.42
TCE	15.183	0.923	11.07
ALPHA-TFT(SURR)	15.683	19.581	308.77
TOLUENE	17.941	8.578	94.25
PCE	19.591	2.003	26.36
Cl-BENZENE	20.900	0.786	13.96
M&P-XYLENE	22.233	1.833	30.22
O-XYLENE	23.433	0.695	14.18
(unknown)	25.375	1.945	32.01

Component	Retention	Height	Area
(unknown)	9.125	1.498	14.60
~~1_1-DCE~~ NOT IN DELCD	9.950	1.855	12.67 — (UNKNOWN)
(unknown)	12.766	3.548	44.07
BENZENE	13.400	5.203	76.42 <
TCE	15.183	0.923	11.07
ALPHA-TFT(SURR)	15.683	19.581	308.77
TOLUENE	17.941	8.578	94.25 <
~~PCE~~	19.591	2.003	26.36
~~Cl-BENZENE~~	20.900	0.786	13.96
M&P-XYLENE	22.233	1.833	30.22 <
O-XYLENE	23.433	0.695	14.18 <
(unknown)	25.375	1.945	32.01
(unknown)	26.475	2.580	25.62
13			704.19

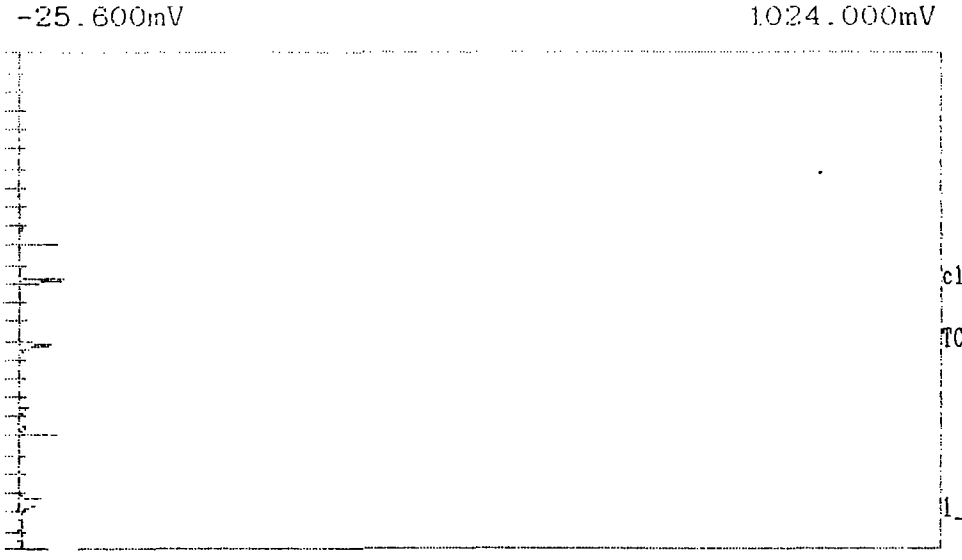
2/21/96
mp

VP2 86

GC#2

DELCD

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/21/1996 12:30:00
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 1data407.CHR ()
Operator : MARK PAULI



Component	Retention	Height	Area
c1_2-DCE	11.833	55.317	685.82
TCE	15.266	36.751	666.01
1_4-DCBA (SURR)	23.466	61.182	1321.53

Component	Retention	Height	Area
~~1_2-DCE~~ NOT IN PID	11.833	55.317	685.82
TCE	15.266	36.751	666.01
1_4-DCBA (SURR)	23.466	61.182	1321.53
3			2673.36

2/21/96 MOP

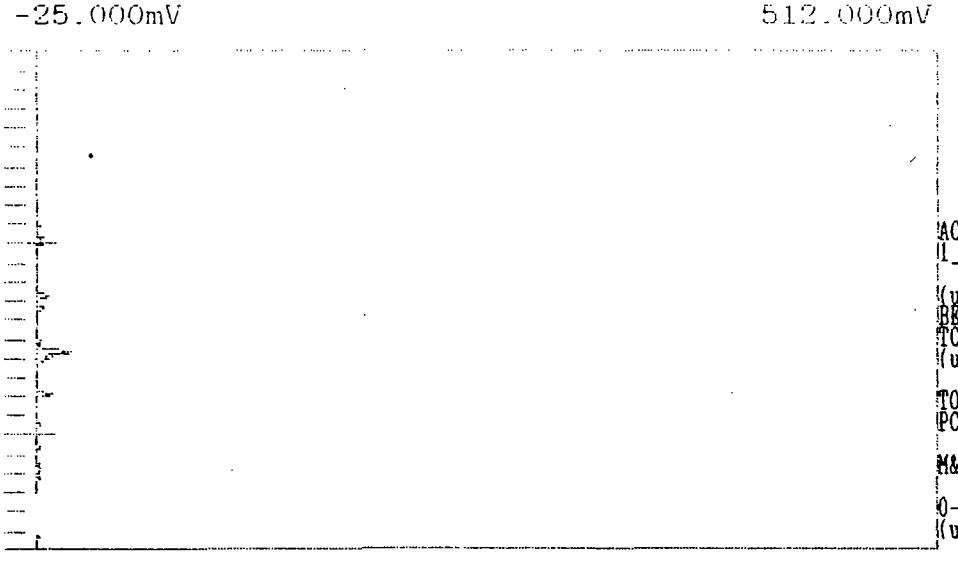
VP2 79

GC#2

PID

LAB DUP

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/21/1996 13:10:17
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 2DATA408.CHR ( )
Operator : MARK PAULI



Component	Retention	Height	Area
ACETONE	9.716	2.301	13.30
1_1-DCE	9.950	7.976	54.72
(unknown)	12.758	7.227	94.40
BENZENE	13.408	4.700	73.46
TCE	15.150	0.888	10.20
(unknown)	15.975	8.498	119.07 M
TOLUENE	17.883	8.916	98.69
PCE	19.500	1.589	20.49
M&P-XYLENE	22.075	1.724	28.78
O-XYLENE	23.258	0.755	16.21
(unknown)	25.250	1.924	32.46

Component	Retention	Height	Area
unknown)	9.116	4.557	29.96
ACETONE	9.716	2.301	13.30 <
~~1_1-DCE~~	9.950	7.976	54.72
unknown)	12.758	7.227	94.40 <
BENZENE	13.408	4.700	73.46
TCE	15.150	0.888	10.20
ALPHA-TFT(SURR)	15.658	20.796	312.70 M
unknown)	15.975	8.498	119.07 M
TOLUENE	17.883	8.916	98.69 <
~~PCE~~	19.500	1.589	20.49
M&P-XYLENE	22.075	1.724	28.78 <
O-XYLENE	23.258	0.755	16.21 <
unknown)	25.250	1.924	32.46
unknown)	26.416	2.298	24.07
14			928.51

2/21/96 MDP

VP2 79'

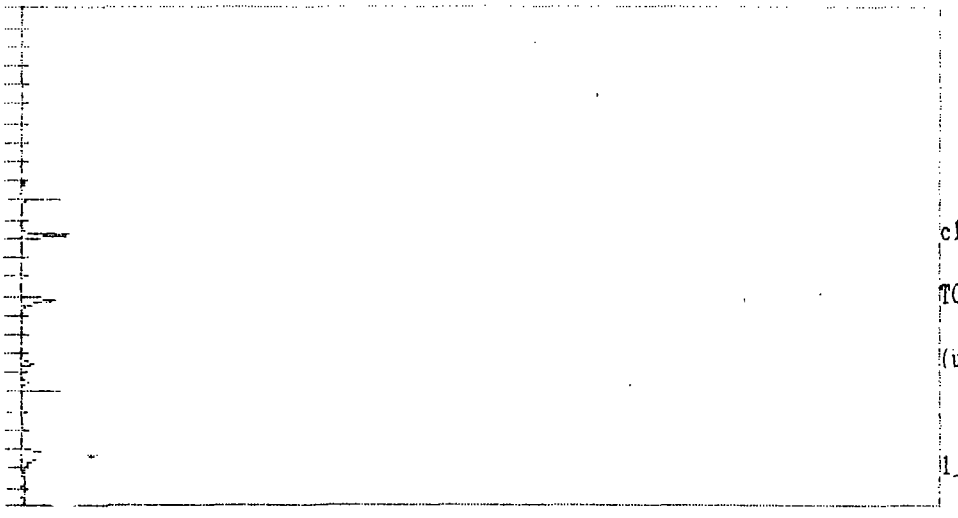
GC#2

DELCD

LAB DUP

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/21/1996 13:10:17
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 1data408.CHR ( )
Operator : MARK PAULI

-25.600mV 1024.000mV



Component	Retention	Height	Area
c1_2-DCE	11.833	60.148	749.13
TCE	15.250	43.269	769.51
(unknown)	18.583	15.793	205.08
1_4-DCBA (SURR)	23.283	89.768	1947.68

Component	Retention	Height	Area
~~1_2-DCE~~ NOT IN P10	11.833	60.148	749.13
TCE	15.250	43.269	769.51 ←
(unknown)	18.583	15.793	205.08
1_4-DCBA (SURR)	23.283	89.768	1947.68
4			3671.40

2/21/96 mop

10 ug/L

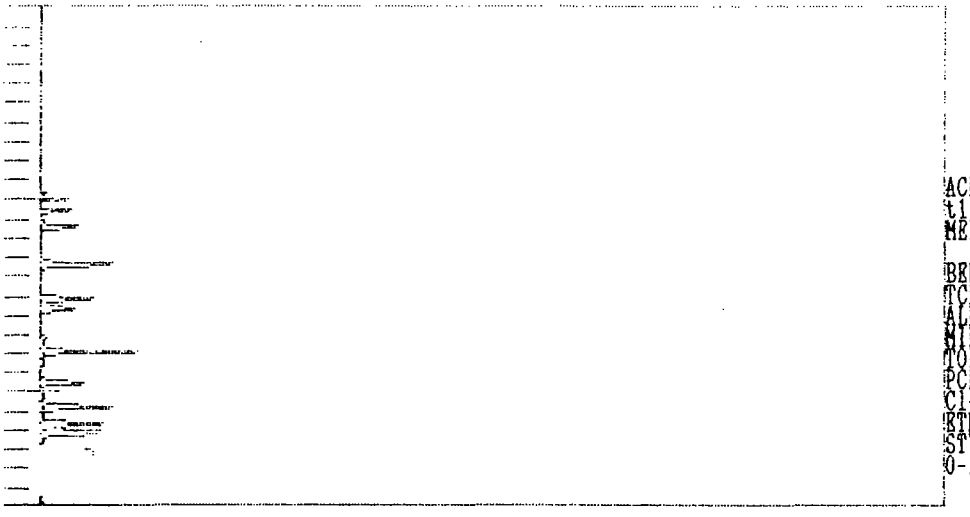
GC#2

PID

(CCV)

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/21/1996 18:19:30
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 2DATA415.CHR ()
Operator : MARK PAULI

-25.000mV 512.000mV



Component	Retention	Height	Area	
ACETONE	9.708	3.588	21.14	
t1_2-DCE	10.591	25.296	198.68	
MEK & c1_2-DCE	11.433	31.712	322.54	
BENZENE	13.366	45.774	678.05	
TCE	15.150	30.471	455.85	M
ALPHA-TFT(SURR)	15.658	19.761	321.87	M
MIBK	17.216	2.774	33.68	
TOLUENE	17.900	56.674	645.88	
PCE	19.533	29.170	380.34	
C1-BENZENE	20.800	42.592	605.25	
ETHYL BENZENE	21.675	35.424	557.05	
STYRENE	23.108	30.742	469.23	
O-XYLENE	23.291	30.589	492.69	

Component	Retention	Height	Area	
(unknown)	9.075	2.189	14.30	
ACETONE	9.708	3.588	21.14	
1_1-DCE	9.975	17.617	115.64	
t1_2-DCE	10.591	25.296	198.68	
MEK & c1_2-DCE	11.433	31.712	322.54	
BENZENE	13.366	45.774	678.05	
TCE	15.150	30.471	455.85	M
ALPHA-TFT(SURR)	15.658	19.761	321.87	M
MIBK	17.216	2.774	33.68	
TOLUENE	17.900	56.674	645.88	
PCE	19.533	29.170	380.34	
C1-BENZENE	20.800	42.592	605.25	
ETHYL BENZENE	21.675	35.424	557.05	
M&P-XYLENE	22.125	37.317	638.01	
STYRENE	23.108	30.742	469.23	
O-XYLENE	23.291	30.589	492.69	
(unknown)	26.400	3.587	37.88	
(unknown)	27.566	1.529	13.16	
18			6001.23	

2/21/96
mop

10 ug/L

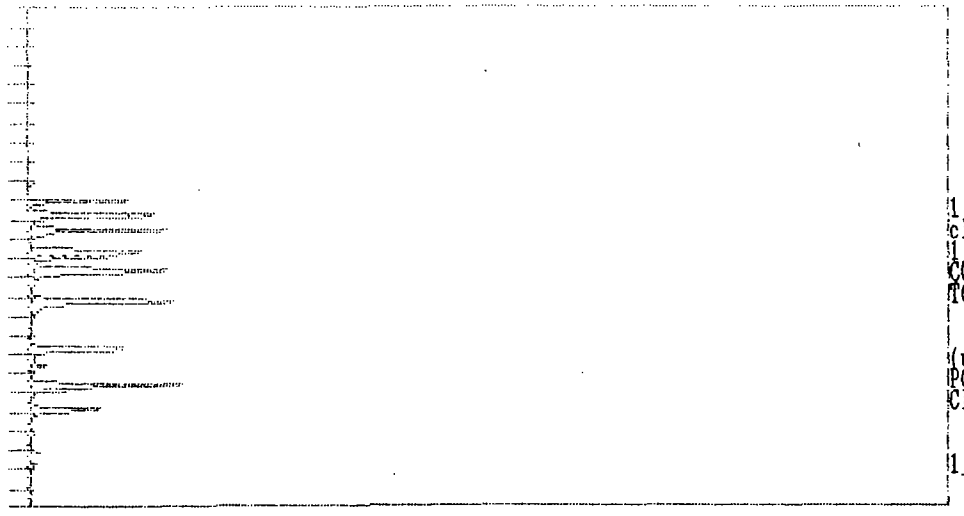
GC #2

(CCV)

DELCD

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/21/1996 18:19:30
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 1data415.CHR ()
Operator : MARK PAULI

-25.600mV 1024.000mV



Component	Retention	Height	Area	
1_1-DCA	10.800	150.385	1495.48	M
cI_2-DCE	11.500	165.878	1928.02	
1_1_1-TCA	12.833	105.241	1626.90	
CCl4	13.616	150.950	3055.41	
TCE	15.216	186.540	3173.29	
(unknown)	18.600	17.191	208.35	
PCE	19.600	171.231	2424.29	
Cl-BENZENE	20.866	84.743	1235.78	
1_4-DCBA (SURR)	23.316	70.852	1509.17	

Component	Retention	Height	Area	
1_1-DCE	10.016	131.977	1004.07	
tI_2-DCE	10.650	165.293	1178.69	M
1_1-DCA	10.800	150.385	1495.48	M
cI_2-DCE	11.500	165.878	1928.02	
1_2-DCA	12.616	126.884	1481.85	
1_1_1-TCA	12.833	105.241	1626.90	
CCl4	13.616	150.950	3055.41	
TCE	15.216	186.540	3173.29	
1_1_2-TCA	17.700	149.957	1923.46	
(unknown)	18.600	17.191	208.35	
PCE	19.600	171.231	2424.29	
Cl-BENZENE	20.866	84.743	1235.78	
1_4-DCBA (SURR)	23.316	70.852	1509.17	

13 22244.76

2/21/96 MP

2-23-96

GC #2

Lower Aquifer

1 pt curve

ACS Field GC #2 2/22/96 Curve

Compound Date 2/23/96	PK #	RT	STD1 50 *Run #*	STD2 10 *Run #*	STD3 5 *Run #*	Linear Regression CC	Slope	Int.	ICB 5.00 mL *run#*	ug/L	10 ICV	%D ICV/STD	1 GP137 (RE) 5.0 mL	ug/L	2 VP1 30' 5.0 mL	ug/L
Acetone	1	11.2	60	22	16	1.000	1.0E+00	-12.1			15	68.2%				
1,1,-DCE	2	11.5	499	113	60	1.000	1.0E-01	-1.4			111	98.2%				
trans-1,2-DCE	3	12.6	1,186	473	264	0.993	5.1E-02	-10.8			431	91.1%				
MEK/cis 1,2-DCE	4	14.1	1,266	369	208	0.999	4.3E-02	-4.9			303	82.1%				
Benzene	6	16.7	2,512	751	417	0.999	2.2E-02	-5.2			637	84.8%				
TCE	7	18.1	1,696	483	278	0.999	3.2E-02	-4.7			434	89.9%				
MIBK	8	19.8	178	55	30	0.998	3.1E-01	-5.6			33	60.0%				
Toluene	9	20.6	2,332	681	401	0.999	2.4E-02	-5.2			596	87.5%				
PCE	10	21.9	1,445	396	227	1.000	3.7E-02	-4.1			363	91.7%				
Chlorobenzene	11	23.7	2,363	693	394	0.999	2.3E-02	-5.0			588	84.8%				
Ethylbenzene	12	24.0	2,157	590	327	0.999	2.5E-02	-3.9			515	87.3%				
m+p-Xylene	13	24.2	2,471	684	374	0.999	2.2E-02	-4.0			598	87.4%				
Styrene	14	25.5	2,292	559	252	0.999	2.2E-02	-1.5			459	82.1%				
o-Xylene	15	25.6	1,737	551	334	0.999	3.3E-02	-6.9			451	81.9%				
1,1,-DCE	1	11.5	3,848	1,000	532	1.000	1.4E-02	-3.0			1,093	109.3%				
t-1,2-DCE	2	12.6	3,479	1,515	853	0.990	1.8E-02	-13.2			1,562	103.1%				
1,1-DCA	3	13.4	6,260	1,966	1,321	1.000	9.2E-03	-7.6			1,868	95.0%				
cis-1,2-DCE	4	14.5	6,315	2,149	1,392	0.999	9.3E-03	-8.9			2,032	94.6%				
1,2-DCA	5	14.9	5,095	2,006	1,302	0.997	1.2E-02	-12.5			1,765	88.0%				
1,1,1-TCA	6	15.9	4,859	1,252	830	1.000	1.1E-02	-4.1			1,224	97.8%				
Carbon Tet.	7	16.6	10,795	3,425	2,209	1.000	5.3E-03	-7.4			3,313	96.7%				
TCE	8	18.2	10,126	3,364	2,340	1.000	5.8E-03	-9.1			3,375	100.3%				
1,1,2-TCA	9	21.2	6,415	2,543	1,678	0.997	9.8E-03	-12.9			2,050	80.6%				
PCE	10	21.9	7,820	2,509	1,596	0.999	7.3E-03	-7.5			2,440	97.2%				
Chlorobenzene	11	23.7	5,244	1,480	833	0.999	1.0E-02	-4.4			1,312	88.6%				

a,a,a-TFT	8	18.5	1,222	**325**	181				311	96%	295	91%	301	93%	296	91%
1,4-DCBA	12	26.8	5,088	**2,113**	1,346				2,157	102%	1,530	72%	1532	73%	1722	81%

Analyst _____

Check _____

Lower Aquifer

ACS Field GC #2	3		4		5		6		7		8		9	
Compound	**VP1 39'**		**VP1 49'**		**VP1 59'**		**VP1 69'**		**VP1 79'**		**VP1 39' DUP**		**VP1 92'**	
Date	5.0 mL		5.0 mL		5.0 mL		5.0 mL		5.0 mL		5.0 mL		5.0 mL	
2/23/96		ug/L		ug/L		ug/L		ug/L		ug/L		ug/L		ug/L
Acetone	16	***10.0***									16	***10.0***		
1,1,-DCE														
trans-1,2-DCE														
MEK/cis 1,2-DCE														
Benzene														
TCE														
MIBK														
Toluene														
PCE														
Chlorobenzene														
Ethylbenzene														
m+p-Xylene														
Styrene														
o-Xylene														
1,1,-DCE														
t-1,2-DCE														
1,1-DCA														
cis-1,2-DCE														
1,2-DCA														
1,1,1-TCA														
Carbon Tet.														
TCE	842	*1.8*	1616	*3.5*	1160	*2.5*	1219	*2.6*	1531	*3.3*	743	*1.6*		
1,1,2-TCA														
PCE														
Chlorobenzene														

a,a,a-TFT	288	89%	313	96%	313	96%	295	91%	313	96%	285	88%	301	93%
1,4-DCBA	1415	67%	2081	98%	2002	95%	1445	68%	2092	99%	1200	57%	1552	73%

Analyst _____
Check _____

Lower Aquifer

ACS Field GC #2 10

Compound Date 2/23/96	VP1 92'DUP 5.0 mL ug/L		10 CCV	%D CCV/STD	5 DLV	%D 5 STD
Acetone			18	81.8%	16	100.0%
1,1,-DCE			112	99.1%	59	98.3%
trans-1,2-DCE			420	88.8%	248	93.9%
MEK/cis 1,2-DCE			320	86.7%	191	91.8%
Benzene			652	86.8%	387	92.8%
TCE			437	90.5%	255	91.7%
MIBK			42	76.4%	32	106.7%
Toluene			602	88.4%	366	91.3%
PCE			359	90.7%	213	93.8%
Chlorobenzene			597	86.1%	372	94.4%
Ethylbenzene			531	90.0%	308	94.2%
m+p-Xylene			608	88.9%	361	96.5%
Styrene			462	82.6%	261	103.6%
o-Xylene			489	87.5%	307	91.9%
1,1,-DCE			888	88.8%	487	91.5%
t-1,2-DCE			1151	76.0%	728	85.3%
1,1-DCA			1706	86.8%	957	72.4%
cis-1,2-DCE			1745	81.2%	1200	86.2%
1,2-DCA			1610	80.3%	CO-ELUTION	
1,1,1-TCA			1115	89.1%	CO-ELUTION	
Carbon Tet.			2883	84.2%	1651	74.7%
TCE			2733	81.2%	1953	83.5%
1,1,2-TCA			1834	72.1%	1486	88.6%
PCE			1993	79.4%	1278	80.1%
Chlorobenzene			1118	75.5%	692	83.1%

a,a,a-TFT	319	98%	301.0	93%	176.0	97%
1,4-DCBA	2063	98%	1,560.0	74%	1,120.0	83%

Analyst _____
Check _____

10 ug/L
(CCV)

GC #2
PID

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/23/1996 08:15:05
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 2DATA454.CHR ()
Operator : MARK PAULI

-25.000mV 512.000mV

Component	Retention	Height	Area	
ACETONE	9.691	2.518	15.37	
t1_2-DCE	10.591	54.179	430.99	
MEK & c1_2-DCE	11.425	30.746	303.28	
BENZENE	13.333	44.229	637.30	
TCE	15.075	28.725	434.48	M
ALPHA-TFT(SURR)	15.591	18.741	295.34	M
MIBK	17.125	2.690	33.15	
TOLUENE	17.833	52.514	595.55	
PCE	19.450	27.991	363.45	
C1-BENZENE	20.700	42.150	588.31	
M&P-XYLENE	22.000	35.411	597.72	
STYRENE	23.150	29.058	451.08	

Component	Retention	Height	Area	
(unknown)	9.075	3.277	15.31	
ACETONE	9.691	2.518	15.37	
1_1-DCE	9.975	16.184	111.13	
t1_2-DCE	10.591	54.179	430.99	
MEK & c1_2-DCE	11.425	30.746	303.28	
BENZENE	13.333	44.229	637.30	
TCE	15.075	28.725	434.48	M
ALPHA-TFT(SURR)	15.591	18.741	295.34	M
MIBK	17.125	2.690	33.15	
TOLUENE	17.833	52.514	595.55	
PCE	19.450	27.991	363.45	
C1-BENZENE	20.700	42.150	588.31	
ETHYL BENZENE	21.550	33.496	515.45	
M&P-XYLENE	22.000	35.411	597.72	
STYRENE	22.983	29.457	459.45	
~~STYRENE~~ o-XYLENE	23.150	29.058	451.08	
(unknown)	26.316	2.346	23.95	
17			5871.31	

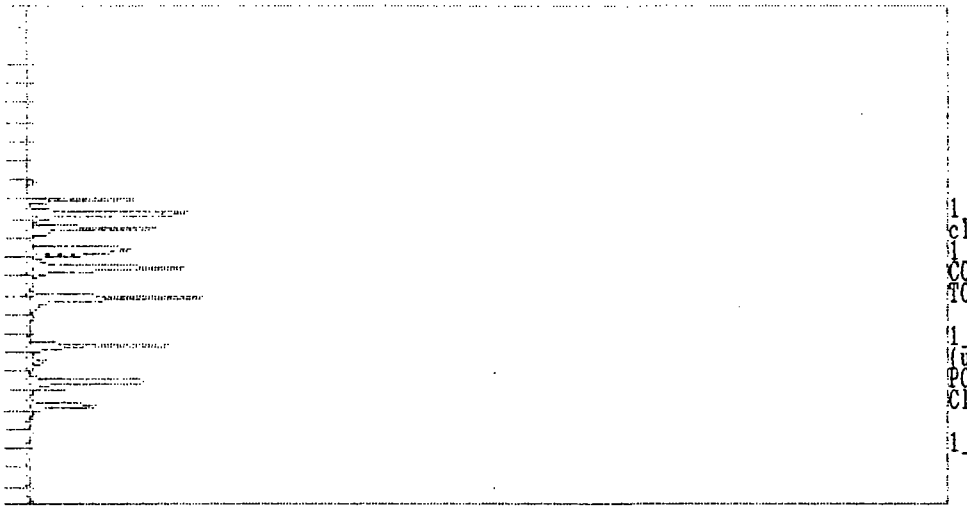
2/23/96
mcf

GC#2 DELCD

10 ug/L (CCV)

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/23/1996 08:15:05
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 1data454.CHR ( )
Operator : MARK PAULI

-25.600mV 1024.000mV



Component	Retention	Height	Area	
1_1-DCA	10.800	185.910	1868.20	M
cl_2-DCE	11.483	176.641	2031.51	
1_1_1-TCA	12.800	90.197	1223.55	M
CCl4	13.583	176.228	3313.41	
TCE	15.133	193.715	3374.91	
1_1_2-TCA	17.616	157.368	2050.49	
(unknown)	18.533	18.933	225.58	
PCE	19.516	175.186	2439.85	
Cl-BENZENE	20.766	92.104	1312.18	
1_4-DCBA (SURR)	23.183	72.238	1529.86	

Component	Retention	Height	Area	
1_1-DCE	10.016	140.571	1093.09	
tl_2-DCE	10.650	217.701	1562.00	M
1_1-DCA	10.800	185.910	1868.20	M
cl_2-DCE	11.483	176.641	2031.51	
1_2-DCA	12.566	134.515	1764.64	M
1_1_1-TCA	12.800	90.197	1223.55	M
CCl4	13.583	176.228	3313.41	
TCE	15.133	193.715	3374.91	
1_1_2-TCA	17.616	157.368	2050.49	
(unknown)	18.533	18.933	225.58	
PCE	19.516	175.186	2439.85	
Cl-BENZENE	20.766	92.104	1312.18	
1_4-DCBA (SURR)	23.183	72.238	1529.86	
13			23789.26	

2/23/96 mop

BLANK (CCB)

GC #2 PID

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/23/1996 08:55:30
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 2DATA455.CHR ()
Operator : MARK PAULI

-25.000mV 512.000mV

Component	Retention	Height	Area
BENZENE	13.358	1.625	24.75
TCE	15.091	1.340	16.05
ALPHA-TFT(SURR)	15.600	19.907	310.50
TOLUENE	17.825	6.178	68.28
PCE	19.450	1.955	24.52
C1-BENZENE	20.716	0.923	15.47
M&P-XYLENE	22.000	2.149	34.29
STYRENE	23.183	1.049	25.56

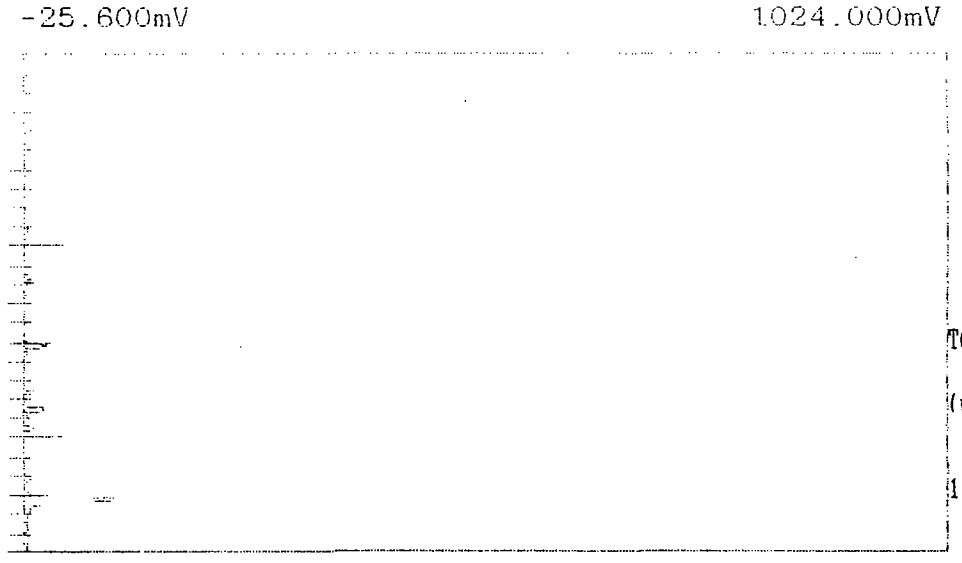
Component	Retention	Height	Area
BENZENE	13.358	1.625	24.75
TCE	15.091	1.340	16.05
ALPHA-TFT(SURR)	15.600	19.907	310.50
TOLUENE	17.825	6.178	68.28
~~PCE~~	19.450	1.955	24.52
~~C1-BENZENE~~	20.716	0.923	15.47
M&P-XYLENE	22.000	2.149	34.29
STYRENE	23.183	1.049	25.56
(unknown)	26.325	2.110	22.32
9			541.74

2/23/96 mop

BLANK (CCB)

GC#2 DELCD

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/23/1996 08:55:30
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 1data455.CHR ()
Operator : MARK PAULI



Component	Retention	Height	Area
TCE	15.183	30.956	411.97
(unknown)	18.533	31.607	403.31
1_4-DCBA (SURR)	23.183	99.386	2157.29

Component	Retention	Height	Area
TCE	15.183	30.956	411.97
(unknown)	18.533	31.607	403.31
1_4-DCBA (SURR)	23.183	99.386	2157.29
3			2972.57

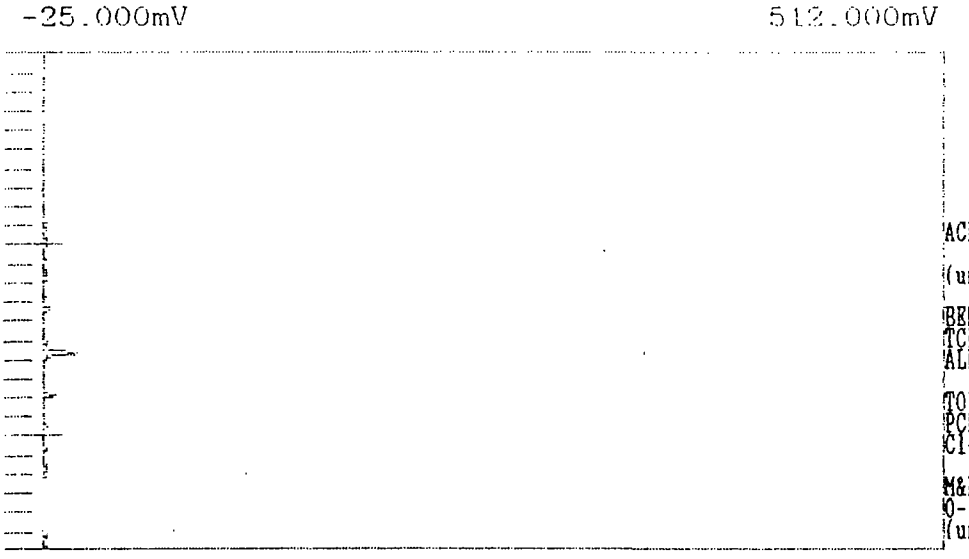
2/23/96 MOP

VPI 30'

GC #2

PID

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/23/1996 10:21:45
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 2DATA457.CHR ( )
Operator : MARK PAULI



Component	Retention	Height	Area
ACETONE	9.691	2.347	15.07
(unknown)	11.858	2.434	31.82
BENZENE	13.383	3.708	55.88
TCE	15.158	1.254	15.19
ALPHA-TFT(SURR)	15.666	19.276	295.87
TOLUENE	17.891	7.200	79.36
PCE	19.525	2.127	27.11
Cl-BENZENE	20.800	0.655	12.36
M&P-XYLENE	22.116	2.126	34.51
O-XYLENE	23.283	0.818	16.49
(unknown)	25.258	1.057	17.24

Component	Retention	Height	Area
(unknown)	9.108	1.859	14.78
ACETONE	9.691	2.347	15.07
(unknown)	11.858	2.434	31.82
BENZENE	13.383	3.708	55.88
TCE	15.158	1.254	15.19
ALPHA-TFT(SURR)	15.666	19.276	295.87
TOLUENE	17.891	7.200	79.36
~~PCE~~	19.525	2.127	27.11
~~Cl-BENZENE~~	20.800	0.655	12.36
M&P-XYLENE	22.116	2.126	34.51
O-XYLENE	23.283	0.818	16.49
(unknown)	25.258	1.057	17.24
(unknown)	26.408	2.588	27.72
13			643.40

2/23/96 MOP

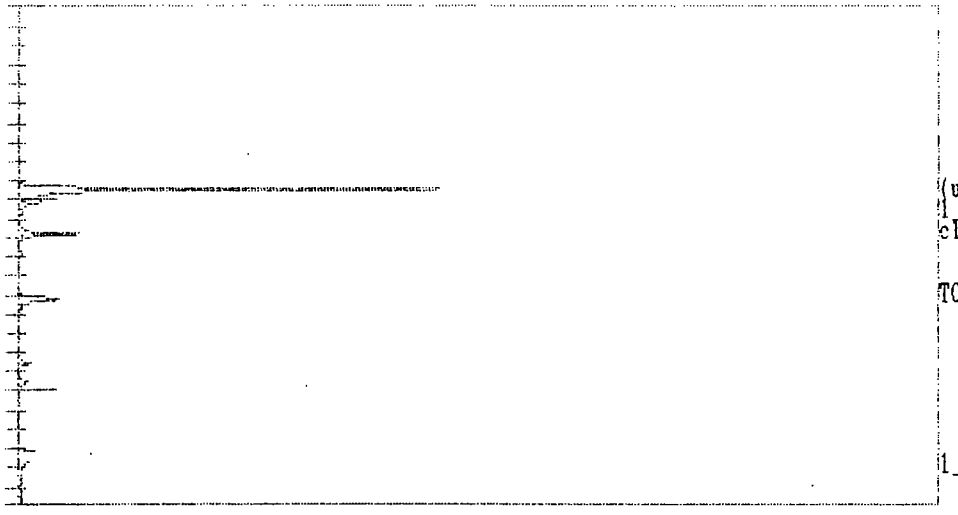
VP | 30'

GC #2

DELCD

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/23/1996 10:21:45
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : Idata457.CHR ( )
Operator : MARK PAULI

-25.600mV 1024.000mV



Component	Retention	Height	Area
(unknown)	9.383	1155.859	8209.73
1_1-DCE	10.100	30.537	623.02
1_2-DCE	11.800	64.480	760.96
TCE	15.233	47.784	884.26
1_4-DCBA (SURR)	23.316	79.429	1721.89

Component	Retention	Height	Area	
unknown)	9.383	1155.859	8209.73	(UNKNOWN)
~~1_1 DCE~~ NOT IN PID	10.100	30.537	623.02	(UNKNOWN)
1_2-DCE	11.800	64.480	760.96	<
TCE	15.233	47.784	884.26	<
1_4-DCBA (SURR)	23.316	79.429	1721.89	

5 12199.86

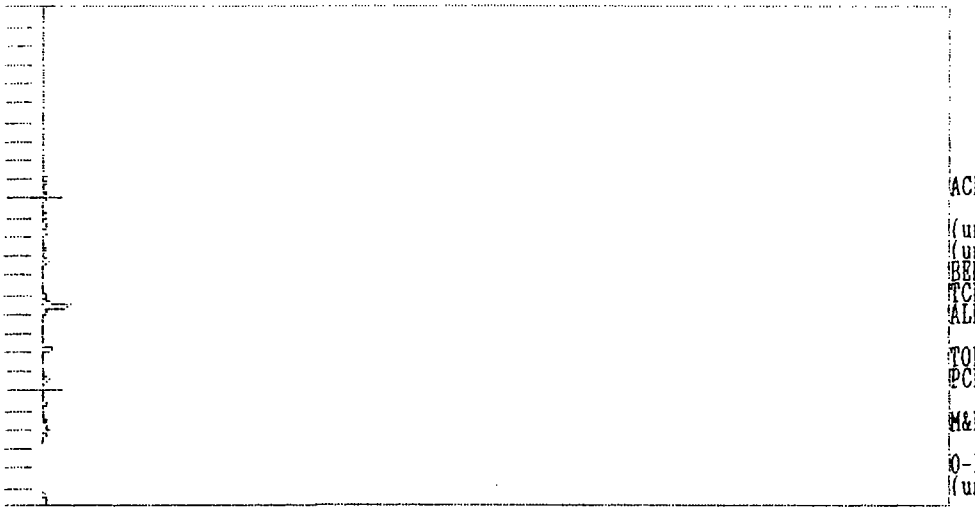
2/23/96 MDP

VP1 39'

GC #2
PID

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/23/1996 11:04:48
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 2DATA458.CHR ( )
Operator : MARK PAULI

-25.000mV 512.000mV



Component	Retention	Height	Area
ACETONE	9.691	2.377	16.04
(unknown)	11.825	2.637	32.84
(unknown)	12.708	1.167	14.19
BENZENE	13.341	2.384	35.24
TCE	15.091	1.338	16.34
ALPHA-TFT(SURR)	15.608	18.768	287.82
TOLUENE	17.841	7.830	84.60
PCE	19.483	2.311	29.78
M&P-XYLENE	22.033	2.355	37.20
O-XYLENE	23.233	0.809	15.40
(unknown)	25.200	1.532	24.70
(unknown)	26.366	2.347	24.93
12			619.08

MSP

1pt w/5 STD (ACETONE @ 10ppb IN 5 STD)

16/16 x10 = 10.0 ppb

2/23/96
MSP

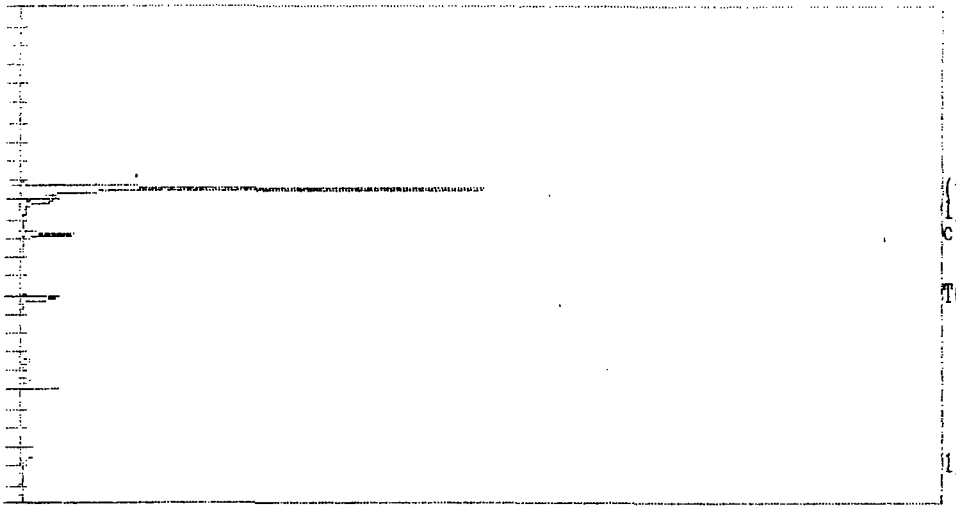
VP 1 39'

GC #2

P&LCD

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/23/1996 11:04:48
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 1data458.CHR ( )
Operator : MARK PAULI

-25.600mV 1024.000mV



Component	Retention	Height	Area
(unknown)	9.383	1417.630	10386.06
1_1-DCE	10.100	41.765	772.60
cl_2-DCE	11.783	61.725	715.97
TCE	15.183	46.644	842.14
1_4-DCBA (SURR)	23.250	64.662	1415.08

Component	Retention	Height	Area
unknown)	9.383	1417.630	10386.06 (unknown)
~~1-DCE~~ NOT IN PID	10.100	41.765	772.60
:1_2-DCE	11.783	61.725	715.97 <
TCE	15.183	46.644	842.14 <
_4-DCBA (SURR)	23.250	64.662	1415.08 ———
5			14131.85

2/23/96
MSP

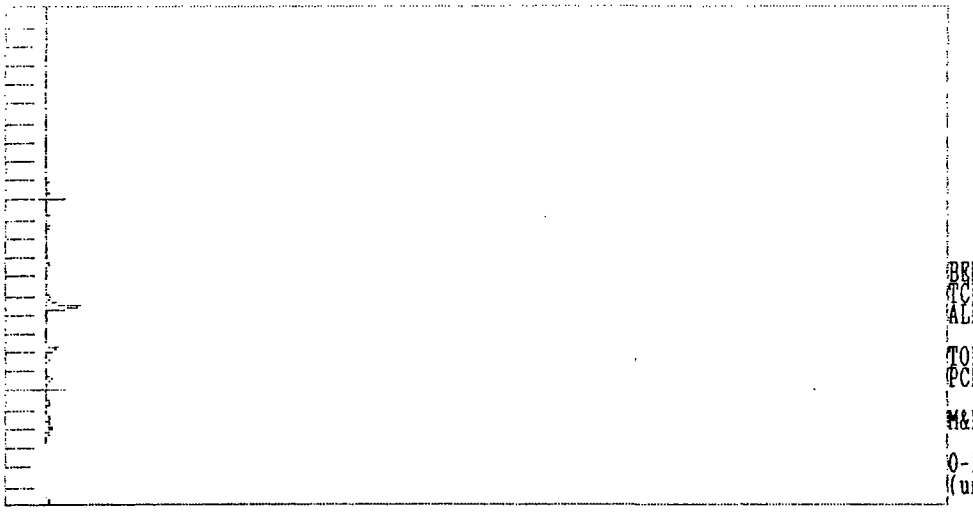
VP1 99'

GC#2

PID

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/23/1996 11:46:13
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 2DATA459.CHR ( )
Operator : MARK PAULI

-25.000mV 512.000mV



Component	Retention	Height	Area
BENZENE	13.341	1.837	27.26
TCE	15.083	1.422	17.16
ALPHA-TFT(SURR)	15.591	19.698	312.70
TOLUENE	17.850	9.179	102.05
PCE	19.466	2.375	30.32
M&P-XYLENE	22.025	2.831	44.76
O-XYLENE	23.225	1.102	24.42
(unknown)	25.183	2.368	41.55

Component	Retention	Height	Area
BENZENE	13.341	1.837	27.26 <
TCE	15.083	1.422	17.16
ALPHA-TFT(SURR)	15.591	19.698	312.70
TOLUENE	17.850	9.179	102.05 <
~~PCE~~	19.466	2.375	30.32
M&P-XYLENE	22.025	2.831	44.76 <
O-XYLENE	23.225	1.102	24.42 <
(unknown)	25.183	2.368	41.55
(unknown)	26.350	2.389	25.88
(unknown)	27.566	1.385	12.33
10			638.43

2/23/96 mp

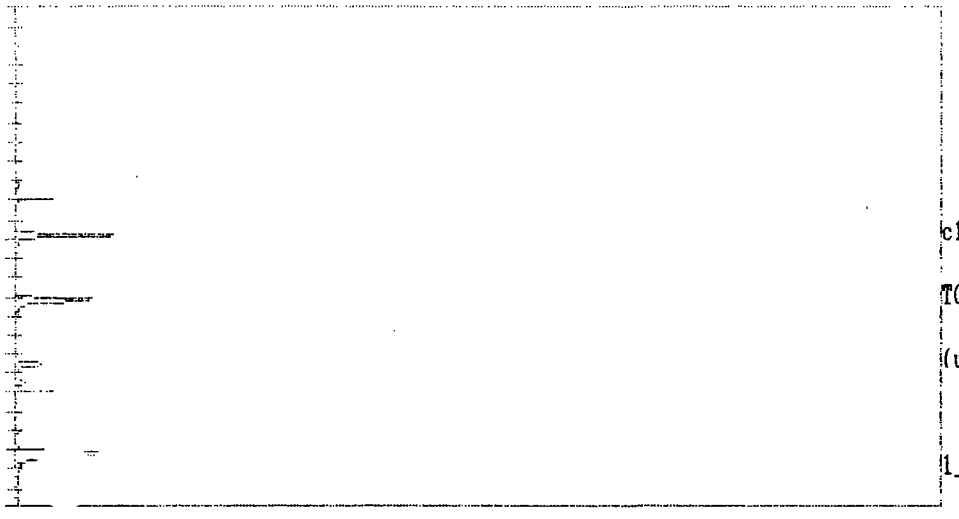
VP1 49'

GC#2

DELCD

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/23/1996 11:46:13
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 1data459.CHR ( )
Operator : MARK PAULI

-25.600mV 1024.000mV



Component	Retention	Height	Area
c1_2-DCE	11.783	111.618	1419.23
TCE	15.183	91.152	1615.68
(unknown)	18.533	37.635	495.79
1_4-DCBA (SURR)	23.233	95.500	2081.05

Component	Retention	Height	Area
~~1_2-DCE~~ NOT IN PID	11.783	111.618	1419.23 (UNKNOWN)
CE	15.183	91.152	1615.68
unknown)	18.533	37.635	495.79
_4-DCBA (SURR)	23.233	95.500	2081.05
4			5611.75

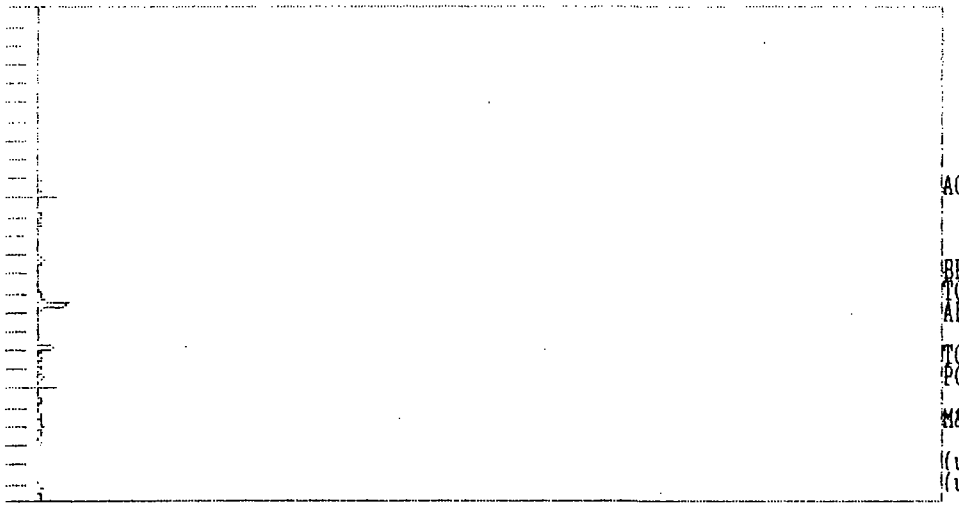
2/23/96 MOP

VP1 59'

GC#2
PID

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/23/1996 12:27:04
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 2DATA460.CHR ( )
Operator : MARK PAULI

-25.000mV 512.000mV



Component	Retention	Height	Area
ACETONE	9.700	2.100	13.67
BENZENE	13.358	2.680	41.13
TCE	15.100	1.498	18.55
ALPHA-TFT(SURR)	15.616	19.759	313.04
TOLUENE	17.858	11.703	132.61
PCE	19.483	2.466	31.44
M&P-XYLENE	22.033	2.732	43.66
(unknown)	23.200	1.107	24.62
(unknown)	25.200	4.022	68.10

Component	Retention	Height	Area
ACETONE	9.700	2.100	13.67
BENZENE	13.358	2.680	41.13
TCE	15.100	1.498	18.55
ALPHA-TFT(SURR)	15.616	19.759	313.04
TOLUENE	17.858	11.703	132.61
~~PCE~~	19.483	2.466	31.44
M&P-XYLENE	22.033	2.732	43.66
(unknown)	23.200	1.107	24.62
(unknown)	25.200	4.022	68.10
(unknown)	26.383	2.480	27.52
(unknown)	27.550	1.612	14.49
11			728.85

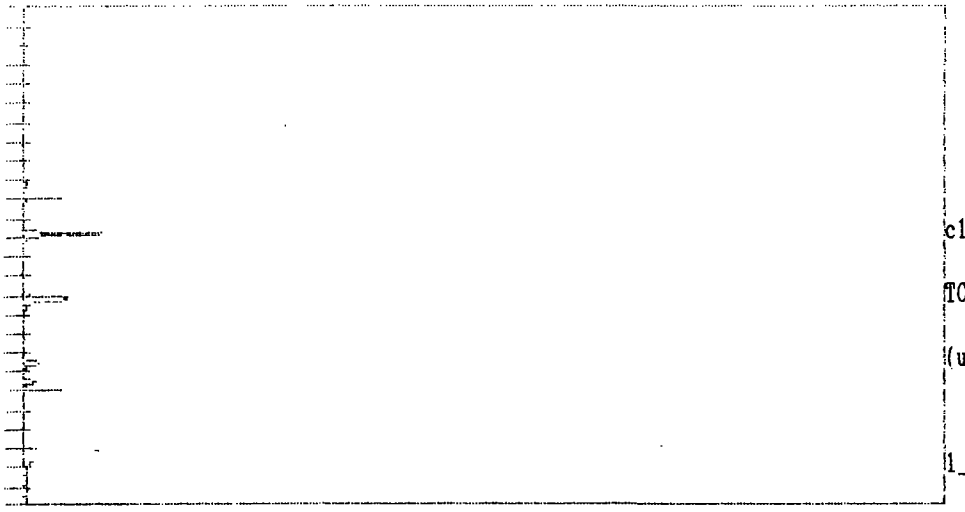
2/23/96
mop

GC #2

VP1 59'

DELCD

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/23/1996 12:27:04
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 1data460.CHR ()
Operator : MARK PAULI



Component	Retention	Height	Area
c1_2-DCE	11.800	89.953	1143.22
TCE	15.183	62.914	1159.94
(unknown)	18.550	23.061	301.36
1_4-DCBA (SURR)	23.250	91.505	2001.90

Component	Retention	Height	Area
c1_2-DCE NOT IN P10	11.800	89.953	1143.22 (UNKNOWN)
TCE	15.183	62.914	1159.94 <
(unknown)	18.550	23.061	301.36
1_4-DCBA (SURR)	23.250	91.505	2001.90 ———
4			4606.42

2/23/96
MOP

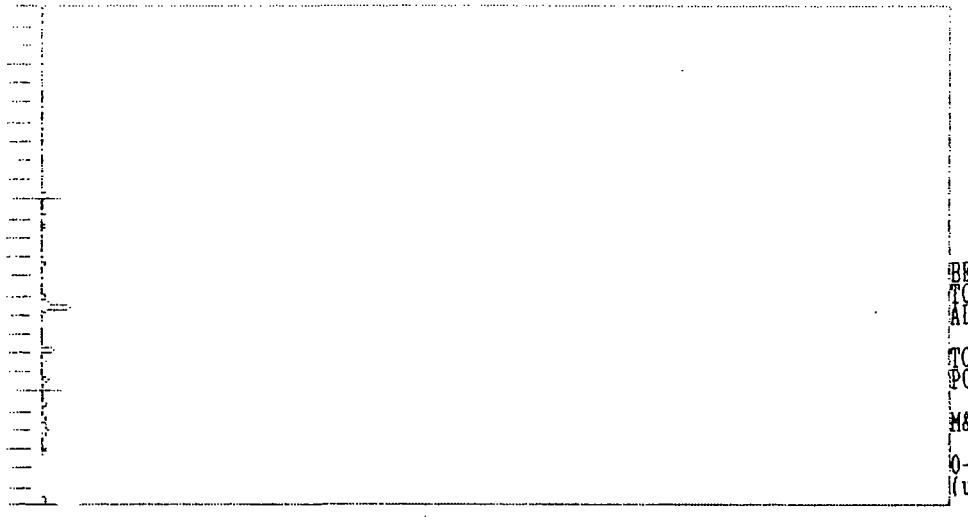
VP1 69'

GC#2

PID

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/23/1996 13:08:27
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 2DATA461.CHR ()
Operator : MARK PAULI

-25.000mV 512.000mV



Component	Retention	Height	Area
BENZENE	13.383	2.266	33.89
TCE	15.125	1.484	18.14
ALPHA-TFT(SURR)	15.625	18.796	295.09
TOLUENE	17.866	8.926	99.49
PCE	19.483	2.633	33.32
M&P-XYLENE	22.050	2.761	43.55
O-XYLENE	23.241	0.946	18.92
(unknown)	25.200	2.483	43.63

Component	Retention	Height	Area
BENZENE	13.383	2.266	33.89
TCE	15.125	1.484	18.14
ALPHA-TFT(SURR)	15.625	18.796	295.09
TOLUENE	17.866	8.926	99.49
~~PCE~~	19.483	2.633	33.32
M&P-XYLENE	22.050	2.761	43.55
O-XYLENE	23.241	0.946	18.92
(unknown)	25.200	2.483	43.63
(unknown)	26.383	2.392	25.74
9			611.78

2/23/96 MAP

VPI 69'

GC#2

D&LCD

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/23/1996 13:08:27
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 1data461.CHR ( )
Operator : MARK PAULI

Component	Retention	Height	Area
c1_2-DCE	11.816	89.898	1125.94
TCE	15.216	68.374	1218.89
(unknown)	18.566	24.983	325.73
1_4-DCBA (SURR)	23.250	66.216	1444.52

Component	Retention	Height	Area
~~1_2-DCE~~ NOT IN PID	11.816	89.898	1125.94 (UNKNOWN)
TCE	15.216	68.374	1218.89 <
(unknown)	18.566	24.983	325.73
1_4-DCBA (SURR)	23.250	66.216	1444.52 —
4			4115.08

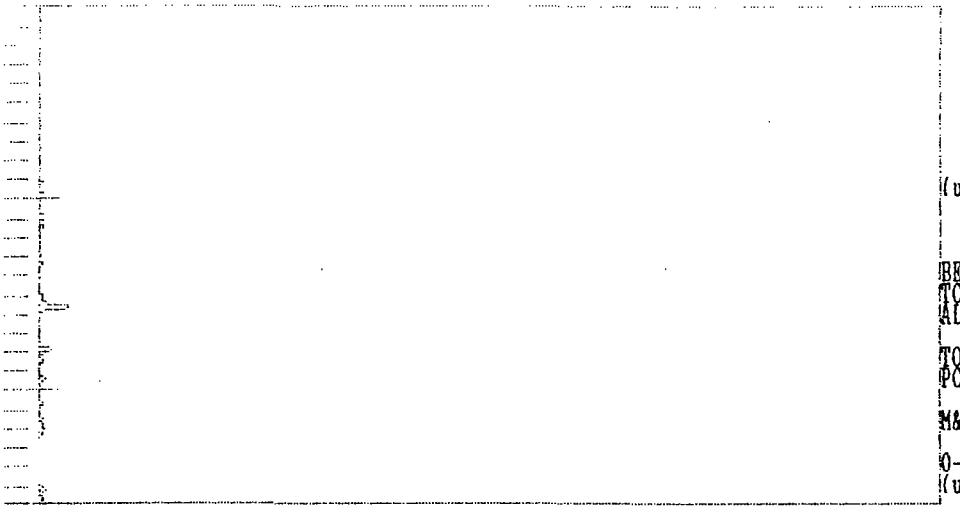
2/23/96
mdp

VP1 79'

GC#2
PID

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/23/1996 13:50:20
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 2DATA462.CHR ( )
Operator : MARK PAULI

-25.000mV 512.000mV



Component	Retention	Height	Area
(unknown)	9.116	1.372	13.15
BENZENE	13.358	1.993	29.85
TCE	15.100	1.584	19.67
ALPHA-TFT(SURR)	15.616	19.876	313.39
TOLUENE	17.850	9.708	107.37
PCE	19.491	2.511	32.34
M&P-XYLENE	22.058	2.883	45.94
O-XYLENE	23.283	1.138	25.74
(unknown)	25.241	2.562	43.95

Component	Retention	Height	Area
(unknown)	9.116	1.372	13.15
BENZENE	13.358	1.993	29.85 <
TCE	15.100	1.584	19.67
ALPHA-TFT(SURR)	15.616	19.876	313.39
TOLUENE	17.850	9.708	107.37 <
PCE	19.491	2.511	32.34
M&P-XYLENE	22.058	2.883	45.94 <
O-XYLENE	23.283	1.138	25.74 <
(unknown)	25.241	2.562	43.95
(unknown)	26.391	2.561	26.69
(unknown)	27.575	1.506	13.66
11			671.75

2/23/96 MDP

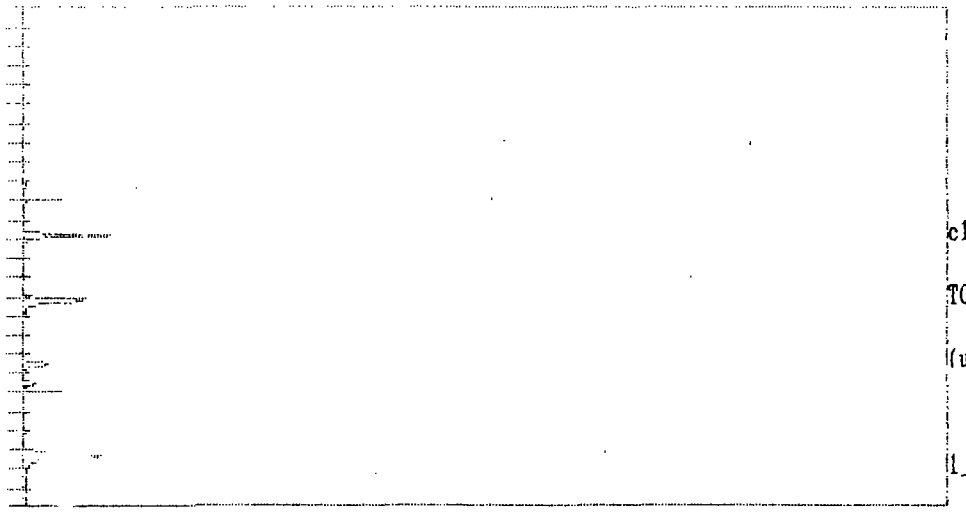
VP1 79'

GC #2

DELCD

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/23/1996 13:50:20
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 1data462.CHR ( )
Operator : MARK PAULI

-25.600mV 1024.000mV



Component	Retention	Height	Area
c1_2-DCE	11.800	102.294	1302.27
TCE	15.200	83.097	1531.12
(unknown)	18.550	34.872	452.75
1_4-DCBA (SURR)	23.283	95.684	2092.33

Component	Retention	Height	Area
~~c1_2-DCE~~ NOT IN PID	11.800	102.294	1302.27 (UNKNOWN)
TCE	15.200	83.097	1531.12 <
(unknown)	18.550	34.872	452.75
1_4-DCBA (SURR)	23.283	95.684	2092.33 ———
4			5378.47

2/23/96 MOP

VPI 39'

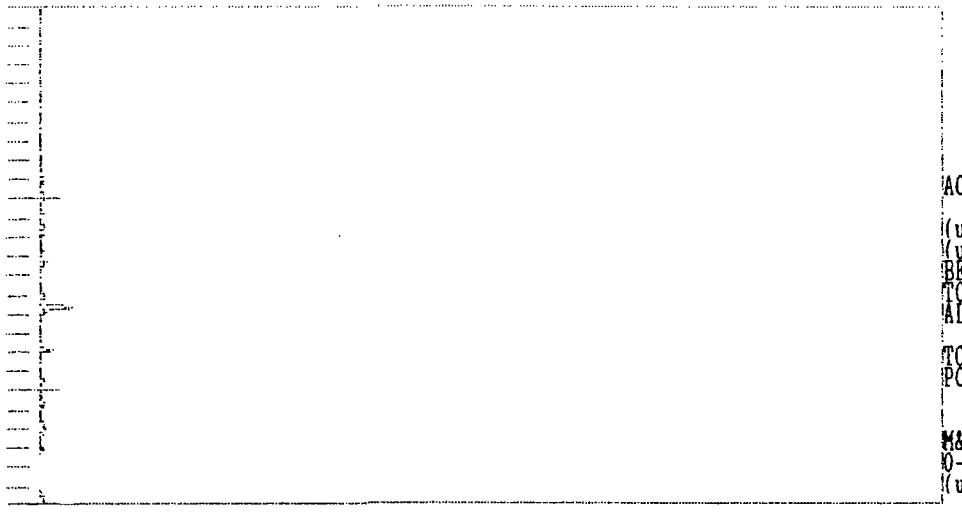
GC #2

LAB DUP

PID

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/23/1996 14:38:02
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 2DATA463.CHR ( )
Operator : MARK PAULI

-25.000mV 512.000mV



Component	Retention	Height	Area
ACETONE	9.700	2.288	16.13
(unknown)	11.866	2.496	30.50
(unknown)	12.750	1.056	13.13
BENZENE	13.383	2.729	40.83
TCE	15.150	1.290	15.87
ALPHA-TFT(SURR)	15.641	18.713	284.54
TOLUENE	17.900	7.689	85.41
PCE	19.516	2.238	28.56
M&P-XYLENE	22.108	2.278	36.62
O-XYLENE	23.291	0.771	14.51
(unknown)	25.266	1.731	30.18

1pt ACETONE

$\frac{16}{16} \times 10.0 \mu g/L = 10.0 \mu g/L$ ACETONE

Component	Retention	Height	Area
(unknown)	9.066	1.902	14.73
ACETONE	9.700	2.288	16.13
(unknown)	11.866	2.496	30.50
(unknown)	12.750	1.056	13.13
BENZENE	13.383	2.729	40.83
TCE	15.150	1.290	15.87
ALPHA-TFT(SURR)	15.641	18.713	284.54
TOLUENE	17.900	7.689	85.41
~~PCE~~	19.516	2.238	28.56
M&P-XYLENE	22.108	2.278	36.62
O-XYLENE	23.291	0.771	14.51
(unknown)	25.266	1.731	30.18
(unknown)	26.400	2.718	27.81
13			638.81

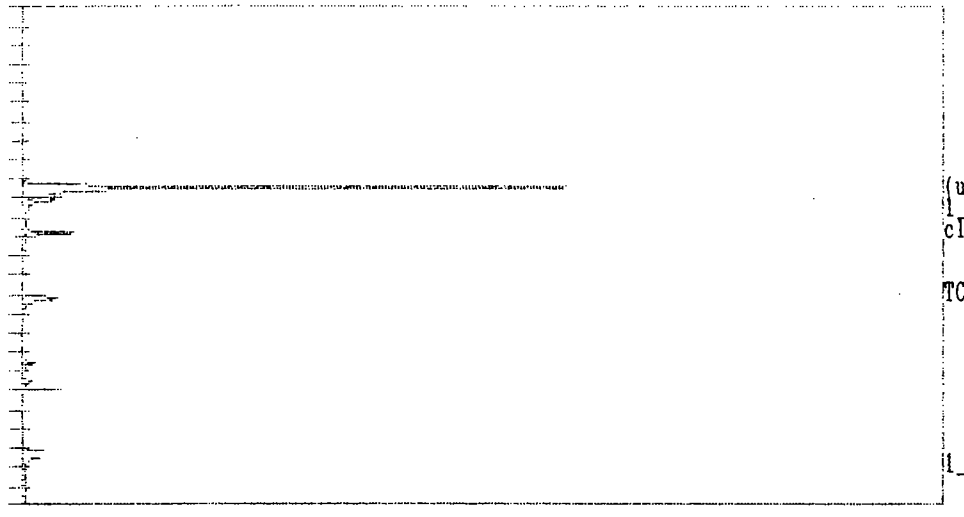
2/23/96 MOP

VP1 39'

GC#2 LAB DUP

DELCD

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/23/1996 14:38:02
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 1data463.CHR ( )
Operator : MARK PAULI



Component	Retention	Height	Area
(unknown)	9.383	1419.091	10334.50
1_1-DCE	10.116	39.187	781.26
cI_2-DCE	11.816	55.071	651.40
TCE	15.250	41.899	742.68
1_4-DCBA (SURR)	23.316	55.220	1199.54

Component	Retention	Height	Area
unknown)	9.383	1419.091	10334.50
~~1 DCE~~ NOT IN PID	10.116	39.187	781.26 (UNKNOWN)
:1_2-DCE	11.816	55.071	651.40
TCE	15.250	41.899	742.68
1_4-DCBA (SURR)	23.316	55.220	1199.54
5			13709.38

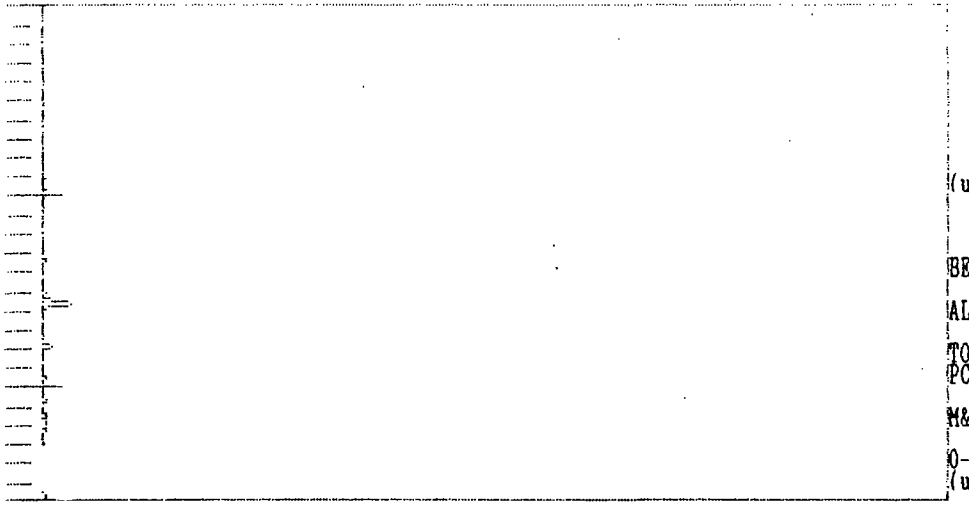
2/23/96 MSP

VPI 92'

GC#2
PID

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/23/1996 15:22:32
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 2DATA464.CHR ( )
Operator : MARK PAULI

-25.000mV 512.000mV



Component	Retention	Height	Area
(unknown)	9.133	1.277	12.74
BENZENE	13.375	1.737	26.63
ALPHA-TFT(SURR)	15.633	19.170	301.31
TOLUENE	17.850	6.302	67.84
PCE	19.475	1.727	21.88
M&P-XYLENE	22.041	1.719	28.39
O-XYLENE	23.225	0.630	12.09
(unknown)	25.208	2.407	41.55

Component	Retention	Height	Area
(unknown)	9.133	1.277	12.74
BENZENE	13.375	1.737	26.63
ALPHA-TFT(SURR)	15.633	19.170	301.31
TOLUENE	17.850	6.302	67.84
PCE	19.475	1.727	21.88
M&P-XYLENE	22.041	1.719	28.39
O-XYLENE	23.225	0.630	12.09
(unknown)	25.208	2.407	41.55
(unknown)	26.358	2.515	26.82
(unknown)	27.541	1.183	12.26
10			551.51

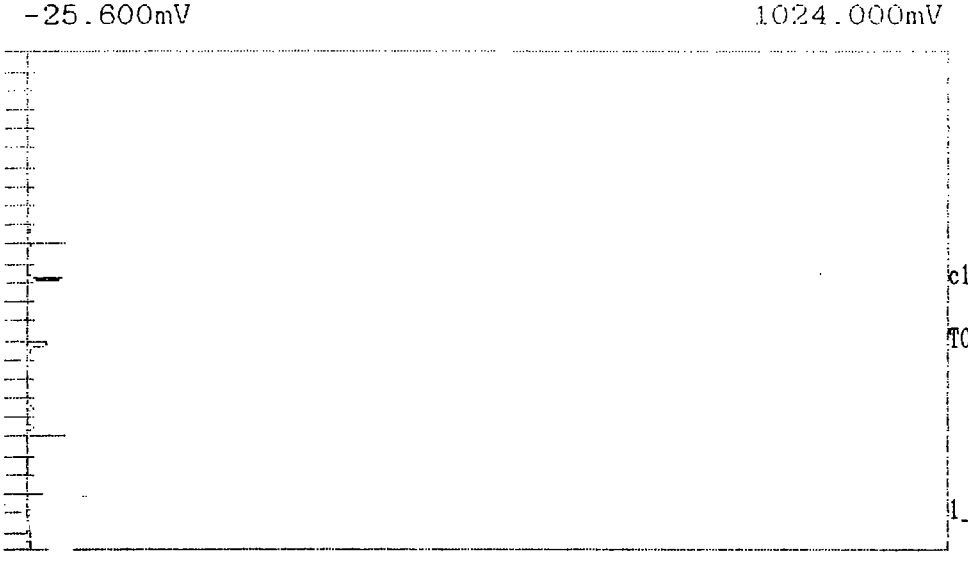
2/23/96 MOP

VP1 92'

GC #2

DELCD

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/23/1996 15:22:32
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 1data464.CHR ( )
Operator : MARK PAULI



Component	Retention	Height	Area
c1_2-DCE	11.800	39.325	469.90
TCE	15.216	26.583	360.14
1_4-DCBA (SURR)	23.250	70.332	1552.06

Component	Retention	Height	Area
c1_2-DCE	11.800	39.325	469.90
TCE	15.216	26.583	360.14
1_4-DCBA (SURR)	23.250	70.332	1552.06
3			2382.10

2/23/96 MOP

VP1 92'

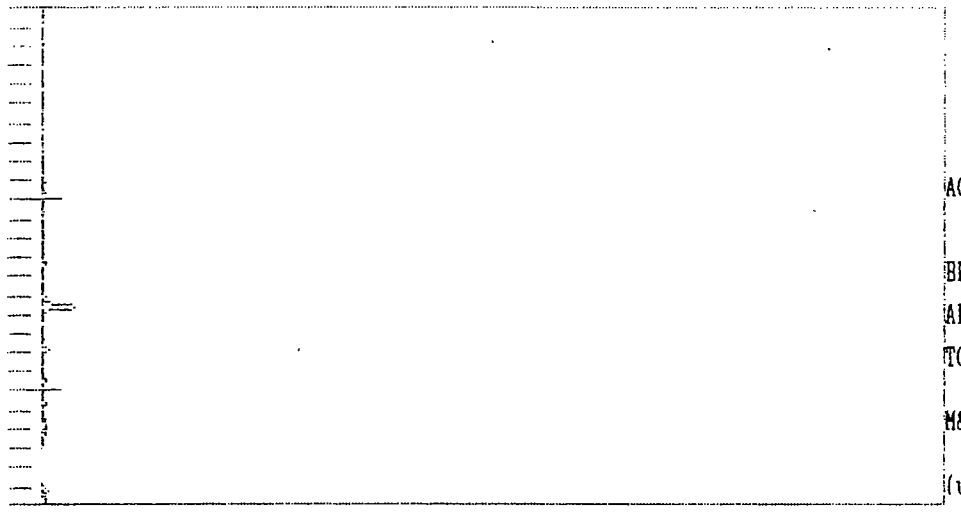
GC#2

PID

LAB DUP

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/23/1996 16:01:39
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 2DATA465.CHR ()
Operator : MARK PAULI

-25.000mV 512.000mV



Component	Retention	Height	Area
ACETONE	9.725	1.462	13.81
BENZENE	13.400	0.848	14.44
ALPHA-TFT(SURR)	15.633	20.059	319.31
TOLUENE	17.875	3.972	42.51
M&P-XYLENE	22.066	0.914	16.88
(unknown)	25.233	2.442	41.83

Component	Retention	Height	Area
ACETONE	9.725	1.462	13.81
BENZENE	13.400	0.848	14.44
ALPHA-TFT(SURR)	15.633	20.059	319.31
TOLUENE	17.875	3.972	42.51
M&P-XYLENE	22.066	0.914	16.88
(unknown)	25.233	2.442	41.83
(unknown)	26.383	2.114	18.71
7			467.49

2/23/96 MOP

VP1 92'

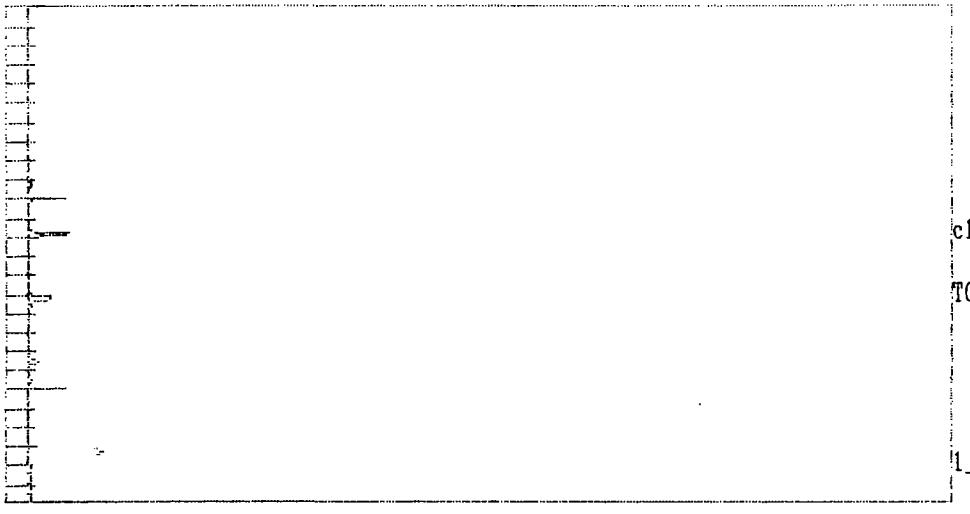
GC#2

LAB QMP

DELCD

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/23/1996 16:01:39
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 1data465.CHR ( )
Operator : MARK PAULI

-25.600mV 1024.000mV



Component	Retention	Height	Area
c1_2-DCE	11.816	48.210	610.31
TCE	15.216	32.206	583.29
1_4-DCBA (SURR)	23.266	93.681	2062.71

Component	Retention	Height	Area
c1_2-DCE	11.816	48.210	610.31
TCE	15.216	32.206	583.29
1_4-DCBA (SURR)	23.266	93.681	2062.71
3			3256.31

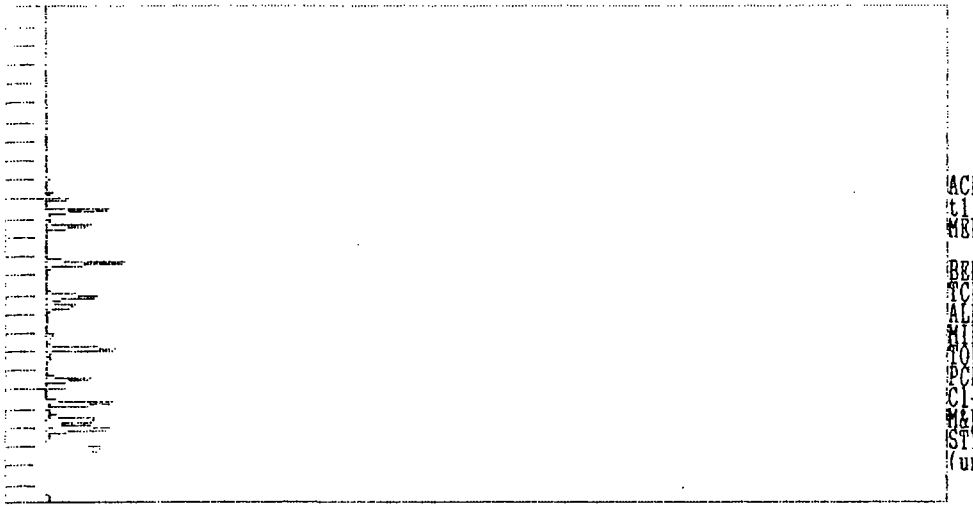
2/23/96 WOP

10 µg/L
(CCV)

GC #2
PID

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/23/1996 16:43:48
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 2DATA466.CHR ()
Operator : MARK PAULI

-25.000mV 512.000mV



Component	Retention	Height	Area	
ACETONE	9.700	3.095	17.92	
t1_2-DCE	10.600	54.913	419.85	
MEK & c1_2-DCE	11.433	31.709	319.56	
BENZENE	13.350	45.117	651.75	
TCE	15.116	29.312	437.31	M
ALPHA-TFT(SURR)	15.608	18.773	301.45	M
MIBK	17.150	3.393	41.99	
TOLUENE	17.850	52.806	601.81	
PCE	19.466	27.536	359.08	
C1-BENZENE	20.733	42.544	596.85	
M&P-XYLENE	22.041	35.484	607.97	
STYRENE	23.025	30.818	462.21	
(unknown)	23.208	30.096	489.01	

Component	Retention	Height	Area	
(unknown)	9.066	3.133	17.48	
ACETONE	9.700	3.095	17.92	
1_1-DCE	9.966	16.825	112.06	
t1_2-DCE	10.600	54.913	419.85	
MEK & c1_2-DCE	11.433	31.709	319.56	
BENZENE	13.350	45.117	651.75	
TCE	15.116	29.312	437.31	M
ALPHA-TFT(SURR)	15.608	18.773	301.45	M
MIBK	17.150	3.393	41.99	
TOLUENE	17.850	52.806	601.81	
PCE	19.466	27.536	359.08	
C1-BENZENE	20.733	42.544	596.85	
ETHYL BENZENE	21.583	34.078	530.91	
M&P-XYLENE	22.041	35.484	607.97	
STYRENE	23.025	30.818	462.21	
~~(unknown)~~ O-XYLENE	23.208	30.096	489.01	
(unknown)	26.350	2.998	32.06	
17			5999.26	

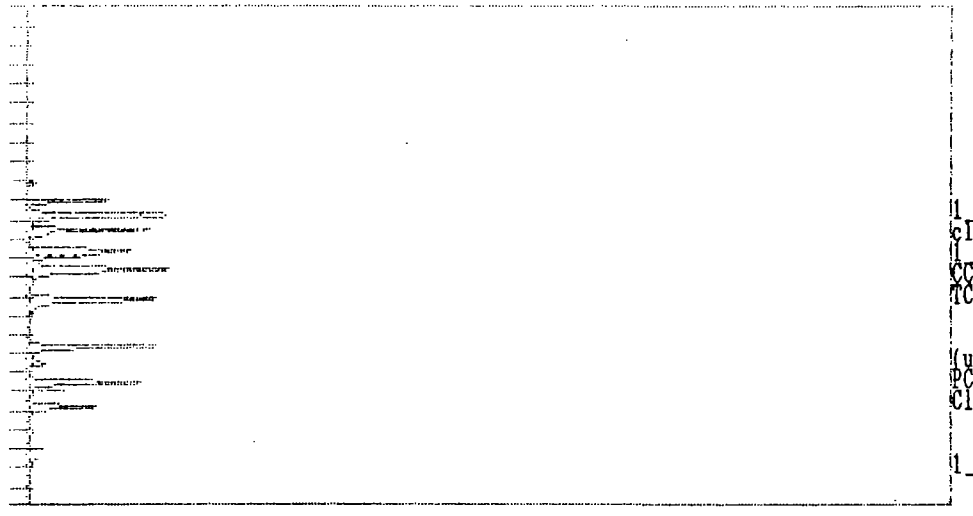
2/23/96 MSP

GC#2
DELCD

10 ug/L
(CCV)

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/23/1996 16:43:48
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 1data466.CHR ( )
Operator : MARK PAULI

-25.600mV 1024.000mV



Component	Retention	Height	Area	
1_1-DCA	10.800	161.814	1706.38	M
cI_2-DCE	11.500	148.128	1745.11	
1_1_1-TCA	12.816	80.936	1114.89	M
CCl4	13.600	152.948	2883.47	
TCE	15.183	159.044	2733.18	
(unknown)	18.550	18.816	225.91	
PCE	19.533	142.461	1992.71	
C1-BENZENE	20.800	77.508	1117.77	
1_4-DCBA (SURR)	23.233	73.578	1560.04	

Component	Retention	Height	Area	
1_1-DCE	10.033	113.900	888.04	
cI_2-DCE	10.666	170.475	1151.37	M
1_1-DCA	10.800	161.814	1706.38	M
cI_2-DCE	11.500	148.128	1745.11	
1_2-DCA	12.600	126.821	1609.59	M
1_1_1-TCA	12.816	80.936	1114.89	M
CCl4	13.600	152.948	2883.47	
TCE	15.183	159.044	2733.18	
1_1_2-TCA	17.650	143.310	1833.83	
(unknown)	18.550	18.816	225.91	
PCE	19.533	142.461	1992.71	
C1-BENZENE	20.800	77.508	1117.77	
1_4-DCBA (SURR)	23.233	73.578	1560.04	
13			20562.28	

2/23/96
MDP

5 µg/L

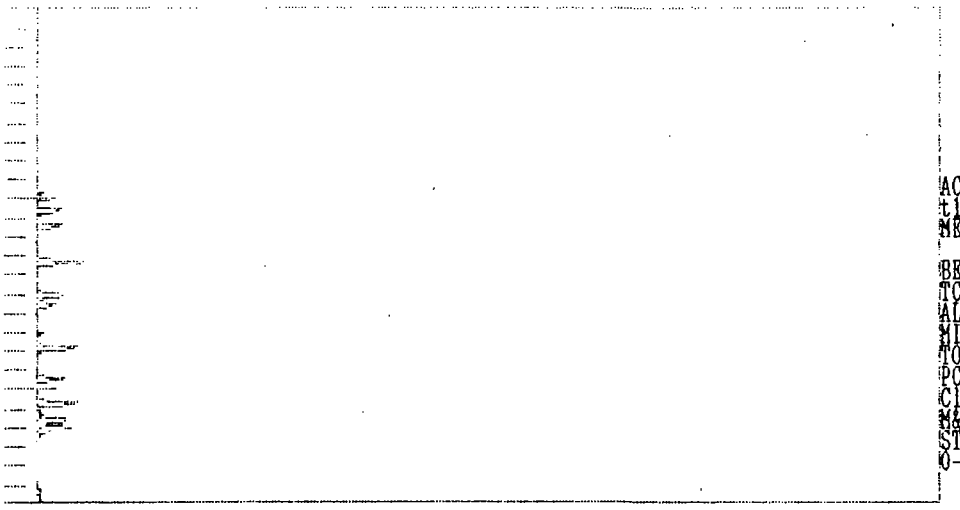
GC #2

(DLV)

PID

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/23/1996 17:25:21
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 2DATA467.CHR ()
Operator : MARK PAULI

-25.000mV 512.000mV



Component	Retention	Height	Area	
ACETONE	9.716	2.499	15.31	
t1_2-DCE	10.616	31.837	248.25	
MEK & c1_2-DCE	11.433	19.049	191.43	
BENZENE	13.333	27.137	386.61	
TCE	15.075	17.105	255.46	M
ALPHA-TFT(SURR)	15.575	10.901	176.47	M
MIBK	17.133	2.579	32.14	
TOLUENE	17.833	32.364	366.39	
PCE	19.466	16.426	212.66	
C1-BENZENE	20.733	26.444	372.02	
M&P-XYLENE	22.041	21.206	360.53	M
STYRENE	23.058	18.284	261.32	M
O-XYLENE	23.225	18.165	307.10	M

Component	Retention	Height	Area	
(unknown)	9.083	2.547	13.44	
ACETONE	9.716	2.499	15.31	
1_1-DCE	9.983	8.926	59.31	
t1_2-DCE	10.616	31.837	248.25	
MEK & c1_2-DCE	11.433	19.049	191.43	
BENZENE	13.333	27.137	386.61	
TCE	15.075	17.105	255.46	M
ALPHA-TFT(SURR)	15.575	10.901	176.47	M
MIBK	17.133	2.579	32.14	
TOLUENE	17.833	32.364	366.39	
PCE	19.466	16.426	212.66	
C1-BENZENE	20.733	26.444	372.02	
ETHYL BENZENE	21.600	19.857	308.49	M
M&P-XYLENE	22.041	21.206	360.53	M
STYRENE	23.058	18.284	261.32	M
O-XYLENE	23.225	18.165	307.10	M
(unknown)	26.383	2.679	24.48	

17 3591.40

2/23/96

MP

5 ug/L

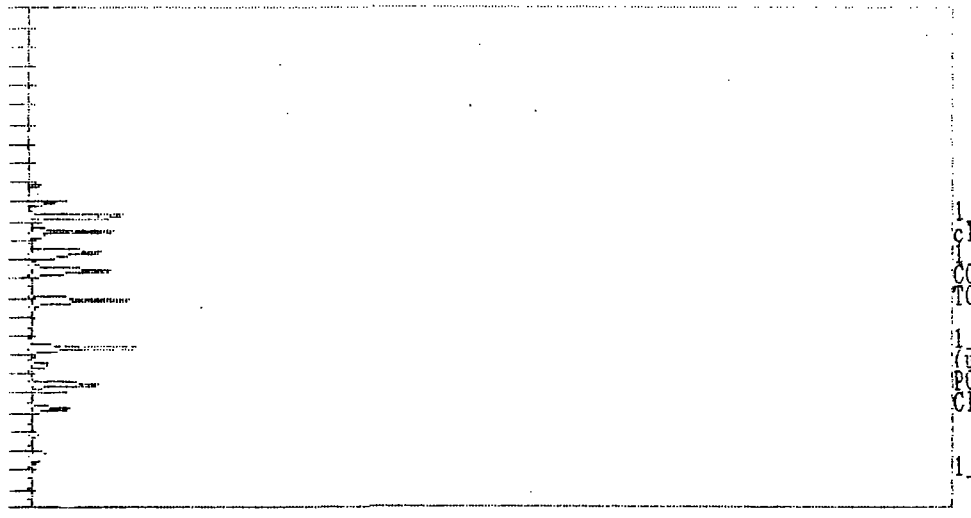
(DLV)

GC #2

D&LCD

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/23/1996 17:25:21
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 1data467.CHR ( )
Operator : MARK PAULI

-25.600mV 1024.000mV



Component	Retention	Height	Area	
1_1-DCA	10.816	91.240	956.86	M
cI_2-DCE	11.500	97.716	1200.27	
1_2-DCA	12.583	95.606	1752.87	
CCl4	13.583	89.795	1650.95	
TCE	15.133	112.617	1952.63	
1_1_2-TCA	17.633	117.753	1486.28	
(unknown)	18.533	25.991	321.79	
PCE	19.533	91.129	1278.13	
Cl-BENZENE	20.800	47.246	692.02	
1_4-DCBA (SURR)	23.250	52.948	1120.04	

Component	Retention	Height	Area	
1_1-DCE	10.050	61.250	487.05	
tl_2-DCE	10.683	107.917	727.74	M
1_1-DCA	10.816	91.240	956.86	M
cl_2-DCE	11.500	97.716	1200.27	
1_2-DCA	12.583	95.606	1752.87	
CCl4	13.583	89.795	1650.95	
TCE	15.133	112.617	1952.63	
1_1_2-TCA	17.633	117.753	1486.28	
(unknown)	18.533	25.991	321.79	
PCE	19.533	91.129	1278.13	
Cl-BENZENE	20.800	47.246	692.02	
1_4-DCBA (SURR)	23.250	52.948	1120.04	
12			13626.63	

2/23/96
MSP

2-24-96

GC #2

Lower Aquifer

ACS Field GC #2 2/22/96 Curve

Compound Date 2/24/96	PK #	RT	STD1 50 *Run #*	STD2 10 *Run #*	STD3 5 *Run #*	Linear Regression CC	 Slope	 Int.	ICB 5 ML *run#*	 ug/L	10 ICV	%D ICV/STD	1 VP4 58' 5.0 mL ug/L	 	2 VP4 68' 5.0 mL ug/L	
Acetone	1	11.2	60	22	16	1.000	1.0E+00	-12.1			20	90.9%				
1,1,-DCE	2	11.5	499	113	60	1.000	1.0E-01	-1.4			120	106.2%				
trans-1,2-DCE	3	12.6	1,186	473	264	0.993	5.1E-02	-10.8			400	84.6%				
MEK/cis 1,2-DCE	4	14.1	1,266	369	208	0.999	4.3E-02	-4.9			323	87.5%				
Benzene	6	16.7	2,512	751	417	0.999	2.2E-02	-5.2			653	87.0%				
TCE	7	18.1	1,696	483	278	0.999	3.2E-02	-4.7			447	92.5%				
MIBK	8	19.8	178	55	30	0.998	3.1E-01	-5.6			37	67.3%				
Toluene	9	20.6	2,332	681	401	0.999	2.4E-02	-5.2			622	91.3%				
PCE	10	21.9	1,445	396	227	1.000	3.7E-02	-4.1			373	94.2%				
Chlorobenzene	11	23.7	2,363	693	394	0.999	2.3E-02	-5.0			635	91.6%				
Ethylbenzene	12	24.0	2,157	590	327	0.999	2.5E-02	-3.9			540	91.5%				
m+p-Xylene	13	24.2	2,471	684	374	0.999	2.2E-02	-4.0			625	91.4%				
Styrene	14	25.5	2,292	559	252	0.999	2.2E-02	-1.5			468	83.7%				
o-Xylene	15	25.6	1,737	551	334	0.999	3.3E-02	-6.9			531	96.4%				
1,1,-DCE	1	11.5	3,848	1,000	532	1.000	1.4E-02	-3.0			1,408	140.8%				
t-1,2-DCE	2	12.6	3,479	1,515	853	0.990	1.8E-02	-13.2			1,988	131.2%				
1,1-DCA	3	13.4	6,260	1,966	1,321	1.000	9.2E-03	-7.6			1,866	94.9%				
cis-1,2-DCE	4	14.5	6,315	2,149	1,392	0.999	9.3E-03	-8.9			2,592	120.6%				
1,2-DCA	5	14.9	5,095	2,006	1,302	0.997	1.2E-02	-12.5			2,428	121.0%				
1,1,1-TCA	6	15.9	4,859	1,252	830	1.000	1.1E-02	-4.1			1,102	88.0%				
Carbon Tet.	7	16.6	10,795	3,425	2,209	1.000	5.3E-03	-7.4			3,406	99.4%				
TCE	8	18.2	10,126	3,364	2,340	1.000	5.8E-03	-9.1			4,032	119.9%				
1,1,2-TCA	9	21.2	6,415	2,543	1,678	0.997	9.8E-03	-12.9			2,763	108.7%				
PCE	10	21.9	7,820	2,509	1,596	0.999	7.3E-03	-7.5			2,923	116.5%				
Chlorobenzene	11	23.7	5,244	1,480	833	0.999	1.0E-02	-4.4			1,660	112.2%				

a,a,a-TFT	8	18.5	1,222	**325**	181				297	91%	308	95%	284	87%	293	90%
1,4-DCBA	12	26.8	5,088	**2,113**	1,346				2,304	109%	1,995	94%	1648	78%	1514	72%

Analyst _____

Check _____

Lower Aquifer

ACS Field GC #2	3		4		5					
Compound **Date** **2/24/96**	**VP4 79'** 5.0 mL ug/L		**VP4 79' LAB DUP** 5.0 mL ug/L		**VP4 89'** 1.0 mL ug/L		**10** **CCV**	**%D** CCV/STD	**5** **DLV**	**%D** 5 STD
Acetone							23	104.5%	16	100.0%
1,1,-DCE							111	98.2%	65	108.3%
trans-1,2-DCE							438	92.6%	225	85.2%
MEK/cis 1,2-DCE							337	91.3%	189	90.9%
Benzene							673	89.6%	392	94.0%
TCE							427	88.4%	250	89.9%
MIBK							54	98.2%	29	96.7%
Toluene							598	87.8%	349	87.0%
PCE							355	89.6%	205	90.3%
Chlorobenzene							638	92.1%	371	94.2%
Ethylbenzene							534	90.5%	307	93.9%
m+p-Xylene							613	89.6%	348	93.0%
Styrene							511	91.4%	264	104.8%
o-Xylene							516	92.3%	300	89.8%
1,1,-DCE							1060	106.0%	554	104.1%
t-1,2-DCE							1525	100.7%	712	83.5%
1,1-DCA							1888	96.0%	1013	76.7%
cis-1,2-DCE							2138	99.5%	1290	92.7%
1,2-DCA							COELUTION	#VALUE!	COELUTION	#VALUE!
1,1,1-TCA							COELUTION	#VALUE!	COELUTION	#VALUE!
Carbon Tet.							3029	88.4%	1791	81.1%
TCE							3293	97.9%	2030	86.8%
1,1,2-TCA							2640	103.8%	1535	91.5%
PCE							2312	92.1%	1337	83.8%
Chlorobenzene							1436	97.0%	785	94.2%

a,a,a-TFT	267	82%	265	82%	295	91%	303.0	93%	173.0	96%
1,4-DCBA	1634	77%	1568	74%	1761	83%	2,167.0	103%	1,177.0	87%

Analyst _____

Check _____

10 ug/L

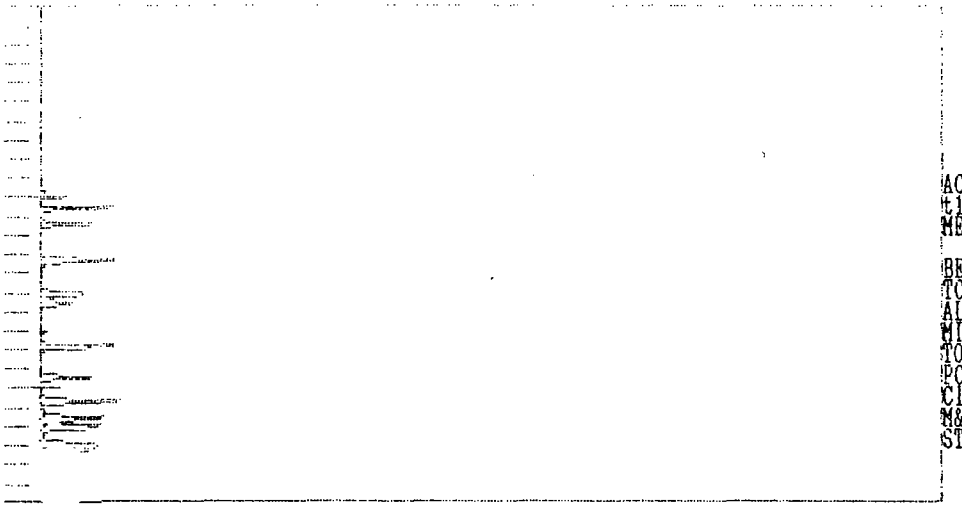
GC #2

(CCV)

PID

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/24/1996 08:43:07
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 2DATA488.CHR ( )
Operator : MARK PAULI

-25.000mV 512.000mV



Component	Retention	Height	Area	
ACETONE	9.691	3.338	20.36	
t1_2-DCE	10.591	51.879	400.38	
MEK & c1_2-DCE	11.408	31.978	323.07	
BENZENE	13.300	45.594	652.80	
TCE	15.066	29.577	446.82	M
ALPHA-TFT(SURR)	15.575	18.690	307.56	M
MIBK	17.133	3.025	37.46	
TOLUENE	17.816	54.626	621.64	
PCE	19.433	28.546	372.76	
C1-BENZENE	20.683	44.866	634.83	
M&P-XYLENE	21.991	37.138	625.35	
STYRENE	23.125	31.778	530.50	

Component	Retention	Height	Area	
(unknown)	9.075	4.301	18.99	
ACETONE	9.691	3.338	20.36	
1_1-DCE	9.958	17.503	119.55	
t1_2-DCE	10.591	51.879	400.38	
MEK & c1_2-DCE	11.408	31.978	323.07	
BENZENE	13.300	45.594	652.80	
TCE	15.066	29.577	446.82	M
ALPHA-TFT(SURR)	15.575	18.690	307.56	M
MIBK	17.133	3.025	37.46	
TOLUENE	17.816	54.626	621.64	
PCE	19.433	28.546	372.76	
C1-BENZENE	20.683	44.866	634.83	
ETHYL BENZENE	21.541	35.103	540.37	
M&P-XYLENE	21.991	37.138	625.35	
STYRENE	22.958	32.488	468.44	
~~STYRENE~~ o-XYLENE	23.125	31.778	530.50	
(unknown)	26.325	2.743	37.24	
17			6158.13	

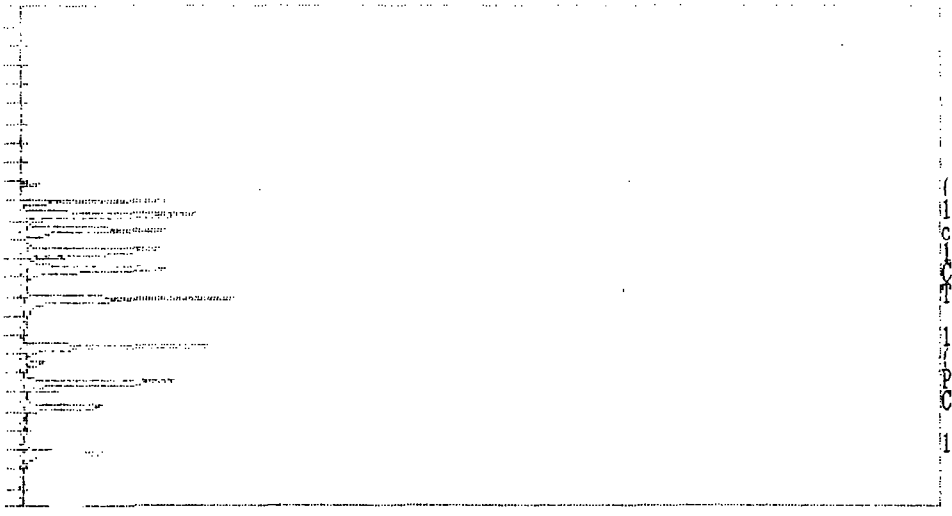
2/24/96 MP

10 ug/L
(CCV)

GC #2
DELCD

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/24/1996 08:43:07
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 1data488.CHR ( )
Operator : MARK PAULI

-25.600mV 1024.000mV



Component	Retention	Height	Area	
(unknown)	9.116	50.360	268.17	
1_1-DCA	10.783	198.684	1865.59	M
cl_2-DCE	11.466	221.140	2591.53	
1_1_1-TCA	12.750	90.765	1102.34	M
CCl4	13.550	178.089	3405.75	
TCE	15.133	236.513	4032.43	
1_1_2-TCA	17.616	213.055	2762.87	
(unknown)	18.516	24.734	294.77	
PCE	19.500	208.491	2922.95	
Cl-BENZENE	20.750	116.344	1660.16	
1_4-DCBA (SURR)	23.166	92.030	1994.69	

Component	Retention	Height	Area	
(unknown)	9.116	50.360	268.17	
1_1-DCE	10.016	182.317	1408.34	
cl_2-DCE	10.633	256.964	1988.37	M
1_1-DCA	10.783	198.684	1865.59	M
cl_2-DCE	11.466	221.140	2591.53	
1_2-DCA	12.550	183.142	2427.75	M
1_1_1-TCA	12.750	90.765	1102.34	M
CCl4	13.550	178.089	3405.75	
TCE	15.133	236.513	4032.43	
1_1_2-TCA	17.616	213.055	2762.87	
(unknown)	18.516	24.734	294.77	
PCE	19.500	208.491	2922.95	
Cl-BENZENE	20.750	116.344	1660.16	
1_4-DCBA (SURR)	23.166	92.030	1994.69	

14 28725.71

2/24/96 MSP

GC#2
PID

BLANK
(CCB)

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/24/1996 09:21:58
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 2DATA489.CHR ()
Operator : MARK PAULI

-25.000mV 512.000mV

Component	Retention	Height	Area
BENZENE	13.316	1.189	18.57
TCE	15.050	1.478	17.61
ALPHA-TFT(SURR)	15.558	18.855	296.73
TOLUENE	17.783	6.510	71.19
PCE	19.400	2.106	26.81
(unknown)	21.950	2.104	33.44
STYRENE	23.125	0.868	18.19

Component	Retention	Height	Area
BENZENE	13.316	1.189	18.57
TCE	15.050	1.478	17.61
ALPHA-TFT(SURR)	15.558	18.855	296.73
TOLUENE	17.783	6.510	71.19
PCE	19.400	2.106	26.81
(unknown)	21.950	2.104	33.44
STYRENE	23.125	0.868	18.19
(unknown)	26.300	2.055	23.32
8			505.87

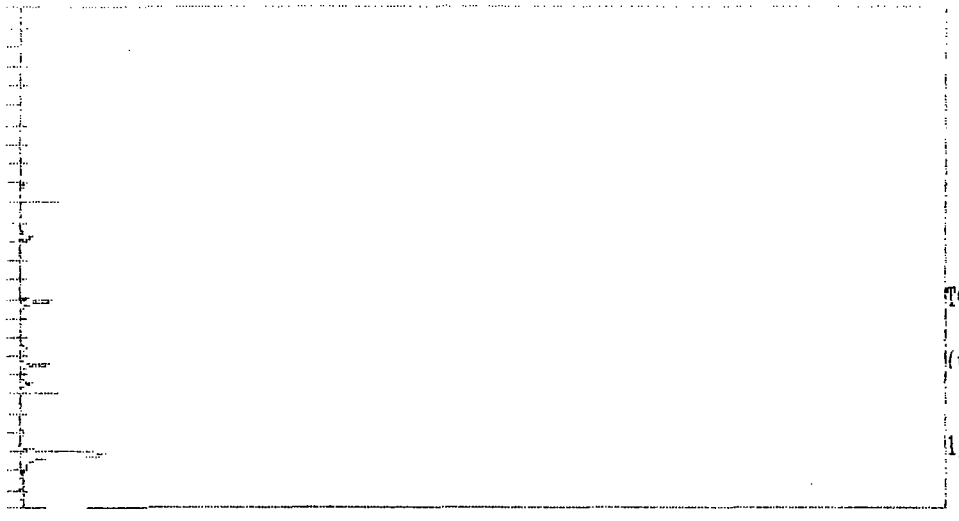
2/24/96
mop

BLANK
(CCB)

GC#2
DELCD

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/24/1996 09:21:58
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 1data489.CHR ( )
Operator : MARK PAULI

-25.600mV 1024.000mV



Component	Retention	Height	Area
TCE	15.116	34.660	449.73
(unknown)	18.483	33.370	428.49
1_4-DCBA (SURR)	23.133	104.878	2304.21

Component	Retention	Height	Area
'CE	15.116	34.660	449.73 <
unknown)	18.483	33.370	428.49
_4-DCBA (SURR)	23.133	104.878	2304.21
3			3182.42

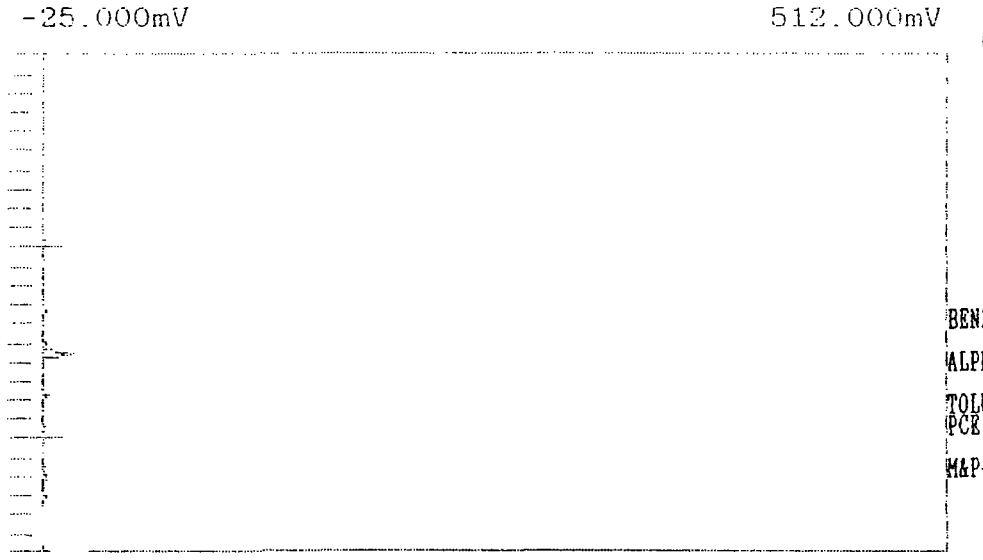
2/24/96
MP

VP4 58'

GC #2

PID

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/24/1996 10:00:39
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 2DATA490.CHR ()
Operator : MARK PAULI



Component	Retention	Height	Area
BENZENE	13.350	1.292	20.42
ALPHA-TFT(SURR)	15.591	17.760	283.98
TOLUENE	17.816	3.116	33.57
PCE	19.433	1.353	17.30
M&P-XYLENE	21.983	0.921	16.33

Component	Retention	Height	Area
BENZENE	13.350	1.292	20.42
ALPHA-TFT(SURR)	15.591	17.760	283.98
TOLUENE	17.816	3.116	33.57
PCE	19.433	1.353	17.30
M&P-XYLENE	21.983	0.921	16.33
(unknown)	26.333	2.004	25.03
6			396.62

2/24/96 mdp

VPA 58'

GC #2

DELCD

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/24/1996 10:00:39
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : ldata490.CHR ( )
Operator : MARK PAULI

Component	Retention	Height	Area
c1_2-DCE	11.800	27.220	346.68
1_4-DCBA (SURR)	23.183	74.420	1647.63

Component	Retention	Height	Area
c1_2-DCE	11.800	27.220	346.68
1_4-DCBA (SURR)	23.183	74.420	1647.63
2			1994.32

2/24/96 MSP

VP4 68'

GC#2
PID

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/24/1996 10:38:27
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 2DATA491.CHR ( )
Operator : MARK PAULI

-25.000mV 512.000mV

Component	Retention	Height	Area
BENZENE	13.375	1.158	19.13
ALPHA-TFT(SURR)	15.616	18.215	292.17
TOLUENE	17.858	3.381	36.56
(unknown)	25.191	2.132	36.90

Component	Retention	Height	Area
BENZENE	13.375	1.158	19.13 <
ALPHA-TFT(SURR)	15.616	18.215	292.17
TOLUENE	17.858	3.381	36.56 <
(unknown)	25.191	2.132	36.90
(unknown)	26.366	1.804	17.92
5			402.68

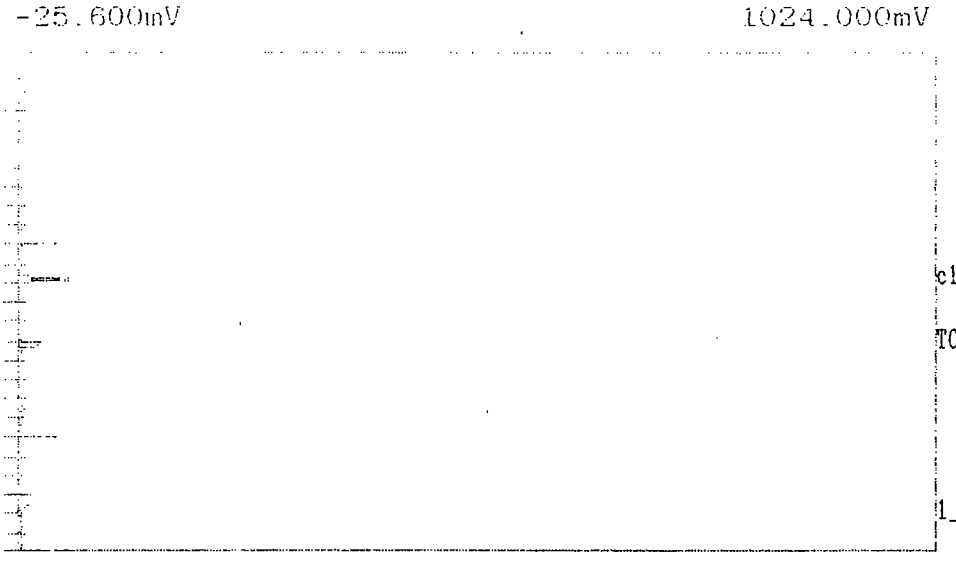
2/24/96 MSP

VPA 68'

GC#2

DELCO

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/24/1996 10:38:27
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : Idata491.CHR ( )
Operator : MARK PAULI



Component	Retention	Height	Area
c1_2-DCE	11.800	62.486	780.99
TCE	15.200	26.705	344.46
1_4-DCBA (SURR)	23.250	68.430	1513.76

Component	Retention	Height	Area
:1_2-DCE	11.800	62.486	780.99
TCE	15.200	26.705	344.46
_4-DCBA (SURR)	23.250	68.430	1513.76
3			2639.21

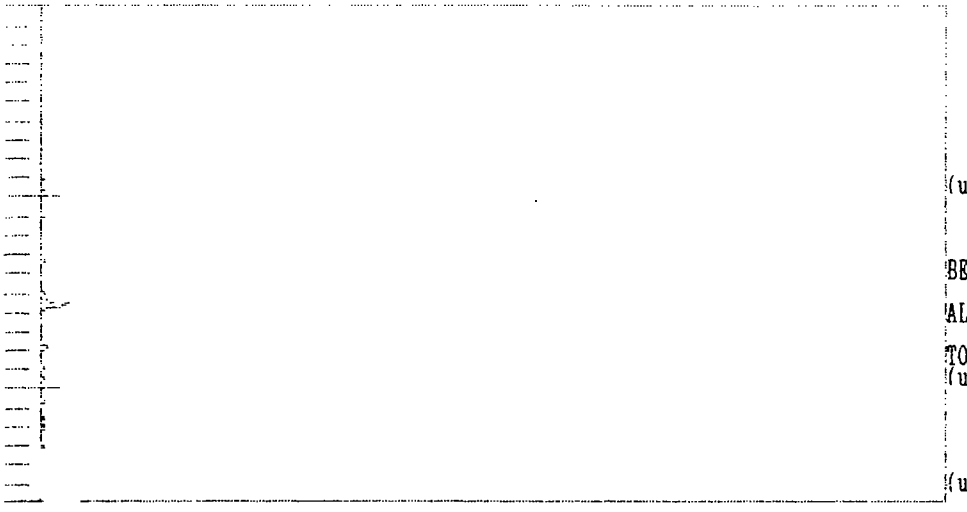
2/24/96 mop

VP4 79'

GC#2
PID

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/24/1996 11:17:13
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 2DATA492.CHR ( )
Operator : MARK PAULI

-25.000mV 512.000mV



Component	Retention	Height	Area
(unknown)	9.116	1.137	12.03
BENZENE	13.375	1.163	19.29
ALPHA-TFT(SURR)	15.608	17.057	267.31
TOLUENE	17.850	4.401	48.56
(unknown)	18.950	1.181	13.12
(unknown)	25.200	3.975	69.30

Component	Retention	Height	Area
(unknown)	9.116	1.137	12.03
BENZENE	13.375	1.163	19.29
ALPHA-TFT(SURR)	15.608	17.057	267.31
TOLUENE	17.850	4.401	48.56
(unknown)	18.950	1.181	13.12
(unknown)	25.200	3.975	69.30
(unknown)	26.366	2.111	19.68
7			449.30

2/24/96 MVP

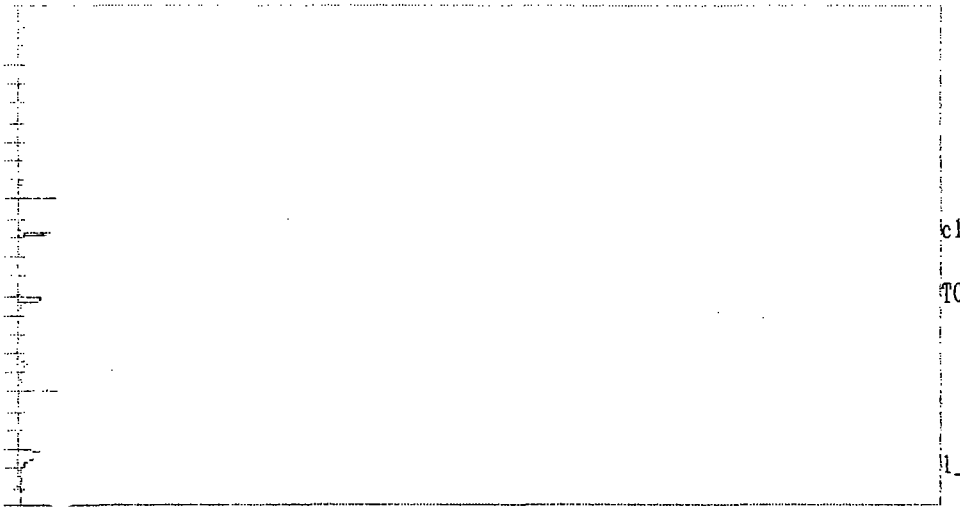
VPA 79'

GC#2

DELCD

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/24/1996 11:17:13
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 1data492.CHR ( )
Operator : MARK PAULI

-25.600mV 1024.000mV



Component	Retention	Height	Area
c1_2-DCE	11.800	35.909	441.38
TCE	15.200	33.165	587.94
1_4-DCBA (SURR)	23.266	73.566	1634.43

Component	Retention	Height	Area
:1_2-DCE	11.800	35.909	441.38
'CE	15.200	33.165	587.94
_4-DCBA (SURR)	23.266	73.566	1634.43
3			2663.75

2/24/96
mop

VPA 79'

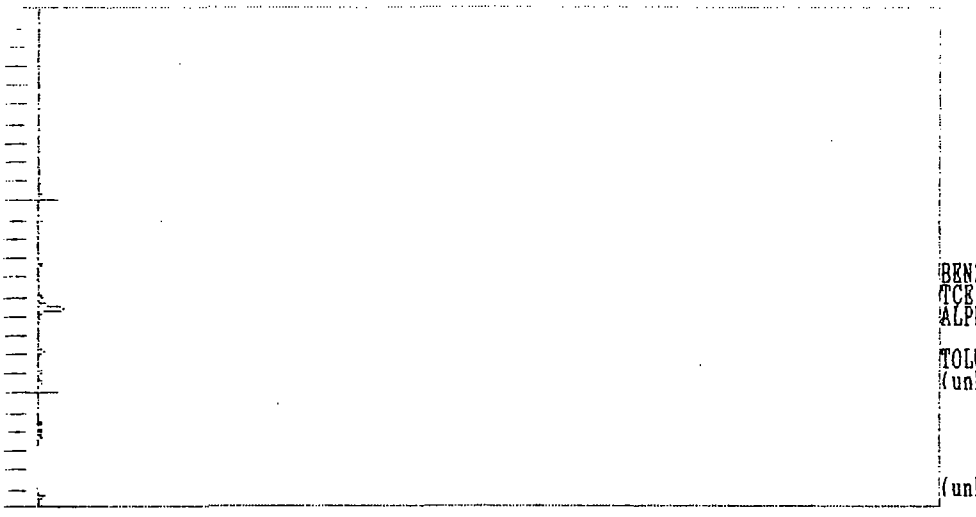
GC #2

PID

LAB DUP

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/24/1996 11:56:01
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 2DATA493.CHR ( )
Operator : MARK PAULI

-25.000mV 512.000mV



Component	Retention	Height	Area
BENZENE	13.375	1.117	18.57
TCE	15.100	0.890	13.41
ALPHA-TFT(SURR)	15.625	16.951	264.61
TOLUENE	17.866	4.595	49.89
(unknown)	18.950	1.172	13.12
(unknown)	25.250	4.185	72.72

Component	Retention	Height	Area
BENZENE	13.375	1.117	18.57 C
TCE	15.100	0.890	13.41
ALPHA-TFT(SURR)	15.625	16.951	264.61
TOLUENE	17.866	4.595	49.89 <
(unknown)	18.950	1.172	13.12
(unknown)	25.250	4.185	72.72
(unknown)	26.400	2.161	20.80
7			453.13

2/24/96 DUP

VP4 79'

GC#2

LAB

DUP

DELCD

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/24/1996 11:56:01
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 1data493.CHR ()
Operator : MARK PAULI

-25.600mV 1024.000mV

Component	Retention	Height	Area
c1_2-DCE	11.816	37.790	468.15
TCE	15.216	36.218	640.99
1_4-DCBA (SURR)	23.316	69.606	1568.23

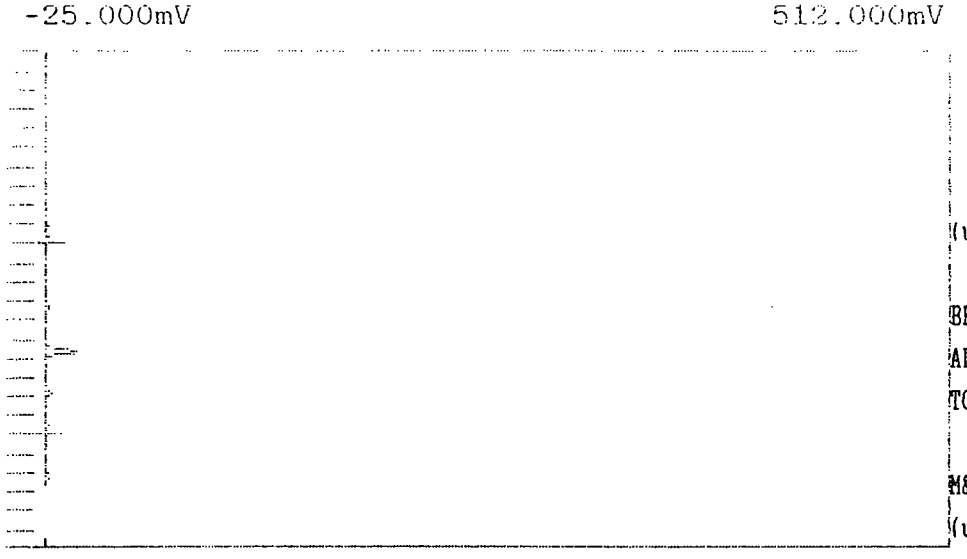
Component	Retention	Height	Area
:1_2-DCE	11.816	37.790	468.15
TCE	15.216	36.218	640.99
1_4-DCBA (SURR)	23.316	69.606	1568.23
3			2677.37

2/24/96 MOP

VP4 89'

GC #2
PID

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/24/1996 13:19:36
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 2DATA494.CHR ()
Operator : MARK PAULI



Component	Retention	Height	Area
(unknown)	9.133	1.610	15.63
BENZENE	13.400	0.930	16.60
ALPHA-TFT(SURR)	15.641	18.400	294.79
TOLUENE	17.891	2.691	29.36
M&P-XYLENE	22.133	0.566	12.56
(unknown)	25.275	1.734	27.97

Component	Retention	Height	Area
(unknown)	9.133	1.610	15.63
BENZENE	13.400	0.930	16.60
ALPHA-TFT(SURR)	15.641	18.400	294.79
TOLUENE	17.891	2.691	29.36
M&P-XYLENE	22.133	0.566	12.56
(unknown)	25.275	1.734	27.97
(unknown)	26.433	3.326	34.97
7			431.89

2/24/96

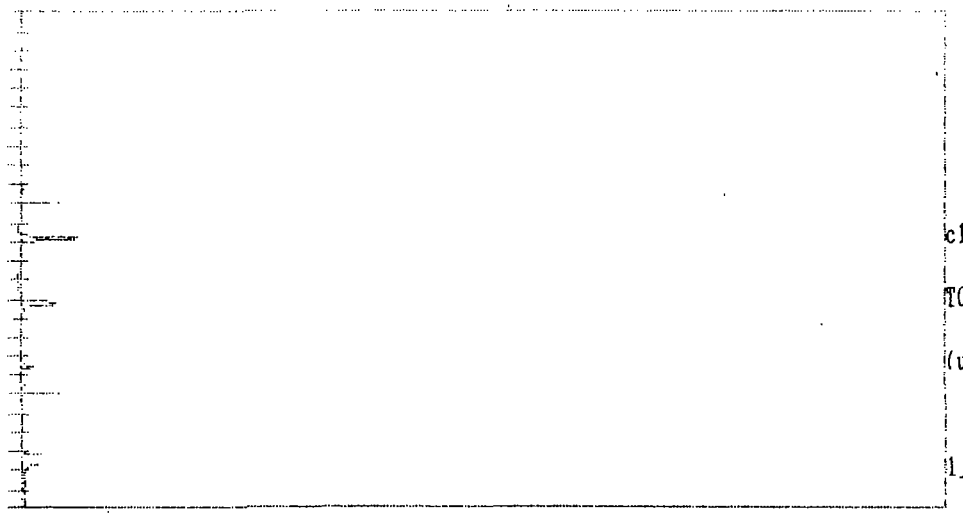
VP4 89'

GC#2

DELCD

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/24/1996 13:19:36
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 1data494.CHR ( )
Operator : MARK PAULI

-25.600mV 1024.000mV



Component	Retention	Height	Area
c1_2-DCE	11.816	66.075	824.34
TCE	15.216	44.075	786.49
(unknown)	18.600	15.916	212.36
1_4-DCBA (SURR)	23.350	79.027	1760.78

Component	Retention	Height	Area
:1_2-DCE	11.816	66.075	824.34
:CE	15.216	44.075	786.49
unknown)	18.600	15.916	212.36
L_4-DCBA (SURR)	23.350	79.027	1760.78
4			3583.98

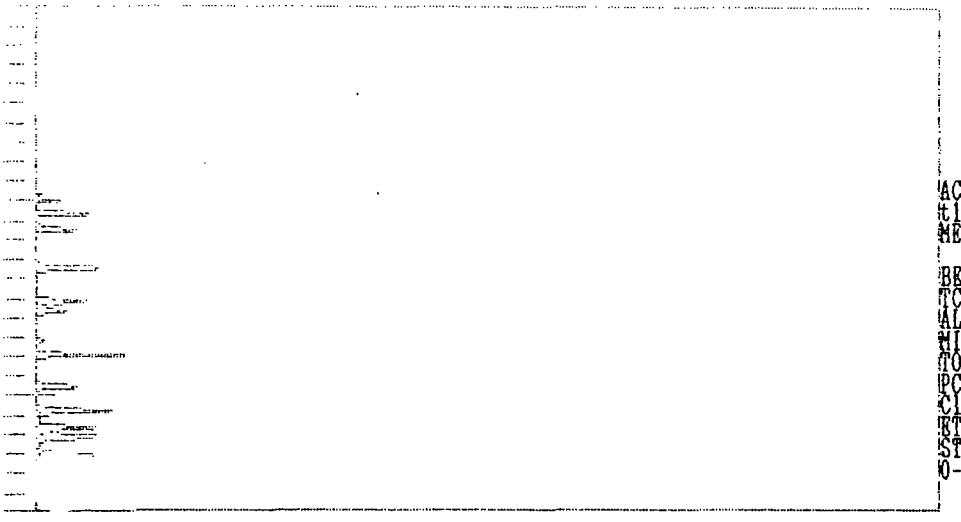
2/24/96 mof

GC#2
PID

10 ug/L
~~BCV~~ MP 2/24/96
(CCV)

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/24/1996 13:58:38
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : \DATA\95.CHR ( )
Operator : MARK PAULI

-25.000mV 512.000mV



Component	Retention	Height	Area	
ACETONE	9.716	3.677	23.13	
c1_2-DCE	10.633	56.636	437.60	
MEK & c1_2-DCE	11.475	33.036	337.40	
BENZENE	13.408	45.529	672.61	
TCE	15.150	29.033	426.63	M
ALPHA-TFT(SURR)	15.666	18.796	302.89	M
MIBK	17.191	4.396	54.48	
TOLUENE	17.891	52.952	598.27	
PCE	19.525	27.081	355.33	
C1-BENZENE	20.791	44.827	638.13	
ETHYL BENZENE	21.658	34.407	533.94	
STYRENE	23.116	33.186	511.43	
O-XYLENE	23.275	31.345	515.94	

Component	Retention	Height	Area	
unknown)	9.066	4.286	21.01	
ACETONE	9.716	3.677	23.13	
_1-DCE	9.983	16.148	111.47	
c1_2-DCE	10.633	56.636	437.60	
MEK & c1_2-DCE	11.475	33.036	337.40	
BENZENE	13.408	45.529	672.61	
TCE	15.150	29.033	426.63	M
ALPHA-TFT(SURR)	15.666	18.796	302.89	M
MIBK	17.191	4.396	54.48	
TOLUENE	17.891	52.952	598.27	
PCE	19.525	27.081	355.33	
C1-BENZENE	20.791	44.827	638.13	
ETHYL BENZENE	21.658	34.407	533.94	
M&P-XYLENE	22.108	35.858	613.48	
STYRENE	23.116	33.186	511.43	
O-XYLENE	23.275	31.345	515.94	
unknown)	26.408	3.059	30.70	
17			6184.44	

2/24/96
MP

10 ng/L

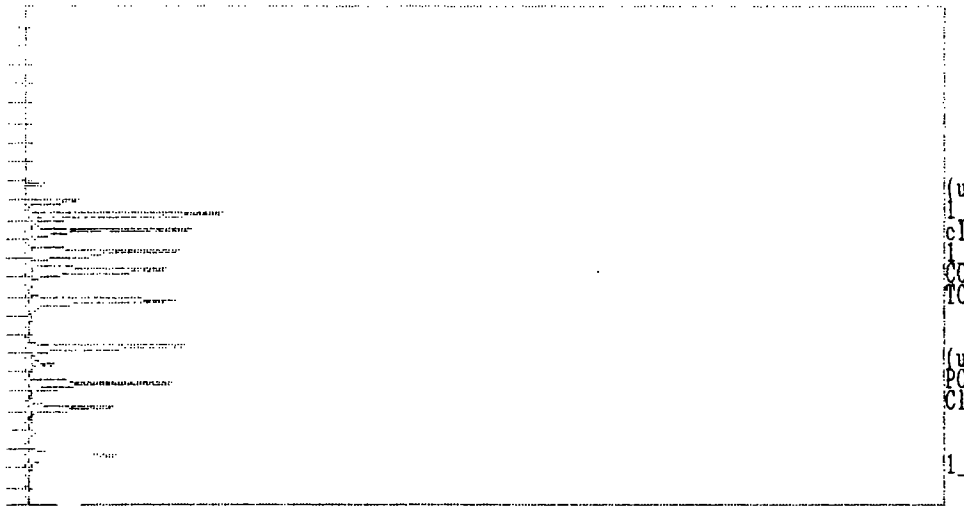
GC#2

(CCV)

DELCD

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/24/1996 13:58:38
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 1data495.CHR ( )
Operator : MARK PAULI

-25.600mV 1024.000mV



Component	Retention	Height	Area	
(unknown)	9.133	40.557	225.71	
1_1-DCA	10.833	176.372	1888.33	M
cl_2-DCE	11.533	182.868	2138.04	
1_2-DCA	12.633	168.675	3175.34	
CCl4	13.650	158.811	3029.32	
TCE	15.233	189.151	3292.98	
(unknown)	18.583	24.932	300.64	
PCE	19.566	163.270	2311.93	
Cl-BENZENE	20.850	98.373	1435.79	
1_4-DCBA (SURR)	23.300	99.174	2167.18	

Component	Retention	Height	Area	
(unknown)	9.133	40.557	225.71	
1_1-DCE	10.050	134.084	1060.41	
t1_2-DCE	10.700	220.588	1525.07	M
1_1-DCA	10.833	176.372	1888.33	M
c1_2-DCE	11.533	182.868	2138.04	
1_2-DCA	12.633	168.675	3175.34	— coelution w/ 1,1,1-TCA
CCl4	13.650	158.811	3029.32	
TCE	15.233	189.151	3292.98	
1_1_2-TCA	17.683	204.782	2640.13	
(unknown)	18.583	24.932	300.64	
PCE	19.566	163.270	2311.93	
Cl-BENZENE	20.850	98.373	1435.79	
1_4-DCBA (SURR)	23.300	99.174	2167.18	
13			25190.87	

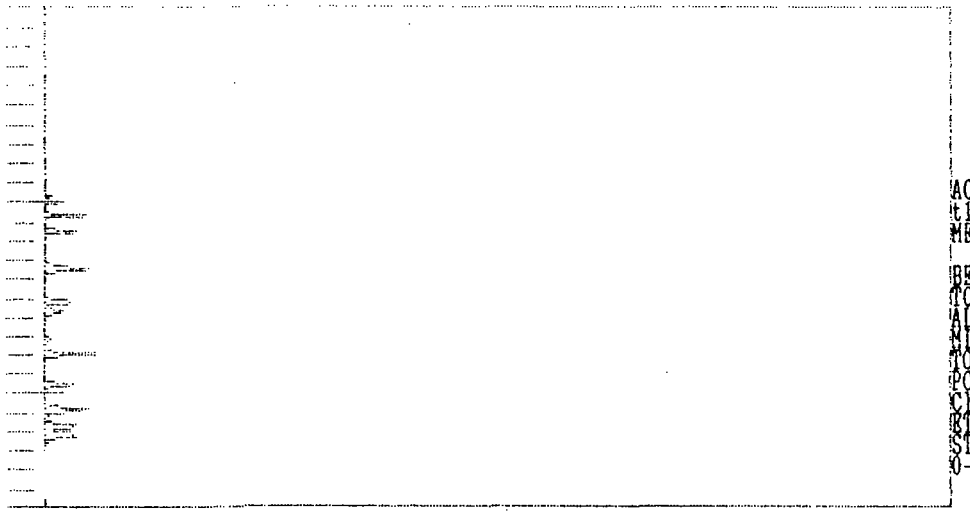
2/29/96 MOP

5 ug/L
(DLV)

GC#2
PID

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/24/1996 14:38:42
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 2DATA496.CHR ()
Operator : MARK PAULI

-25.000mV 512.000mV



Component	Retention	Height	Area	
ACETONE	9.733	2.661	16.47	
t1_2-DCE	10.658	30.071	225.30	
MEK & c1_2-DCE	11.491	18.528	189.31	
BENZENE	13.441	26.239	392.19	
TCE	15.200	16.832	249.53	M
ALPHA-TFT(SURR)	15.700	10.980	172.67	M
MIBK	17.225	2.412	28.82	
TOLUENE	17.925	30.890	349.09	
PCE	19.558	15.736	205.09	
C1-BENZENE	20.841	25.947	370.83	
ETHYL BENZENE	21.716	19.575	307.08	M
STYRENE	23.183	17.968	264.14	M
O-XYLENE	23.350	17.765	299.60	M

Component	Retention	Height	Area	
(unknown)	9.083	2.729	13.45	
ACETONE	9.733	2.661	16.47	
1_1-DCE	10.008	9.327	64.75	
t1_2-DCE	10.658	30.071	225.30	
MEK & c1_2-DCE	11.491	18.528	189.31	
BENZENE	13.441	26.239	392.19	
TCE	15.200	16.832	249.53	M
ALPHA-TFT(SURR)	15.700	10.980	172.67	M
MIBK	17.225	2.412	28.82	
TOLUENE	17.925	30.890	349.09	
PCE	19.558	15.736	205.09	
C1-BENZENE	20.841	25.947	370.83	
ETHYL BENZENE	21.716	19.575	307.08	M
M&P-XYLENE	22.183	20.367	347.91	M
STYRENE	23.183	17.968	264.14	M
O-XYLENE	23.350	17.765	299.60	M
(unknown)	26.441	3.022	26.52	

17 3522.73

2/24/96
mp

5 ug/L

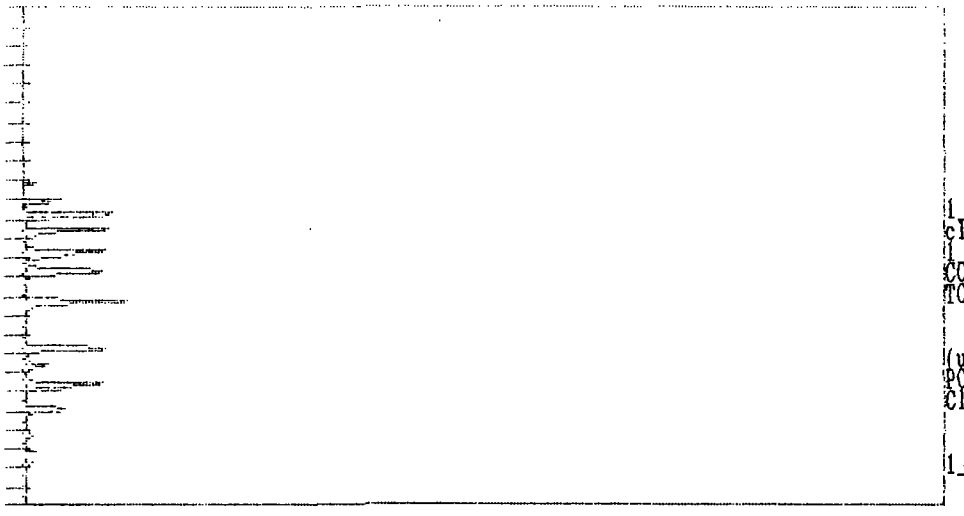
GC #2

DELCD

(DLV)

Lab name : ACS FIELD GC #2
Client : ACS
Analysis date : 02/24/1996 14:38:42
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 15 M
Carrier : Helium
Data file : 1data496.CHR ()
Operator : MARK PAULI

-25.600mV 1024.000mV



Component	Retention	Height	Area
1_1-DCA	10.850	94.686	1013.12 M
cl_2-DCE	11.566	104.223	1289.75
1_2-DCA	12.666	96.796	1796.21
CCl4	13.700	92.649	1790.96
TCE	15.283	117.047	2029.78
(unknown)	18.616	25.813	325.10
PCE	19.616	94.362	1336.97
Cl-BENZENE	20.916	52.158	785.03
1_4-DCBA (SURR)	23.400	54.705	1177.41

Component	Retention	Height	Area
1_1-DCE	10.066	70.096	554.27
cl_2-DCE	10.716	108.405	712.46 M
1_1-DCA	10.850	94.686	1013.12 M
cl_2-DCE	11.566	104.223	1289.75
1_2-DCA	12.666	96.796	1796.21
CCl4	13.700	92.649	1790.96
TCE	15.283	117.047	2029.78
1_1_2-TCA	17.716	120.930	1535.47
(unknown)	18.616	25.813	325.10
PCE	19.616	94.362	1336.97
Cl-BENZENE	20.916	52.158	785.03
1_4-DCBA (SURR)	23.400	54.705	1177.41
12			14346.54

2/24/96 MAP

2-13-96

GC # 1

Lower Aquifer

ACS Field GC #1			100	20	10								1		2	
Compound	**PK**	**RT**	**STD1**	**STD2**	**STD3**	**Linear Regression**			**ICB**		**10**	**%D**	**VP3 99'**		**GP57A**	
Date	**#**		**50**	**10**	**5**				5.00 mL		**ICV**	ICV/STD	5.00 mL		0.05 mL	
2/13/96			*Run #*	*Run #*	*Run #*	**CC**	**Slope**	**Int.**		ug/L				ug/L		ug/L
Acetone	1	11.2	878	258	198	1.000	1.3E-01	-14.9			255	98.8%			221	**1,403**
1,1,-DCE	2	11.5	965	279	158	0.999	5.7E-02	-4.8			277	99.3%				
trans-1,2-DCE	3	12.6	7,311	1,906	1,036	1.000	7.3E-03	-3.1			1,954	102.5%				
MEK	4	14.1	2,005	473	207	0.999	5.1E-02	-2.1			495	104.7%				
cis-1,2-DCE	5	14.5	7,683	1,798	949	1.000	6.7E-03	-1.7			1,823	101.4%				
Benzene	6	16.7	12,823	3,318	1,817	1.000	4.1E-03	-3.1			3,443	103.8%			71802	29,357.0
TCE	7	18.1	7,512	1,991	1,152	1.000	7.1E-03	-3.7			2,105	105.7%				
MIBK	8	19.8	1,786	434	259	1.000	3.0E-02	-2.7			453	104.4%				
Toluene	9	20.6	11,735	3,196	1,852	1.000	4.6E-03	-4.1			3,319	103.8%				
PCE	10	22.0	6,189	1,681	952	1.000	8.7E-03	-3.9			1,714	102.0%				
Chlorobenzene	11	23.8	12,991	3,171	1,592	1.000	4.0E-03	-2.0			3,032	95.6%				
Ethylbenzene	12	24.2	11,036	2,693	1,412	1.000	4.7E-03	-2.1			2,641	98.1%				
m+p-Xylene	13	24.4	13,500	3,580	1,885	0.999	3.9E-03	-3.2			3,407	95.2%				
Styrene +o-xyl	14	25.7	22,945	5,474	2,815	1.000	2.3E-03	-1.8			5,292	96.7%				
1,1,-DCE	1	11.5	2,755	1,029	641	0.997	2.2E-02	-10.6			896	87.1%				
t-1,2-DCE	2	12.6	8,240	3,564	2,433	0.997	8.0E-03	-16.2			3,070	86.1%				
1,1-DCA	3	13.4	10,969	4,715	3,334	0.998	6.0E-03	-16.7			4,069	86.3%				
cis-1,2-DCE	4	14.5	11,049	4,594	3,371	0.999	6.0E-03	-16.2			3,984	86.7%				
1,2-DCA	5	14.9	1,497	625	639	0.993	4.9E-02	-23.5			592	94.7%	2046	**76.9**		
1,1,1-TCA	6	15.9	8,009	3,272	2,368	0.999	8.1E-03	-15.3			2,843	86.9%				
Carbon Tet.	7	16.7	16,025	7,088	4,837	0.996	4.2E-03	-17.0			6,068	85.6%				
TCE	8	18.2	10,917	5,126	3,808	0.997	6.5E-03	-21.4			4,457	86.9%				
1,1,2-TCA	9	21.2	9,690	4,306	3,015	0.997	6.9E-03	-17.7			3,678	85.4%				
PCE	10	22.1	11,253	4,969	3,864	0.999	6.2E-03	-19.7			4,321	87.0%				
Chlorobenzene	11	23.9	6,657	2,586	1,722	0.998	9.3E-03	-12.5			2,193	84.8%				
a,a,a-TFT	8	18.5	5,445	**1,263**	674				1,247	99%	1,325	105%	1277	101%	1602	127%
1,4-DCBA	12	27.0	7,436	**3,171**	2,172				3,041	96%	2,689	85%	2813	89%	3525	111%

Analyst _____

Check _____

Lower Aquif

ACS Field GC #1	3		4		5		6		7					
Compound **Date** **2/13/96**	**GP57A** 0.005 mL ug/L		**VP3 99' LAB DUP** 5.00 mL ug/L		**VP3 99'** 1.00 mL ug/L		**GP68A** 5.00 mL ug/L		**GP68A** 1.00 mL ug/L		**10** **CCV**	**%D** CCV/STD	**5** **DLV**	**%D** 5 STD
Acetone							2575	322.4	646	**348.5**	268	103.9%	181	91.4%
1,1,-DCE											285	102.2%	170	107.6%
trans-1,2-DCE											2076	108.9%	1195	115.3%
MEK											533	112.7%	291	140.6%
cis-1,2-DCE											1935	107.6%	1070	112.8%
Benzene	11570	**44,736**									3556	107.2%	1955	107.6%
TCE											2118	106.4%	1250	108.5%
MIBK											512	118.0%	306	118.1%
Toluene											3387	106.0%	2083	112.5%
PCE											1750	104.1%	1051	110.4%
Chlorobenzene											3266	103.0%	1612	101.3%
Ethylbenzene											2763	102.6%	1405	99.5%
m+p-Xylene											3572	99.8%	1966	104.3%
Styrene +o-xyl											5542	101.2%	3031	107.7%
1,1,-DCE											884	85.9%	526	82.1%
t-1,2-DCE											3303	92.7%	1969	80.9%
1,1-DCA											4381	92.9%	2604	78.1%
cis-1,2-DCE											4207	91.6%	2763	82.0%
1,2-DCA			1767	**63.2**	709	**56.5**					603	96.5%	536	83.9%
1,1,1-TCA											3050	93.2%	1987	83.9%
Carbon Tet.											6314	89.1%	4147	85.7%
TCE											4613	90.0%	3140	82.5%
1,1,2-TCA											3979	92.4%	2618	86.8%
PCE											4615	92.9%	3434	88.9%
Chlorobenzene											2369	91.6%	1502	87.2%

a,a,a-TFT	1313	104%	1325	105%	1314	104%	1349	107%	1331	105%	1,349.0	107%	725.0	108%
1,4-DCBA	2992	94%	2656	84%	3227	102%	2956	93%	3337	105%	3,007.0	95%	1,923.0	89%

Analyst _____
Check _____

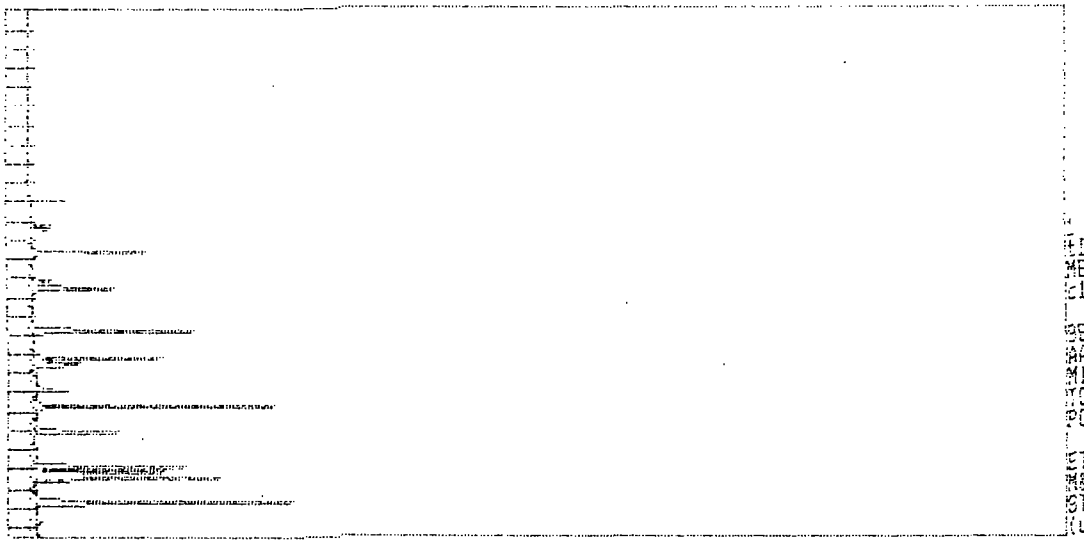
GC#1

5 ug/L

PID

Lab name : ACS FIELD GC #1
Analysis date : 02/13/1996 08:03:20
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 30 M
Carrier : Helium
Data file : 2DATA314.CHR ()
Operator : MARK PAULI

-25.000mV 1024.000mV



Component	Retention	Area
t-DCE	11.533	157.77 M
tr 2-DCE	12.633	1036.32
MEK	14.150	207.42
cl 2-DCE	14.550	949.01
BENZENE	16.783	1817.04
AAA-TFT(SURR)	18.533	673.61 M
MIBK	19.816	258.92
TOLUENE	20.683	1851.70
PCE	22.033	952.27
ETHYL BENZENE	24.200	1412.09
M&P-XYLENE	24.466	1884.76
STYRENE&O-XYLEN	25.700	2815.10
(unknown)	26.800	85.17

Component	Retention	Height	Area	
(TONE	11.266	23.259	197.57	M
t-DCE	11.533	17.843	157.77	M
tr 2-DCE	12.633	114.995	1036.32	
MEK	14.150	20.153	207.42	
cl 2-DCE	14.550	92.313	949.01	
BENZENE	16.783	173.657	1817.04	
TCE	18.183	133.963	1152.35	M
AAA-TFT(SURR)	18.533	68.246	673.61	M
MIBK	19.816	26.640	258.92	
TOLUENE	20.683	241.979	1851.70	
PCE	22.033	110.089	952.27	
Cl-BENZENE	23.850	183.025	1592.37	
ETHYL BENZENE	24.200	149.647	1412.09	
M&P-XYLENE	24.466	191.700	1884.76	
STYRENE&O-XYLEN	25.700	262.755	2815.10	
(unknown)	26.800	5.188	85.17	
(unknown)	27.700	10.884	162.29	

17 17205.77

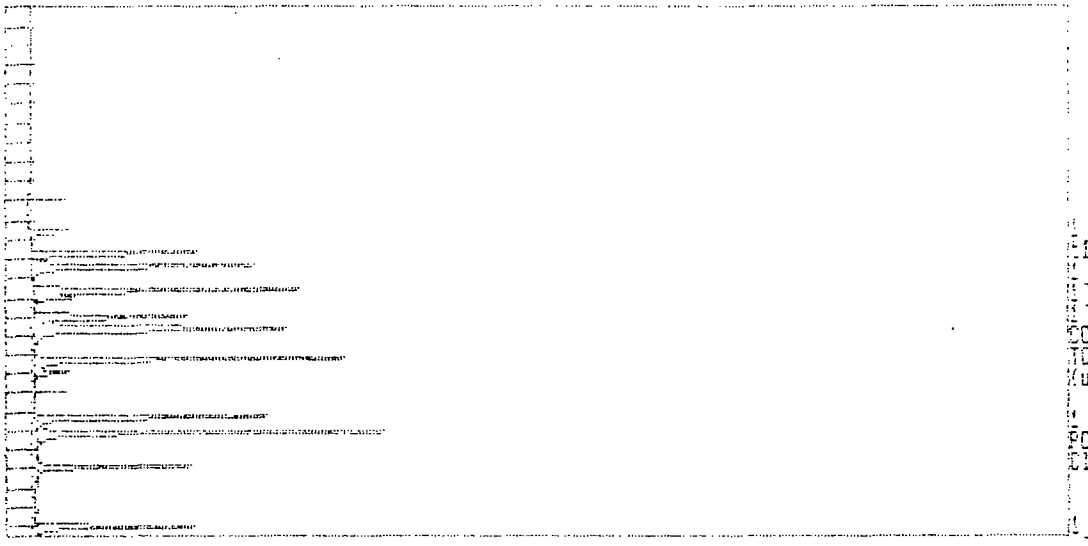
CALCS 8.XLS

2/13/96 MSP

GC#1 5 ug/L
DELCD

Lab name : ACS FIELD GC #1
Analysis date : 02/13/1996 08:03:20
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 30 M
Carrier : Helium
Data file : 1DATA314.CHR ()
Operator : MARK PAULI

-25.600mV 1024.000mV



Component	Retention	Area
1,1-DCE	11.583	640.79
t-1,2-DCE	12.683	2433.24
1,1-DCA	13.366	3334.06
c-1,2-DCE	14.583	3371.41
1,2-DCA	14.983	638.91
1,1,1-TCA	15.983	2368.35
CCl4	16.700	4837.08
TCE	18.216	3808.38
(unknown)	18.916	459.55
1,1,2-TCA	21.283	3014.98
PCE	22.083	3864.23
Cl-BENZENE	23.900	1722.35
1,4-DCBA(SURR)	27.033	2172.46

Component	Retention	Height	Area
1,1-DCE	11.583	64.801	640.79
t-1,2-DCE	12.683	219.501	2433.24
1,1-DCA	13.366	238.281	3334.06
c-1,2-DCE	14.583	268.835	3371.41
1,2-DCA	14.983	41.389	638.91
1,1,1-TCA	15.983	157.671	2368.35
CCl4	16.700	269.241	4837.08
TCE	18.216	347.718	3808.38
(unknown)	18.916	39.989	459.55
1,1,2-TCA	21.283	311.214	3014.98
PCE	22.083	345.300	3864.23
Cl-BENZENE	23.900	158.648	1722.35
1,4-DCBA(SURR)	27.033	191.429	2172.46
13			32665.79

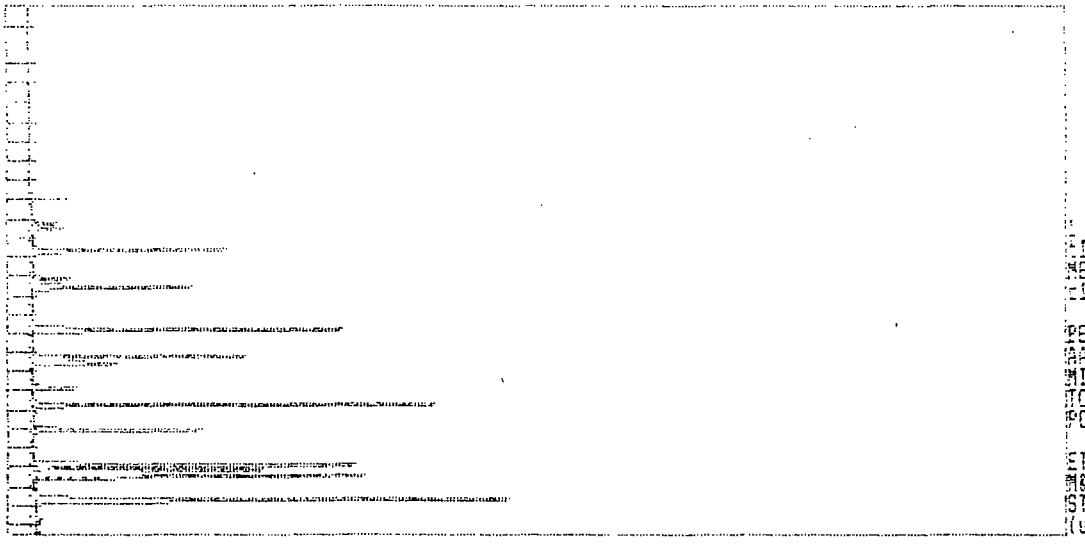
2/13/96
MP

GC#1 10ug/L

PID

Lab name : ACS FIELD GC #1
Analysis date : 02/13/1996 08:46:05
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 30 M
Carrier : Helium
Data file : 2DATA315.CHR ()
Operator : MARK PAULI

-25.000mV 1024.000mV



Component	Retention	Area	
t 1-DCE	11.533	279.06	M
t1 2-DCE	12.650	1905.68	
MEK	14.166	473.44	M
c1 2-DCE	14.566	1797.79	M
BENZENE	16.816	3317.65	
AAA-TFT(SURR)	18.550	1262.88	
MIBK	19.833	433.94	
TOLUENE	20.700	3196.02	
PCE	22.050	1680.99	
ETHYL BENZENE	24.216	2693.14	
M&P-XYLENE	24.466	3580.38	
STYRENE&O-XYLEN	25.716	5474.75	
(unknown)	26.816	86.69	

Component	Retention	Height	Area	
TONE	11.283	30.611	257.61	M
-DCE	11.533	32.420	279.06	M
t1 2-DCE	12.650	206.269	1905.68	
MEK	14.166	39.886	473.44	M
c1 2-DCE	14.566	166.835	1797.79	M
BENZENE	16.816	311.389	3317.65	
TCE	18.216	228.560	1991.26	
AAA-TFT(SURR)	18.550	127.753	1262.88	
MIBK	19.833	48.801	433.94	
TOLUENE	20.700	413.476	3196.02	
PCE	22.050	198.627	1680.99	
C1-BENZENE	23.866	351.846	3171.07	
ETHYL BENZENE	24.216	293.680	2693.14	
M&P-XYLENE	24.466	363.314	3580.38	
STYRENE&O-XYLEN	25.716	525.510	5474.75	
(unknown)	26.816	5.054	86.69	
(unknown)	27.700	15.642	227.02	

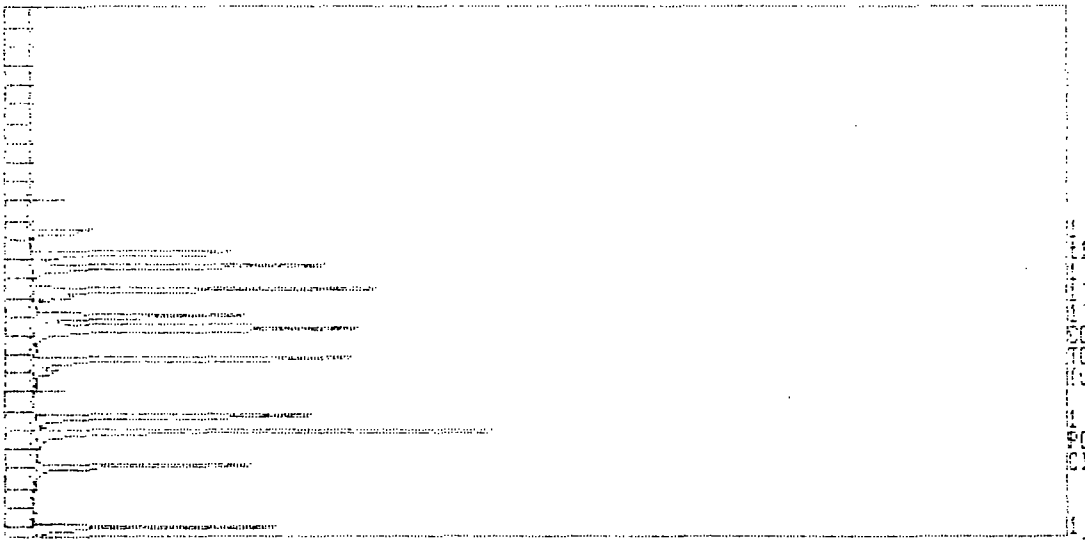
17 31829.37

2/13/96 msp

GC#1 10ug/L
DELCD

Lab name : ACS FIELD GC #1
Analysis date : 02/13/1996 08:46:05
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 30 M
Carrier : Helium
Data file : 1DATA315.CHR ()
Operator : MARK PAULI

-25.600mV 1024.000mV



Component	Retention	Area
1_1-DCE	11.583	1028.57
t-1_2-DCE	12.700	3563.98
1_1-DCA	13.366	4714.92
c-1_2-DCE	14.600	4593.81
1_2-DCA	15.000	624.73
1_1_1-TCA	15.983	3272.37
CCl4	16.716	7088.23
TCE	18.250	5125.76
(unknown)	18.950	518.41
1_1_2-TCA	21.300	4305.80
PCE	22.083	4969.13
Cl-BENZENE	23.900	2585.86
1_4-DCBA(SURR)	27.050	3171.38

Component	Retention	Height	Area
1_1-DCE	11.583	104.041	1028.57
t-1_2-DCE	12.700	316.060	3563.98
1_1-DCA	13.366	332.313	4714.92
c-1_2-DCE	14.600	356.424	4593.81
1_2-DCA	15.000	41.432	624.73
1_1_1-TCA	15.983	215.173	3272.37
CCl4	16.716	366.663	7088.23
TCE	18.250	463.480	5125.76
(unknown)	18.950	36.456	518.41
1_1_2-TCA	21.300	440.846	4305.80
PCE	22.083	449.675	4969.13
Cl-BENZENE	23.900	227.017	2585.86
1_4-DCBA(SURR)	27.050	278.038	3171.38
13			45562.95

2/13/96 msp

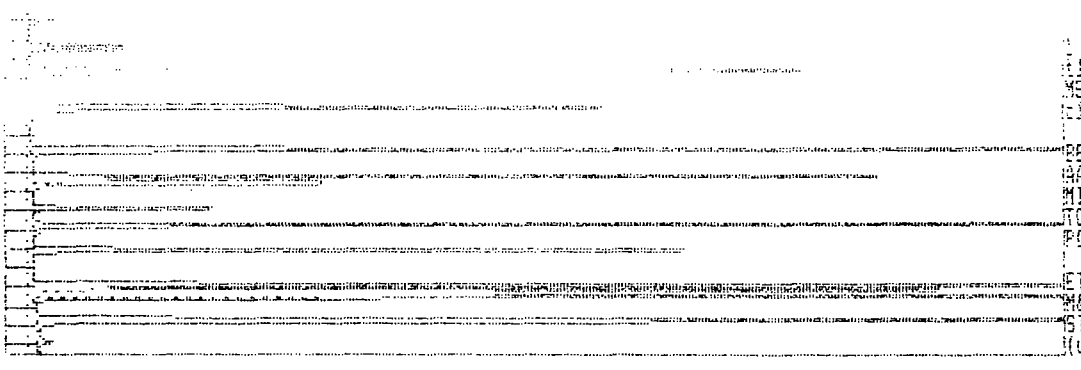
GC #1

50 ug/L

PID

Lab name : ACS FIELD GC #1
Analysis date : 02/13/1996 09:27:58
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x [illegible]
Carrier : Helium
Data file : 2DATA16 [illegible]
Operator : MARK PAIN

-35,000mV



Component	Retention	Height	Area
(known)	10.083	14.134	136.97
ONE	11.266	106.412	878.22
1,1-DCE	11.516	108.798	965.46
tr 1,2-DCE	12.633	786.991	7311.10
MEK	14.133	172.967	2004.78
cl 1,2-DCE	14.533	669.838	7682.69
BENZENE	16.783	1200.278	12823.39
TCE	18.200	843.696	7512.18
AAA-TFT(SURR)	18.533	544.983	5445.33
MIBK	19.833	203.011	1786.39
TOLUENE	20.716	1489.270	11734.68
(unknown)	21.283	7.450	48.34
PCE	22.050	727.979	6189.25
Cl-BENZENE	23.866	1498.837	12990.82
ETHYL BENZENE	24.216	1150.304	11036.00
M&P-XYLENE	24.483	1391.515	13500.37
STYRENE&O-XYLEN	25.716	2139.705	22944.57
(unknown)	26.983	16.847	235.92
(unknown)	27.700	14.042	205.70
(unknown)	28.216	4.451	41.37
20			125473.52

2/13/96

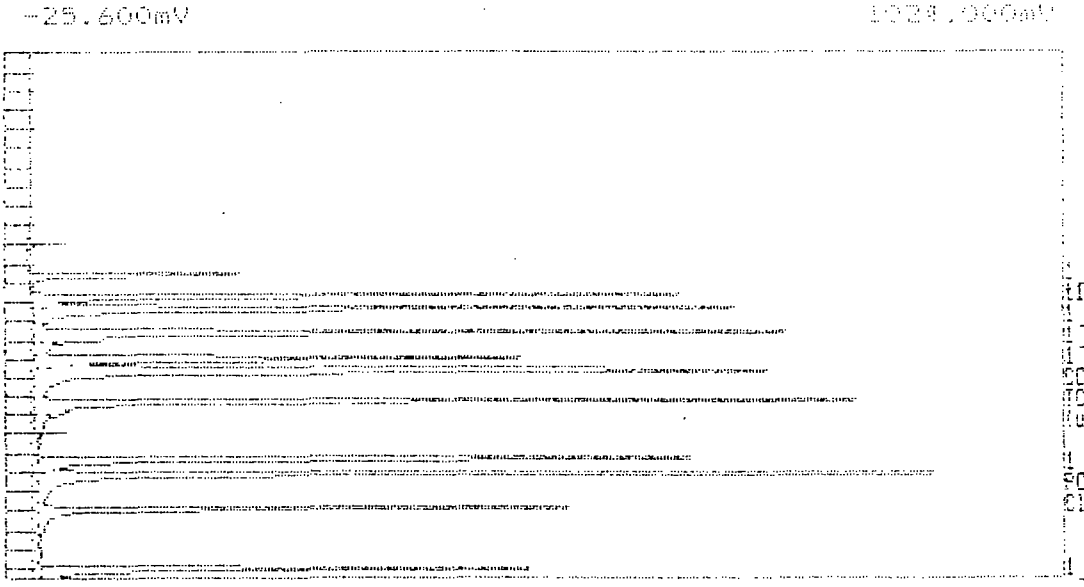
MSP

GC #1

50 ug/L

DELCD

Lab name : ACS FIELD GC #1
Analysis date : 02/13/1996 09:27:58
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 30 M
Carrier : Helium
Data file : 1DATA316.CHR ()
Operator : MARK PAULI



Component	Retention	Area
1_1-DCE	11.566	2755.12
t_1_2-DCE	12.666	8239.71 M
1_1-DCA	13.333	10969.29 M
cI_2-DCE	14.566	11049.02 M
1_2-DCA	14.966	1497.22 M
1_1_1-TCA	15.966	8009.25 M
CCl4	16.683	16024.93 M
TCE	18.216	10916.63 M
(unknown)	18.933	1089.97 M
1_1_2-TCA	21.300	9689.97
PCE	22.083	11252.55
Cl-BENZENE	23.900	6657.31
1_4-DCBA(SURR)	27.033	7436.19

Component	Retention	Height	Area	
1_1-DCE	11.566	257.225	2755.12	
t_1_2-DCE	12.666	672.424	8239.71	M
1_1-DCA	13.333	695.124	10969.29	M
cI_2-DCE	14.566	750.257	11049.02	M
1_2-DCA	14.966	75.075	1497.22	M
1_1_1-TCA	15.966	483.866	8009.25	M
CCl4	16.683	741.115	16024.93	M
TCE	18.216	888.165	10916.63	M
(unknown)	18.933	39.966	1089.97	M
1_1_2-TCA	21.300	877.541	9689.97	
PCE	22.083	887.992	11252.55	
Cl-BENZENE	23.900	539.006	6657.31	
1_4-DCBA(SURR)	27.033	582.935	7436.19	

13 105586.96

2/13/96 MSP

Lab name : ACS FIELD GC #1
Analysis date : 02/13/1996 10:07:10
Method : PURGE AND TRAP
Descriction : PID
Column : MXT-1 0.53mm x 30 M
Carrier : Helium
Data file : 2DATA317.CHR ()
Operator : MARK PAULI

GC #1 PID

BLANK (ICB)

-25.000mV

Component	Retention	Area
ACETONE	11.250	88.73
MEK	14.100	66.13
1,2-DCE	14.500	63.56
BENZENE	16.750	91.27
AAA-TFT(SURR)	18.500	1246.60
MIBK	19.816	104.78
TOLUENE	20.683	506.54
PCE	22.033	242.32
ETHYL BENZENE	24.200	76.43
M&P-XYLENE	24.450	370.77
STYRENE&O-XYLEN	25.683	157.56
(unknown)	26.783	111.43

Component	Retention	Height	Area
ACETONE	11.250	8.224	88.73
MEK	14.100	6.443	66.13
1,2-DCE	14.500	6.000	63.56
BENZENE	16.750	8.611	91.27
TCE	18.166	19.817	150.10
AAA-TFT(SURR)	18.500	132.343	1246.60
MIBK	19.816	11.207	104.78
TOLUENE	20.683	68.246	506.54
PCE	22.033	22.500	242.32
Cl-BENZENE	23.850	3.981	31.26
ETHYL BENZENE	24.200	10.503	76.43
M&P-XYLENE	24.450	47.231	370.77
STYRENE&O-XYLEN	25.683	15.540	157.56
(unknown)	26.783	7.085	111.43
(unknown)	27.666	12.300	191.77
15			3499.26

2/13/96 mvp

Lab name : ACS FIELD GC #1
Analysis date : 02/13/1996 10:07:10
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 30 M
Carrier : Helium
Data file : 1DATA317.CHR ()
Operator : MARK PAULI

GC#1
DELCD

BLANK
(ICB)

-25.600mV 1024.000mV

Component	Retention	Area
TCE	18.216	667.22
(unknown)	18.900	324.96
PCE	22.083	1055.51
1,4-DCBA(SURR)	27.016	3041.35

Component	Retention	Height	Area
-	18.216	66.990	667.22
(unknown)	18.900	33.964	324.96
PCE	22.083	82.768	1055.51
1,4-DCBA(SURR)	27.016	265.501	3041.35
4			5089.04

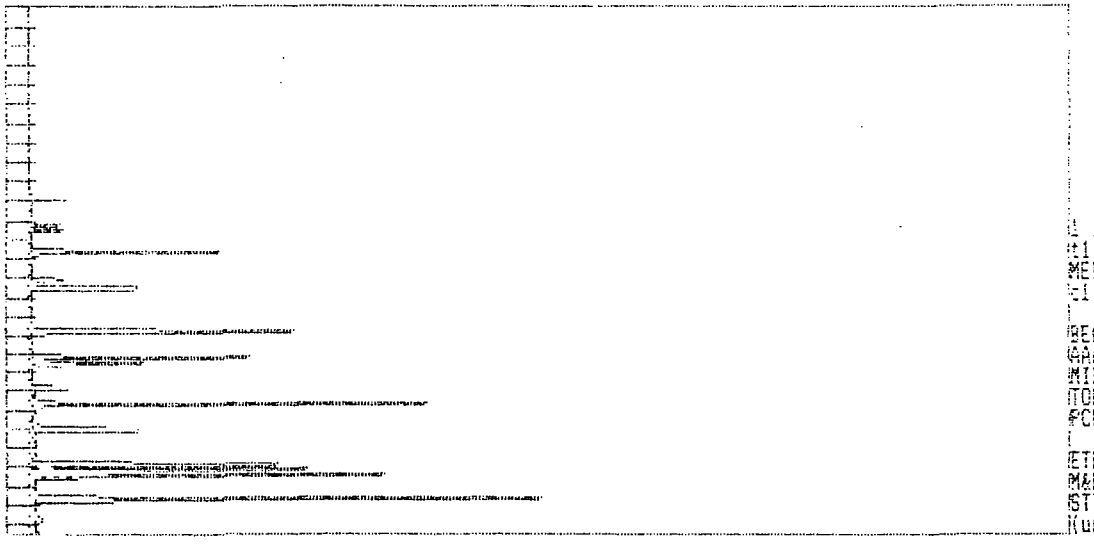
2/13/96 MOP

Lab name : ACS FIELD GC #1
Analysis date : 02/13/1996 10:47:23
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 30 M
Carrier : Helium
Data file : 2DATA318.CHR ()
Operator : MARK PAULI

GC#1
PID

10 ug/L
(ICV)

-25.000mV 1024.000mV



Component	Retention	Area
1,1-DCE	11.516	276.99 M
t1,2-DCE	12.616	1953.58
MEK	14.100	494.92 M
c1,2-DCE	14.516	1822.64 M
BENZENE	16.766	3443.23
AAA-TFT(SURR)	18.516	1325.48
MIBK	19.800	452.72
TOLUENE	20.666	3319.03
PCE	22.016	1714.19
ETHYL BENZENE	24.183	2641.16
M&P-XYLENE	24.450	3407.02
STYRENE&O-XYLEN	25.700	5291.74
(unknown)	26.800	116.94

Component	Retention	Height	Area	
ACETONE	11.250	30.034	254.85	M
1,1-DCE	11.516	32.634	276.99	M
t1,2-DCE	12.616	212.838	1953.58	
MEK	14.100	42.251	494.92	M
c1,2-DCE	14.516	172.121	1822.64	M
BENZENE	16.766	322.756	3443.23	
TCE	18.166	242.706	2105.24	
AAA-TFT(SURR)	18.516	133.475	1325.48	
MIBK	19.800	52.373	452.72	
TOLUENE	20.666	424.881	3319.03	
PCE	22.016	197.832	1714.19	
C1-BENZENE	23.833	348.593	3031.54	
ETHYL BENZENE	24.183	284.352	2641.16	
M&P-XYLENE	24.450	348.827	3407.02	
STYRENE&O-XYLEN	25.700	507.521	5291.74	
(unknown)	26.800	6.517	116.94	
(unknown)	27.700	13.265	207.04	

17 31858.30

2/13/96
MSP

DATA.XLS

Upper Aquifer

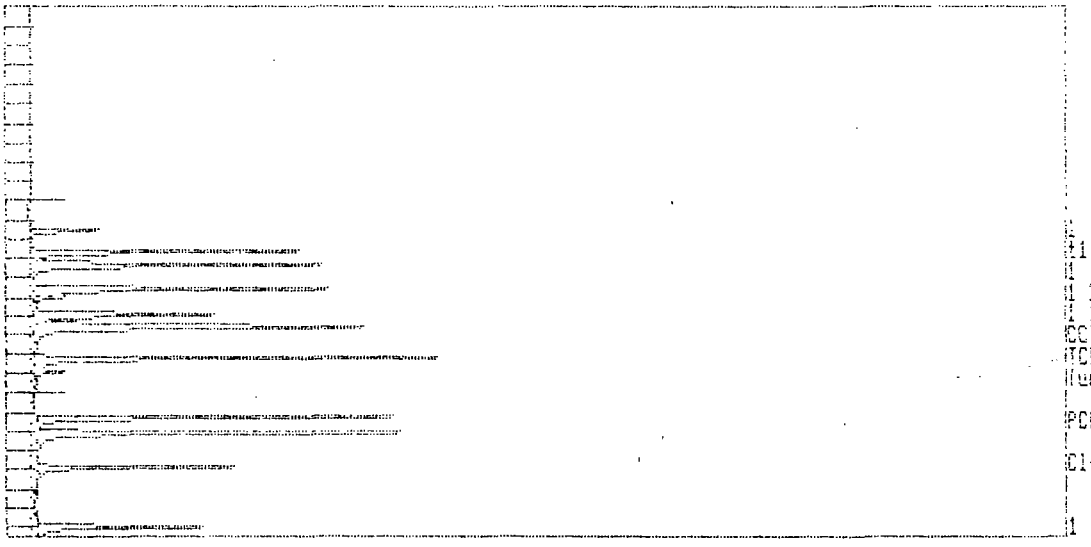
GC#1

DELCD

10 µg/L (ICV)

Lab name : ACS FIELD GC #1
Analysis date : 02/13/1996 10:47:23
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 30 M
Carrier : Helium
Data file : 1DATA318.CHR ()
Operator : MARK PAULI

-25.600mV 1024.000mV



Component	Retention	Area
1 1-DCE	11.566	896.29
t1 2-DCE	12.650	3069.83
1 1-DCA	13.316	4069.36
1 2-DCA	14.950	592.16
1 1 1-TCA	15.950	2843.08
CCl4	16.666	6067.63
TCE	18.200	4456.57
(unknown)	18.900	385.18
PCE	22.050	4321.20
Cl-BENZENE	23.883	2193.36
1 4-DCBA(SURR)	27.016	2688.57

Component	Retention	Height	Area
1 1-DCE	11.566	85.445	896.29
t1 2-DCE	12.650	275.089	3069.83
1 1-DCA	13.316	292.464	4069.36
c1 2-DCE	14.550	320.926	3983.67
1 2-DCA	14.950	37.304	592.16
1 1 1-TCA	15.950	187.809	2843.08
CCl4	16.666	327.645	6067.63
TCE	18.200	408.078	4456.57
(unknown)	18.900	31.288	385.18
1 1 2-TCA	21.266	378.901	3678.00
PCE	22.050	391.165	4321.20
Cl-BENZENE	23.883	202.352	2193.36
1 4-DCBA(SURR)	27.016	241.274	2688.57

13 39244.89

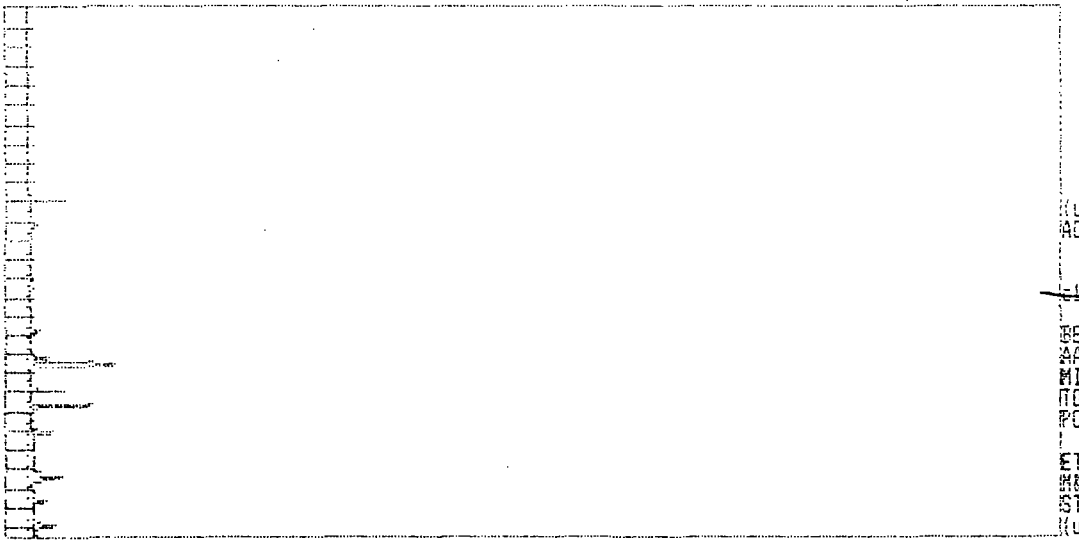
2/13/96 MP

GC#1 VP3 99'

PID

Lab name : ACS FIELD GC #1
Analysis date : 02/13/1996 12:10:21
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 30 M
Carrier : Helium
Data file : 2DATA319.CHR ()
Operator : MARK PAULI

-25.000mV 1024.000mV



Component	Retention	Area
(unknown)	10.083	34.18
ACETONE	11.266	89.98
~~cis 1,2-DCE~~	14.550	41.86
BENZENE	16.783	121.13
AAA-TFT(SURR)	18.550	1277.28
MIBK	19.850	69.12
TOLUENE	20.716	515.81
PCE	22.066	225.86
ETHYL BENZENE	24.216	60.56
M&P-XYLENE	24.483	305.77
STYRENE&O-XYLEN	25.700	139.99
(unknown)	26.983	282.24

Component	Retention	Height	Area
(unknown)	10.083	3.445	34.18
ACETONE	11.266	8.487	89.98 <
~~cis 1,2-DCE~~	14.550	4.231	41.86
BENZENE	16.783	11.749	121.13 <
TCE	18.200	17.258	120.34
AAA-TFT(SURR)	18.550	134.503	1277.28
MIBK	19.850	5.141	69.12 <
TOLUENE	20.716	67.687	515.81 <
PCE	22.066	22.095	225.86
ETHYL BENZENE	24.216	8.568	60.56 <
M&P-XYLENE	24.483	36.360	305.77 <
STYRENE&O-XYLEN	25.700	11.905	139.99 <
(unknown)	26.983	22.826	282.24
(unknown)	27.716	9.718	132.36
(unknown)	28.133	13.347	221.18

15 3637.67

2/13/96 MP

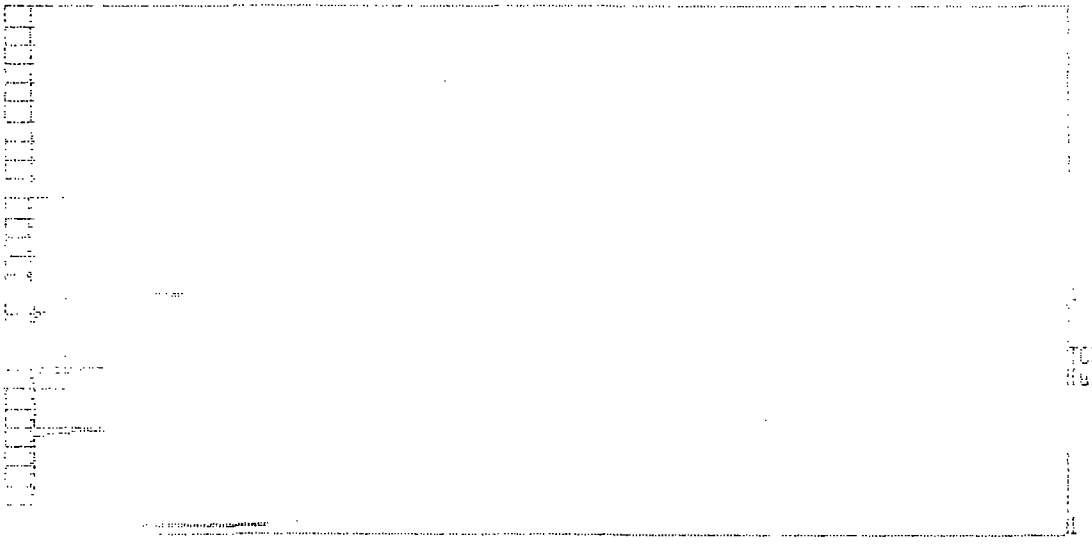
GC#1

VP3 99'

DELCD

Lab name : ACS FIELD GC #1
Analysis date : 02/13/1996 12:10:21
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 30 M
Carrier : Helium
Data file : 1DATA319.CHR ()
Operator : MARK PAULI

-25.600mV 1024.00mV



Component	Retention	Area
1,2-DCE	14.983	2046.08
TCE	18.250	626.85
(unknown)	18.933	990.35
	22.116	1105.51
1 4-DCBA(SURR)	27.066	2812.61

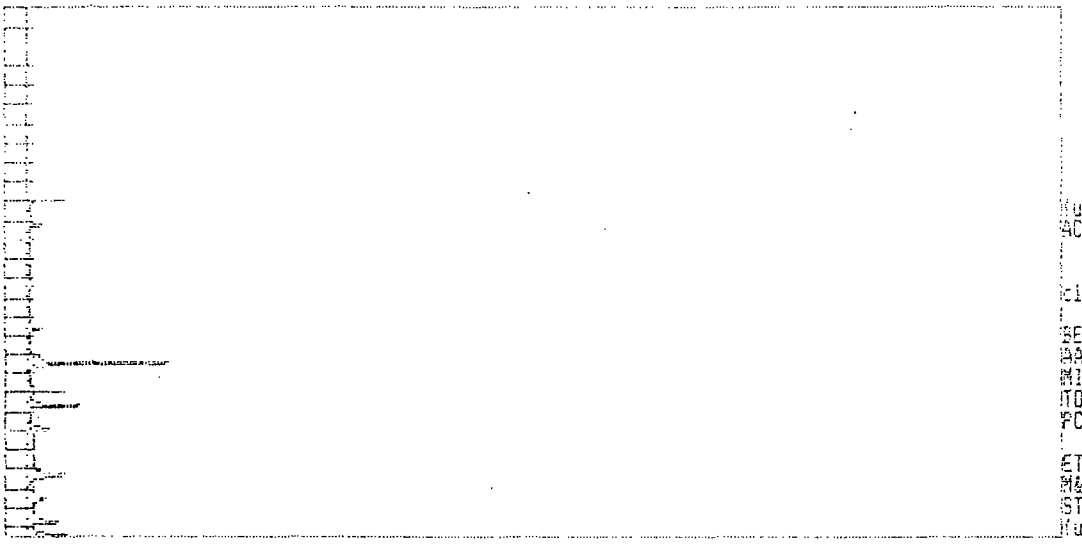
Component	Retention	Height	Area
1,2-DCA	14.983	153.686	2046.08
TCE	18.250	64.827	626.85
(unknown)	18.933	101.557	990.35
PCE	22.116	85.948	1105.51
1 4-DCBA(SURR)	27.066	246.408	2812.61
5			7581.39

2/13/96 MP

GC#1 VP3 99'
PID LAB DUP

Lab name : ACS FIELD GC #1
Analysis date : 02/13/1996 14:26:29
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 30 M
Carrier : Helium
Data file : 2DATA322.CHR ()
Operator : MARK PAULI

-25.000mV 1024.000mV



Component	Retention	Area
(unknown)	10.100	54.81
ACETONE	11.233	152.79
c1 2-DCE	14.433	51.27
BENZENE	16.700	136.23
AAA-TFT(SURR)	18.483	1324.76
MIBK	19.783	54.91
TOLUENE	20.650	563.82
PCE	21.966	271.17
ETHYL BENZENE	24.100	64.46
M&P-XYLENE	24.350	309.38
STYRENE&O-XYLEN	25.533	233.16
(unknown)	26.800	329.41

Component	Retention	Height	Area	
(unknown)	10.100	4.582	54.81	
ACETONE	11.233	13.706	152.79	<
~~c1 2-DCE~~	14.433	5.086	51.27	
BENZENE	16.700	13.445	136.23	<
TCE	18.133	16.901	119.33	
AAA-TFT(SURR)	18.483	136.466	1324.76	
MIBK	19.783	4.754	54.91	<
TOLUENE	20.650	72.715	563.82	<
PCE	21.966	22.804	271.17	
ETHYL BENZENE	24.100	9.256	64.46	<
M&P-XYLENE	24.350	38.594	309.38	<
STYRENE&O-XYLEN	25.533	14.277	233.16	<
(unknown)	26.800	25.231	329.41	
(unknown)	27.550	33.722	500.51	

14 4166.02

2/13/96 MSP

GC#1 VP3 99'

DELCD

LAB DUP

Lab name : ACS FIELD GC #1
Analysis date : 02/13/1996 14:26:29
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 30 M
Carrier : Helium
Data file : 1DATA322.CHR ()
Operator : MARK PAULI

-25.600mV 1024.000mV

Component	Retention	Area
1 2-DCA	14.866	1767.40
TCE	18.166	507.97
(unknown)	18.866	887.78
PCE	22.016	913.64
1 4-DCBA(SURR)	26.866	2655.71

Component	Retention	Height	Area
1 -DCA	14.866	132.828	1767.40
	18.166	51.496	507.97
(unknown)	18.866	88.756	887.78
PCE	22.016	69.073	913.64
1 4-DCBA(SURR)	26.866	229.285	2655.71
5			6732.51

2/13/96 MSP

GC#1

PID

UP3 99'

1/5

Lab name : ACS FIELD GC #1
Analysis date : 02/13/1996 15:09:03
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 30 M
Carrier : Helium
Data file : 2DATA323.CHR ()
Operator : MARK PAULI

-25.000mV

Component	Retention	Area
Unknown)	10.083	35.06
ACETONE	11.250	79.05
c1 2-DCE	14.500	53.93
BENZENE	16.733	100.77
AAA-TFT(SURR)	18.500	1314.07
MIBK	19.783	49.10
TOLUENE	20.666	548.37
PCE	22.016	247.01
ETHYL BENZENE	24.166	67.08
M&P-XYLENE	24.433	360.10
STYRENE&O-XYLEN	25.650	127.83
(unknown)	26.933	126.42

Component	Retention	Height	Area
(known)	10.083	3.639	35.06
A ONE	11.250	7.229	79.05
c_ 2-DCE	14.500	5.317	53.93
BENZENE	16.733	9.794	100.77
TCE	18.150	19.690	142.97
AAA-TFT(SURR)	18.500	137.208	1314.07
MIBK	19.783	3.896	49.10
TOLUENE	20.666	70.969	548.37
PCE	22.016	23.795	247.01
ETHYL BENZENE	24.166	9.482	67.08
M&P-XYLENE	24.433	41.920	360.10
STYRENE&O-XYLEN	25.650	12.188	127.83
(unknown)	26.933	6.624	126.42
(unknown)	27.650	12.207	184.38
14			3436.03

2/13/96 MSP

VP3 99'

1/5

GC #1

DELCD

Lab name : ACS FIELD GC #1
Analysis date : 02/13/1996 15:09:03
Method : PURGE AND TRAP
Descriotion : DELCD
Column : MXT-1 0.53mm x 30 M
Carrier : Helium
Data file : 1DATA323.CHR ()
Operator : MARK PAULI

-25.600mV 1024.000mV

Component	Retention	Area
1 2-DCA	14.933	709.37
PCE	18.200	709.15
(unknown)	18.883	510.86
PCE	22.066	1210.03
1 4-DCBA(SURR)	27.000	3226.99

Component	Retention	Height	Area
1 DCA	14.933	57.458	709.37
1	18.200	71.355	709.15
(unknown)	18.883	52.839	510.86
PCE	22.066	92.361	1210.03
1 4-DCBA(SURR)	27.000	276.491	3226.99
5			6366.40

2/13/96 MSP

GC #1

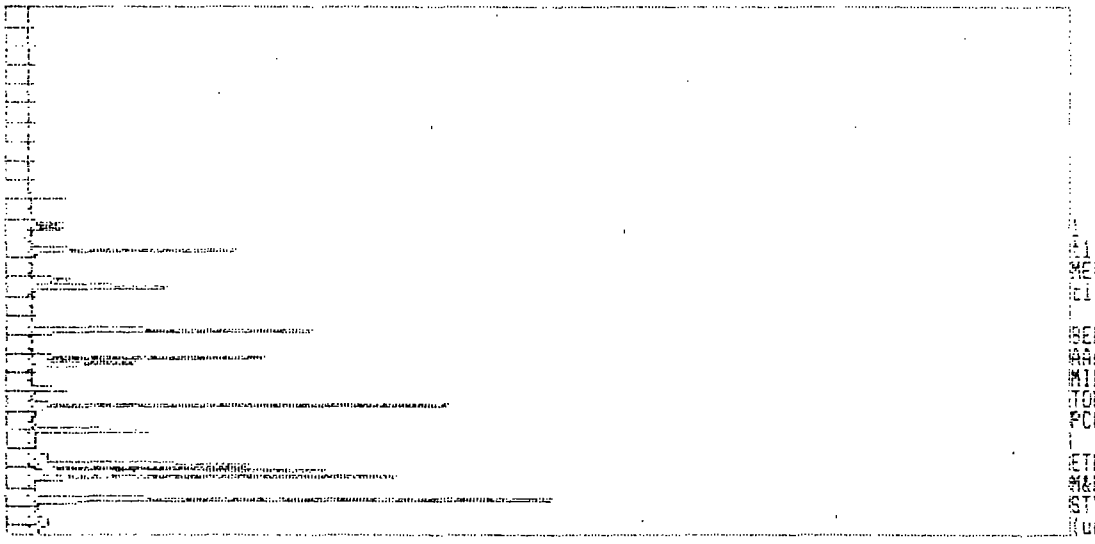
PID

10 ug/L

(CCV)

Lab name : ACS FIELD GC #1
Analysis date : 02/13/1996 17:16:25
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 30 M
Carrier : Helium
Data file : 2DATA326.CHR ()
Operator : MARK PAULI

-25.000mV 1024.000mV



Component	Retention	Area
t 1-DCE	11.316	285.30 M
t1 2-DCE	12.600	2076.32
MEK	14.116	533.27 M
c1 2-DCE	14.533	1935.46 M
BENZENE	16.766	3555.71
AAA-TFT(SURR)	18.516	1349.37
MIBK	19.800	511.66
TOLUENE	20.683	3387.29
PCE	22.016	1750.13
ETHYL BENZENE	24.166	2762.84
M&P-XYLENE	24.433	3572.28
STYRENE&O-XYLEN	25.666	5542.24
(unknown)	27.133	130.34

Component	Retention	Height	Area	
/ TONE	11.250	31.982	267.54	M
t -DCE	11.516	32.909	285.30	M
t1 2-DCE	12.600	222.636	2076.32	
MEK	14.116	45.532	533.27	M
c1 2-DCE	14.533	180.796	1935.46	M
BENZENE	16.766	321.591	3555.71	
TCE	18.183	242.828	2118.15	
AAA-TFT(SURR)	18.516	137.645	1349.37	
MIBK	19.800	54.843	511.66	
TOLUENE	20.683	438.172	3387.29	
PCE	22.016	205.439	1750.13	
(unknown)	23.483	15.256	348.76	
C1-BENZENE	23.833	369.163	3266.18	
ETHYL BENZENE	24.166	293.598	2762.84	
M&P-XYLENE	24.433	371.028	3572.28	
STYRENE&O-XYLEN	25.666	533.150	5542.24	
(unknown)	26.933	11.011	204.53	
(unknown)	27.133	11.913	130.34	
(unknown)	27.650	5.411	65.27	

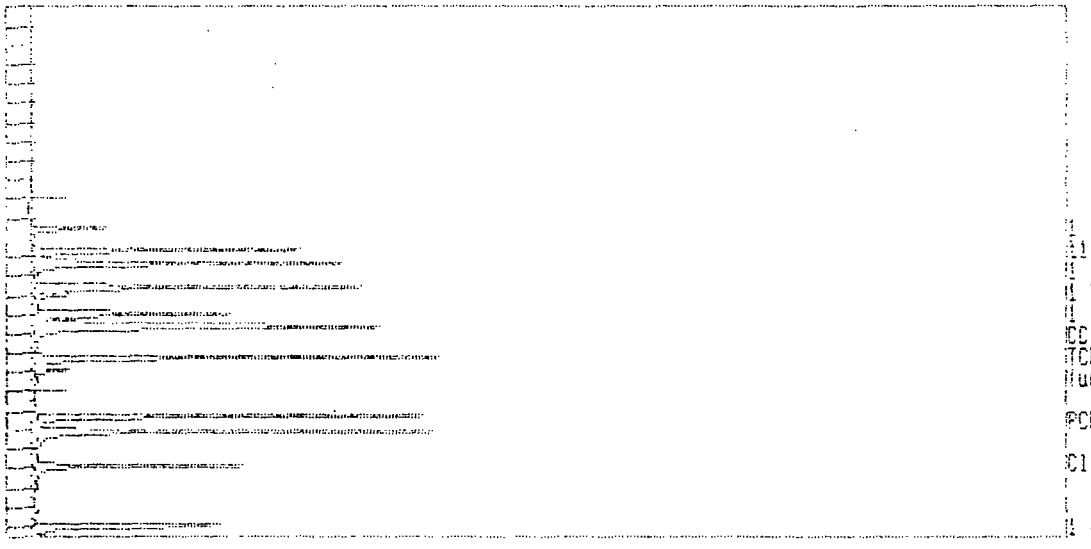
19 33662.60

2/13/96 MAP

GC#1 10 ug/L
DELCD (CCV)

Lab name : ACS FIELD GC #1
Analysis date : 02/13/1996 17:16:25
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 30 M
Carrier : Helium
Data file : 1DATA326.CHR ()
Operator : MARK PAULI

-25.600mV 1024.000mV



Component	Retention	Area
1 1-DCE	11.566	883.80
1 2-DCE	12.650	3303.22
1-DCA	13.333	4381.42
2-DCA	14.966	603.12
1 1 1-TCA	15.950	3049.96
CCl4	16.666	6313.77
TCE	18.216	4612.70
Unknown1	18.900	487.28
PCE	22.066	4614.91
Cl-BENZENE	23.866	2368.89
4-DCBA(SURR)	27.000	3006.61

Component	Retention	Height	Area
1 1-DCE	11.566	89.269	883.80
1 2-DCE	12.650	290.731	3303.22
1 -DCA	13.333	309.933	4381.42
1 2-DCE	14.566	333.967	4206.98
1 2-DCA	14.966	41.078	603.12
1 1 1-TCA	15.950	198.577	3049.96
CCl4	16.666	344.926	6313.77
TCE	18.216	417.124	4612.70
(unknown)	18.900	35.257	487.28
1 1 2-TCA	21.266	412.282	3979.04
PCE	22.066	418.740	4614.91
Cl-BENZENE	23.866	220.490	2368.89
1 4-DCBA(SURR)	27.000	261.754	3006.61
13			41811.70

2/13/96 mp

GC #1

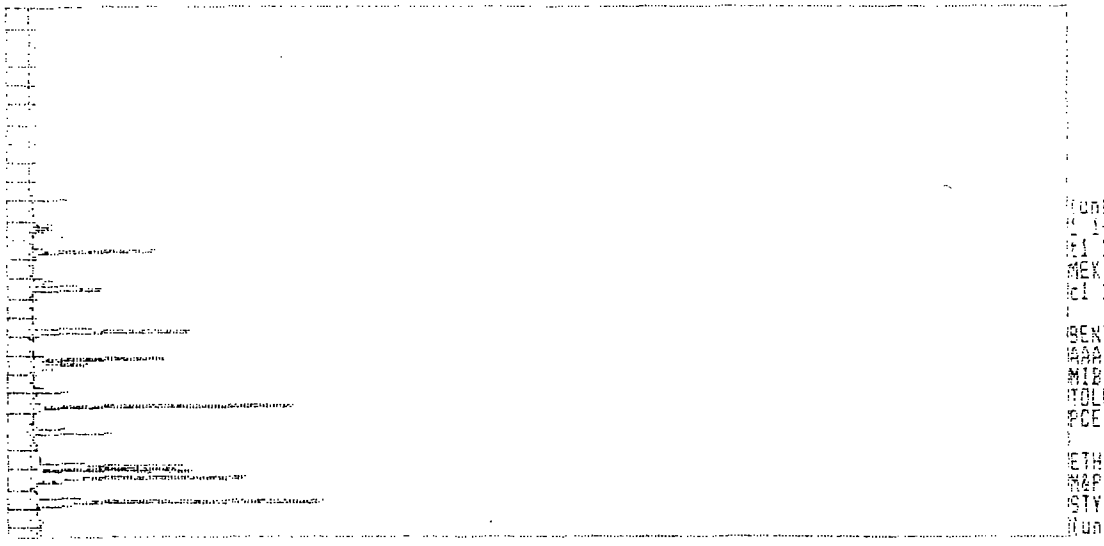
5 ug/L

PID

(DLV)

Lab name : ACS FIELD GC #1
Analysis date : 02/13/1996 17:57:29
Method : PURGE AND TRAP
Description : PID
Column : MXT-1 0.53mm x 30 M
Carrier : Helium
Data file : 2DATA327.CHR ()
Operator : MARK PAULI

-25.000mV 1024.000mV



Component	Retention	Area
(unknown)	10.100	31.06
" 1-DCE	11.533	170.06 M
t1 2-DCE	12.616	1194.59
MEK	14.133	290.94 M
c1 2-DCE	14.533	1069.77 M
BENZENE	16.766	1955.27
AAA-TFT(SURR)	18.516	725.36
MIBK	19.816	305.97
TOLUENE	20.683	2083.12
PCE	22.033	1050.98
ETHYL BENZENE	24.183	1405.30
M&P-XYLENE	24.450	1965.57
STYRENE&O-XYLEN	25.700	3030.88
(unknown)	26.783	51.33

Component	Retention	Height	Area	
(unknown)	10.100	1.992	31.06	
P ONE	11.266	21.399	180.76	M
1 -DCE	11.533	19.586	170.06	M
t1 2-DCE	12.616	131.000	1194.59	
MEK	14.133	24.538	290.94	M
c1 2-DCE	14.533	100.094	1069.77	M
BENZENE	16.766	182.060	1955.27	
TCE	18.183	144.118	1250.36	
AAA-TFT(SURR)	18.516	74.992	725.36	
MIBK	19.816	30.953	305.97	
TOLUENE	20.683	270.245	2083.12	
PCE	22.033	122.553	1050.98	
C1-BENZENE	23.850	189.276	1611.75	
ETHYL BENZENE	24.183	158.769	1405.30	
M&P-XYLENE	24.450	207.134	1965.57	
STYRENE&O-XYLEN	25.700	285.195	3030.88	
(unknown)	26.783	4.802	51.33	
(unknown)	27.683	6.061	80.91	

18 18454.01

2/13/96

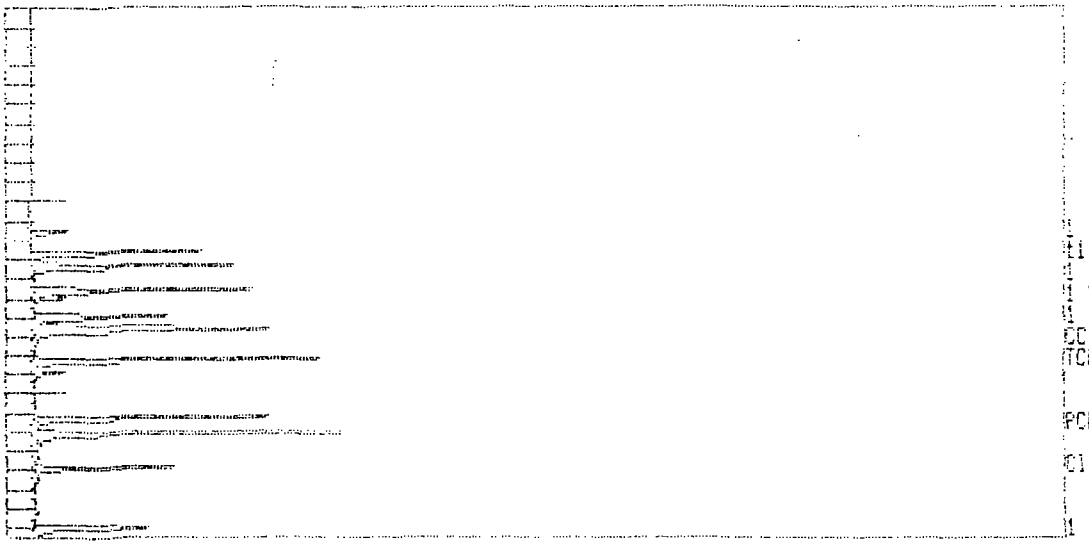
mop

Lab name : ACS FIELD GC #1
Analysis date : 02/13/1996 17:57:29
Method : PURGE AND TRAP
Description : DELCD
Column : MXT-1 0.53mm x 30 M
Carrier : Helium
Data file : 1DATA327.CHR ()
Operator : MARK PAULI

GC#1
DELCO

5 ug/L
(DLV)

-25.600mV 1024.000mV



Component	Retention	Area
1 1-DCE	11.566	526.00
1 2-DCE	12.666	1968.92
1 1-DCA	13.333	2603.55
1 2-DCA	14.966	536.40
1 1 1-TCA	15.966	1586.87
CCl4	16.683	4146.52
TCE	18.216	3139.87
PCE	22.066	3434.01
Cl-BENZENE	23.883	1501.87
1 4-DCBA(SURR)	27.016	1922.72

Component	Retention	Height	Area
1 1-DCE	11.566	53.790	526.00
1 2-DCE	12.666	187.757	1968.92
1 1-DCA	13.333	200.428	2603.55
cis 1 2-DCE	14.566	225.155	2762.79
1 2-DCA	14.966	34.960	536.40
1 1 1-TCA	15.966	134.444	1986.87
CCl4	16.683	237.981	4146.52
TCE	18.216	301.728	3139.87
1 1 2-TCA	21.283	279.827	2618.10
PCE	22.066	312.104	3434.01
Cl-BENZENE	23.883	139.247	1501.87
1 4-DCBA(SURR)	27.016	175.049	1922.72

12 27147.63

2/13/96 MOP

RESULTS OF VENDOR-CONDUCTED TREATABILITY STUDIES

MEMORANDUM

MONTGOMERY WATSON

To:	ACS Technical Committee	**Date:**	September 15, 1995
From:	Phil Heck, Ron Schlicher and Joe Adams	**Reference:**	4077.0120
Subject:	Bench-Scale Treatability Studies		

The results and conclusions from the bench-scale treatability study conducted by the three UV oxidation system vendors are briefly summarized in this memorandum. Recommendations on equipment selection are also provided. The studies were conducted to confirm the ability and performance of advanced oxidation processes (AOPs) for treatment of both low-strength groundwater from the Perimeter Groundwater Containment System (PGCS) and high-strength mixtures of groundwater from the PGCS and source areas. The primary goals of the bench-scale testing were to:

- Demonstrate that AOP technology can remove the contaminants of concern in the groundwater at the ACS Site.
- Identify potential fouling problems of the AOP technology when treating wastes containing high inorganics and metals concentrations such as exist at the ACS Site. This includes defining pretreatment requirements for the source area wastestreams.
- Provide data for sizing of a full scale treatment system.
- Optimize the AOP technology for the specific suite of constituents at the ACS Site. This includes optimization of the hydraulic residence time, oxidant dosage, UV dosage, and lamp replacement frequency.
- Develop accurate O & M requirements and costs from the optimization information.
- Obtain accurate equipment proposals from vendors.

The bench-scale studies were conducted by three equipment vendors; Solarchem (Markam, Ontario), Vulcan Peroxidation Systems, Inc. (Tucson, Arizona), and Zimpro Environmental (Rothchild, Wisconsin). To conduct the testing, samples of groundwater from the PGCS and source areas were collected and shipped to vendors Low-strength groundwater similar to the water expected from the PGCS was collected from the pump test well at the site. Two 55-gallon drums of this water were sent to both Solarchem and Vulcan and ten 1-gallon glass bottles were sent to Zimpro. An additional sample of PGCS water was sent to Montgomery Watson's analytical laboratory for analysis of inorganics, volatile organics, semi-volatile organics and PCBs.

High-strength source area water was collected from both the OFCA and SBP areas using geoprobes. A 50:50 mixture of water collected from the two areas was blended in a

55-gallon drum. An initial sample of the blended mixture was sent to Montgomery Watson's laboratory for analysis of the parameters listed above. After blending and initial sampling, the drum was sealed and the mixture was allowed to sit quiescently for 24 hours, during which time the mixture separated into three layers; a bottom layer of sludge and dense nonaqueous phase material, a middle aqueous layer, and a top layer of low density non-aqueous phase material (oil and grease). The middle aqueous layer was separated from the other two layers by using a peristaltic pump to withdraw liquid from the middle of the drum. Two 5-gallon drums of the aqueous phase were sent to Solarchem, and Vulcan, and two 1-gallon bottles were sent to Zimpro. Additional samples were collected and sent to Montgomery Watson's laboratory for analysis of the parameters listed above.

Groundwater from the PGCS showed only minor contamination. Of the organic compounds detected, benzene was present in the highest concentration (26 ppb) while ethylbenzene and toluene were also present in the 1 to 2 ppb concentration range. All other volatile compounds that were detected were present at levels less than 1 ppb and all semi-volatile compounds were below the detection limit. Iron was the major inorganic contaminant and it caused the water to have a pale yellow-orange color. Iron was present at approximately 13 mg/l. The organic compound concentrations in the PGCS water (particularly benzene) were significantly lower than in previous sampling events of similar water at the ACS Site. Therefore, the vendors were instructed by Montgomery Watson to spike samples of the PGCS water with 10 mg/l of benzene prior to conducting bench testing.

The material collected from the source areas contained a significant concentration of free phase organic material and oil and grease as well as high concentrations of suspended solids and inorganic pollutants as shown in the attached table (Table C-1). The majority of the organic material, O&G and suspended solids were removed in the phase separation process (24 hour settling) along with a significant quantity of the metals (Table C-1). Many of the individual organic compounds that were present at concentrations above their aqueous solubility in the source material were removed to levels significantly below their solubility level after phase separation. Based on the analytical data for the separated and unseparated samples, and the significant removals achieved by phase separation, it can be concluded that most of the individual organic compounds and some of the metals (i.e. cadmium, chromium, copper, lead, nickel and zinc) that were identified in the source area material preferentially partition into either the LNAPL phase, which is itself measured by the oil and grease analysis, or the sludge. The oily material in effect, appeared to "solvent extract" many of the organic compounds from the water. When the oil and grease was removed by phase separation, most of the individual organic compounds were removed as well. The data also indicates that more hydrophobic compounds such as BTEX, naphthalene and PCE were removed to a greater extent than less hydrophobic and more polar compounds such as acetone and 2-butanone. This supports the "solvent extraction" effect, as hydrophobic compounds would be extracted to a greater extent than hydrophilic compounds. The metals that were removed in significant amounts were most likely adsorbed to suspended solids which were removed as sludge. Iron, which was present at a very high concentration was only marginally removed by settling (21% removal), indicating that it was present in a soluble (reduced) form or as an extremely fine colloidal precipitate.

Vendors were instructed to conduct two sets of bench scale tests. The first set of tests were to be performed on samples of the PGCS groundwater. The second set of tests were to be performed on samples of the settled source area groundwater blended with the PGCS water at a 1:4 ratio (1 part source water blended with 4 parts PGCS water). The 1:4 blend was intended to be representative of the mixture that would occur should waters generated from gradual dewatering of the source areas be blended with waters from the PGCS and ONCA during future remediation activities at the site. The vendors were instructed to optimize their

systems around treatment of both samples of water. Following optimization, two of the vendors (Zimpro and Vulcan) were to conduct confirmation runs on both wastestreams and then send both influent and effluent samples to Montgomery Watson's laboratory for analysis. Vendors were also asked to provide alternative treatment strategies for treating the two types of waters (PGCS and the mixture) using advanced oxidation technology if difficulties were encountered in treating either type of water as instructed. Following testing, the vendors were asked to prepare a detailed report of their testing and the results that were obtained. The report was to contain equipment proposals for the equipment necessary to treat both the PGCS water and the mixture as well as chemical dosage rates and expected operations and maintenance costs.

The results from the three vendors are briefly summarized below. The O&M costs in the summary are slightly different than those provided by each vendor. The costs from the vendors have been adjusted so that consistent flowrates and costs for power and chemicals are used to calculate the overall O&M costs for each system.

Zimpro Environmental, Inc. Zimpro failed to complete the testing program required by the contract they received. They did not send initial or final samples to Montgomery Watson's laboratory for testing and were not reimbursed for the work that was performed. They did perform a limited amount of testing on the benzene spiked PGCS water and the mixture of PGCS and source area waters. The Zimpro treatment system was effective in removing benzene from the PGCS water, but was not applicable for treating the mixture. A benzene concentration of 11,644 µg/l in the spiked PGCS water was reduced to 5 µg/l after 20 minutes reaction at a peroxide dose of 15 mg/l and ozone dose of 23 mg/l. For treatment of the PGCS water at a flowrate of 50 gpm the capital cost of a Zimpro - Ultrox system is $150,000 and the operating costs are approximately $1.00/1,000 gallons including chemicals for pH adjustment. Severe fouling problems due to the high iron concentration were anticipated with the mixture and, therefore, it was not tested in the oxidation system. Zimpro did conduct one test on the mixture using Fentons reagent (hydrogen peroxide with a reduced iron catalyst at low pH) and obtained reductions in TOC and benzene concentrations from 82,810 mg/l to 14,200 mg/l and 5,136 mg/l to 3,434 mg/l, respectively after 60 minutes.

Vulcan Peroxidation Systems. The Vulcan system was also able to effectively treat the spiked PGCS water but had trouble treating the mixture. The effectiveness of the Vulcan system on the PGCS water was confirmed by testing of influent and effluent samples by Montgomery Watson. In the spiked PGCS water, a benzene concentration of 10,227 µg/l was reduced in the Vulcan system to <1 µg/l after 30 seconds at a peroxide dose of 100 mg/l and a proprietary catalyst dose of 3 mg/l. COD, O&G and TSS were also partially destroyed in the system. For treatment of the PGCS water at a flowrate of 50 gpm the capital cost of a Vulcan system is $73,000 and the operating costs are approximately $2.04/1,000 gallons including chemicals for pH adjustment.

Severe fouling problems due to the high iron concentration were anticipated with the mixture and pretreatment for removal of iron and suspended solids was required prior to bench testing through the oxidation system. Confirmation samples of the mixture (effluent from oxidation system) were not sent to Montgomery Watson's laboratory for testing, however, an influent sample of the 1:4 blend was submitted for analysis. For the mixture, significant removal of many organic compounds was achieved, but the final levels were above the proposed discharge limits. The difficulty in removing the individual organic compounds was attributed to the high TOC of the water which scavenged hydroxyl radicals and interfered with the treatment process. Vulcan recommended further testing of the mixture, particularly pretreating the source area water prior to blending with the PGCS water, however, they did not have time to complete this work.

Solarchem. As with the other two systems, the Solarchem system was able to effectively treat the spiked PGCS water, however, in an effort to reduce the bench testing costs, confirmation by Montgomery Watson's laboratory was not performed on influent and effluent samples. In addition to testing the PGCS water, Solarchem also performed testing of the mixture and of the source area water itself. Because of the self-cleaning mechanisms contained within the Solarchem system, fouling or other problems associated with treatment of the mixture and source water were not encountered and pretreatment for removal of iron and suspended solids was not required. In fact, Solarchem was able to use the dissolved iron present in the groundwater as a catalyst in the treatment of the PGCS water, the mixture and source water. The process proposed by Solarchem combines the Fentons reagent process with a UV oxidation process. For treatment of the PGCS water at a flowrate of 50 gpm the capital cost of a Solarchem system is $71,000 and the operating costs are approximately $2.72/1,000 gallons including chemicals for pH adjustment.

Solarchem did not recommend blending the source water with the PGCS prior to treatment. The recommended method of treating both the PGCS and source waters would be to treat the source water separately in a pretreatment system prior to blending with the PGCS water. The combined flow would then be treated through a second UV reactor. Pretreatment of the source water would involve heating the water to approximately 130° F, reducing the pH to 3, and adding a high peroxide dose. The reduced iron present in the water would catalyze the Fentons reaction while at the same time the water would be circulated through a UV oxidation reactor. For treatment of the source water at a flowrate of 13 gpm the capital cost of a system is $92,000 and the operating costs are approximately $19.00/1,000 gallons including chemicals for pH adjustment and steam for heating the influent stream from 50 to 130° F. The actual operating costs may be somewhat lower if heat from the effluent stream can be used to preheat the influent stream. Following pretreatment, water would be mixed with low-strength water and would be treated through the system described in the previous paragraph. The total capital cost for treating both waters would be $163,000.

Recommended System. Solarchem is the recommended vendor for supplying a UV oxidation system for treatment of groundwater at the ACS Site. Even though the Solarchem system has a higher expected O&M costs for treatment of the PGCS water than the other two systems that were tested, it has several advantages due to the complex nature of the groundwater at the site. The major water quality complexity driving the selection of the oxidation unit is the high dissolved iron concentration in the groundwater at the site. The advantages of the Solarchem system in regard to iron concentration at the site include the following:

- The Solarchem system has a self cleaning mechanism consisting of automatic wipers for the UV lamps. The other two systems do not have this feature. This cleaning system prevents the buildup of iron deposits (rust) on the lamps. These deposits, if not frequently removed, block light transmission to the fluid and organic contaminants and thus reduce treatment efficiency. Without this automatic cleaning system, frequent shutdown and manual cleaning or lamp replacement would be necessary or the iron in the water would have to be removed to an acceptable level prior to the oxidation process (discussed below).

- For the reasons presented above, the Ultrox and Vulcan systems would require the removal of iron to less than 5 mg/l even when treating only PGCS water. This would require the metals removal system to be located before the oxidation system, which would complicate design and operation of the system because of the VOCs present in the water. If located before the oxidation system, the metals removal system would have to

be enclosed and vented which would interfere with operator access and process control. Locating the metals removal system after the oxidation system would allow the system to be open to the building atmosphere and would ensure that the sludge produced in the metals removal process would be free of volatile organic compounds. A "clean" sludge would make sludge handling less complicated particularly in regard operator exposure and ventilation of sludge dewatering and storage systems.

- In the metals removal process, hydrogen peroxide would have to be added to the metals removal system influent to oxidize reduced iron into the insoluble oxidized form. Locating the oxidation system before the metals removal system would allow the reduced iron to be oxidized to an insoluble form in the oxidation system before entering the metals removal process. The cost of the peroxide required for iron oxidation is not included in the O&M costs for the Ultrox and Vulcan systems, while it is included in the Solarchem costs since the hydrogen peroxide required to oxidize both the organics and the dissolved iron would be added in the Solarchem process. Therefore, the costs associated with the Ultrox and Vulcan systems would actually be closer to the costs for the Solarchem system if the costs for the peroxide necessary for iron oxidation were added the peroxide costs for the Ultrox and Vulcan systems.

- For treatment of the source area waters, Solarchem clearly has the best approach and treatment equipment. The other two vendors were not able to handle the high iron and organic content of the water. One of the two vendors even indicated in a phone conversation that the Solarchem system would be the best oxidation system for treating the source waters because of the high iron concentration. Since the system that would be initially installed would treat primarily PGCS water with the intention of future expansion to treat source area waters, the Solarchem system would be the obvious choice. In addition to the technical advantages the Solarchem system offers, the service and responsiveness of their sales and technical personnel was far superior than either of the other two vendors.

Because the source water (OFCA and SBP) quality is extremely variable, the water is difficult to treat, and because effluent samples of treated OFCA and SBP water from Solarchem were not sent to Montgomery Watson's laboratory for analysis, independent confirmation of the effectiveness of UV oxidation on the source water has not yet been obtained. Therefore, further treatability studies on the source water are recommended prior to final selection of a pretreatment system. These studies could be carried out most effectively after the PGCS treatment system is operational and after some of the source area dewatering wells are installed. With the PGCS treatment system on-line, a large volume of source area water (several thousand gallons) could be extracted from the dewatering wells, passed through the phase separator and stored in the pretreatment equalization tank. The actual quality of the source water could then be more accurately characterized and a pilot oxidation system could be used to conduct studies on the water. With better water quality characterization data and treatment process optimization data, the need for a pretreatment system and, if needed, the design of a system could be more accurately assessed.

TABLE C-1

BENCH-SCALE TESTING
REMOVAL OF CONTAMINANTS FROM HIGH-STRENGTH GROUNDWATER BY PHASE SEPARATION
(1 of 2)

Constituent	Units	Source Stream: 50:50 SBP:Offsite, raw	Source Stream: 50:50 SBP:OffSite, separated	Aqueous Solubility	% Removal By Phase Separation
Water Quality Parameters					
pH	Std Unit	6.32	5.81		
Dissolved oxygen	mg/l	NA	NA		
Temperature	degree C	NA	NA		
Specific conductance	µmHos/cm	NA	NA		
Hardness, total	mg/l-CaCO3	NA	NA		
Residue, diss (TDS)	mg/l	NA	NA		
Residue, susp (TSS)	mg/l	12400	391		96.847
Alkalinity, total	mg/l-CaCO3	NA	NA		
BOD (a)	mg/l	8370	14,700		-75.627
COD	mg/l	79500	26,000		67.296
Carbon (TOC)	mg/l	NA	NA		
Oil and grease	mg/l	30200	74		99.755
Anions					
Chloride	mg/l	NA	NA		
Nitrogen, TKN	mg/l as N	NA	NA		
Phosphorus, total	mg/l as P	NA	NA		
Sulfate	mg/l	NA	NA		
Cations					
Antimony	mg/l	NA	NA		
Arsenic	mg/l	0.046	0.028		39.130
Cadmium	mg/l	0.96	0.543		43.614
Calcium	mg/l	NA	NA		
Chromium, total	mg/l	2.23	0.05		97.758
Copper	mg/l	5.61	0.27		95.187
Iron	mg/l	489.00	386.00		21.063
Lead	mg/l	9.6100	0.1050		98.907
Magnesium	mg/l	NA	NA		
Manganese	mg/l	NA	NA		
Mercury	mg/l	NA	NA		
Nickel	mg/l	2.09	0.78		62.679
Potassium	mg/l	NA	NA		
Selenium	mg/l	NA	NA		
Sodium	mg/l	NA	NA		
Thallium	mg/l	NA	NA		
Zinc	mg/l	33.10	19.00		42.598

TABLE C-1

BENCH-SCALE TESTING
REMOVAL OF CONTAMINANTS FROM HIGH-STRENGTH GROUNDWATER
BY PHASE SEPARATION
(2 of 2)

Constituent	Units	Source Stream: 50:50 SBP:Offsite, raw	Source Stream: 50:50 SBP:OffSite, separated	Aqueous Solubility	% Removal
Organics					
Acetone (b)	µg/l	1,710,000	241,000	misc	85.906
Benzene	µg/l	9,640,000	7,150	1,791,000	99.926
bis(2-Chloroethyl)ether	µg/l	ND	ND		
bis(2-Ethylhexyl)phthalate	µg/l	320,000	120		99.963
2-Butanone	µg/l	974,000	272,000	239,000	72.074
Butyl benzyl phthalate	µg/l	27,000	10		99.963
Chloroethane	µg/l	*	230	5,740,000	*
Chloromethane	µg/l	*	1,940	6,500,000	*
4-Chloro-3-methyphenol	µg/l	ND	ND		
1,2-Dichlorobenzene	µg/l	569,000	10	156,000	99.998
1,1-Dichloroethane	µg/l	7,130,000	74,200	5,060,000	98.959
1,2-Dichloroethane	µg/l	*	909	8,524,000	
1,1-Dichloroethene	µg/l	168,000	80		99.952
1,2-Dichloroethene-cis	µg/l	359,000	451	3,500,000	99.874
1,2-Dichloroethene-trans	µg/l	358,000	20		99.994
1,2-Dichloropropane	µg/l	ND	ND		
Diethyl phthalate	µg/l	*	40		
2,4-Dimethylphenol	µg/l	ND	ND		
Dimethyl phthalate	µg/l	*	380		
Di-n-butyl phthalate	µg/l	65,000	10		99.985
Ethylbenzene	µg/l	6,200,000	664	206,000	99.989
Isophorone	µg/l	77,000	10		99.987
Methylene chloride	µg/l	936,000	22,000	13,000,000	97.650
4-Methyl-2-pentanone	µg/l	2,900,000	29,600	19,100,000	98.979
4-Methylphenol	µg/l	ND	ND		
Naphthalene	µg/l	2,410,000	38	34,400	99.998
2-Nitrophenol	µg/l	ND	ND		
Phenol	µg/l	ND	ND		
Tetrachloroethene	µg/l	35,200,000	2,450	150,300	99.993
Tetrahydrofuran	µg/l	ND	ND		
Toluene	µg/l	31,400,000	22,600	534,800	99.928
1,1,1-Trichloroethane	µg/l	14,600,000	16,500	1,495,000	99.887
Trichloroethene	µg/l	7,650,000	3,670	1,000,000	99.952
Trichlorofluoromethane	µg/l	128,000	34	1,100,000	99.973
Vinyl chloride	µg/l	25,800	80	60,000	99.690
Xylenes, total (c)	µg/l	35,000,000	1,400	175,000	99.996

(a) Increase in BOD likely due to removal of inhibitory compounds during phase separation.

(b) Miscible with water.

(c) Solubility listed is for the most soluble isomer (*ortho*).

* - Not detected in influent, probably due to interference by other organic compounds.

NA - Not Analyzed

ND - Not Detected

SCHEDULE A

SCOPE OF SERVICES

1. PROJECT DESCRIPTION

The scope of work to be provided by SELLER includes all necessary professional services for the following:

The SELLER will conduct bench scale treatability studies on two groundwater samples to evaluate the effectiveness of Advanced Oxidation processes for removal of organic constituents from the groundwater. The SELLER will use the results of the tests to select a full scale treatment system and estimate its performance and operating costs.

2. SERVICES INCLUDED

The professional services provided by the SELLER for the above described project shall include the following tasks:

2.1 GROUNDWATER SAMPLES: The SELLER shall maintain the groundwater samples in a manner that insures minimal loss of any existing contamination prior to its actual use in the experiments. The groundwater samples will be shipped to the SELLER by Montgomery Watson.

2.2 CONDUCT OF LABORATORY EXPERIMENTS: The SELLER shall conduct two complete sets of laboratory experiments on two different groundwater samples. The first set of experiments shall be conducted on low strength groundwater (referred to as PGCS). The second set of experiments shall be conducted on a mixture of 4 parts low strength groundwater and 1 part high strength groundwater from the source areas. The SELLER shall blend the respective groundwaters immediately prior to conducting the second set of experiments.

During each set of experiments the SELLER shall monitor the results of the experiments as necessary to allow selection and optimization of the treatment process. The selected treatment process should have the capability of treating both wastestreams at the following flow conditions: minimum—20 gpm, normal—50 gpm, maximum—70 gpm. The treatment system that is selected must be able to treat either wastestream to the limits contained in Table 1.

For each wastestream, two confirmation runs shall be conducted using the optimum treatment conditions as determined above. The SELLER shall collect a single representative influent sample of each wastestream prior to conducting the two confirmation runs with each wastestream. The SELLER shall also collect a final effluent sample from each of the two runs with each wastestream. Influent and final effluent samples shall be shipped to:

Montgomery Watson Analytical Testing Services
One Science Court
P.O. Box 5385
Madison, Wisconsin 53705-0385

Following testing, the Contractor shall properly dispose of all treated and excess untreated water according to all applicable local, state, and federal regulations.

2.3 REPORT OF RESULTS. A report of the testing results shall be completed by the SELLER. The report shall include the following:

- an assessment of the treatment of the optimum process and operating conditions
- a fixed price quotation for the proposed system
- a statement of the performance guarantee and warranty for the system
- an estimate of the operating costs including power, oxidant usage, and lamp replacement
- an estimate of the pretreatment requirements for the influent groundwater and an estimate of potential fouling problems with the treatment system
- a schematic flow diagram of the system
- an estimate of physical dimensions and dry weight
- a firm delivery schedule, subject to confirmation at time of order.

3. SCHEDULE

The project will commence upon execution of this contract and be completed by July 20, 1995. The project milestones are:

Final Report	July 20, 1995

TABLE 1

PROPOSED EFFLUENT GOALS FOR DISCHARGE OF TREATED GROUNDWATER AMERICAN CHEMICAL SERVICE, INC., NPL SITE

(1 of 3)

Constituent	Units	Recommended Effluent Goal: Discharge to Wetlands
Water Quality Parameters		
pH	Std Unit	6 - 9
Dissolved oxygen	mg/l	5
Temperature	degree C	
Specific conductance	µmHos/cm	1,200
Hardness, total	mg/l-CaCO3	
Total Dissolved Solids	mg/l	750
Total Suspended Solids	mg/l	
Alkalinity, total	mg/l-CaCO3	
Biochemical Oxygen Demand	mg/l	
Chemical Oxygen Demand	mg/l	
Total Organic Carbon	mg/l	
Oil and grease	mg/l	
Anions		
Chloride	mg/l	230
Nitrogen, TKN	mg/l as N	
Phosphorus, total	mg/l as P	
Sulfate(a)	mg/l	250
Ammonia Nitrogen	mg/l as N	
Nitrate-Nitrite Nitrogen	mg/l as N	
Cations		
Antimony	mg/l	45
Arsenic	mg/l	0.05
Beryllium	mg/l	0.004
Cadmium	mg/l	0.005
Calcium	mg/l	
Chromium (III)		1
Chromium (VI)	mg/l	0.011
Copper	mg/l	0.06
Iron	mg/l	0.3
Lead	mg/l	0.04
Magnesium	mg/l	
Manganese	mg/l	0.2
Mercury	mg/l	0.002
Nickel	mg/l	0.79
Potassium	mg/l	

TABLE 1

PROPOSED EFFLUENT GOALS FOR DISCHARGE OF TREATED GROUNDWATER AMERICAN CHEMICAL SERVICE, INC., NPL SITE

(2 of 3)

Constituent	Units	Recommended Effluent Goal: Discharge to Wetlands
Selenium	mg/l	0.035
Sodium	mg/l	
Thallium	mg/l	0.048
Zinc	mg/l	0.53
Organics		
Acetone	µg/l	700,000
Benzene	µg/l	29
bis(2-Chloroethyl)ether	µg/l	14
bis(2-Ethylhexyl)phthalate	µg/l	49
2-Butanone	µg/l	7,156
Butyl benzyl phthalate	µg/l	3,400
Chloroethane	µg/l	70,000,000
Chloromethane	µg/l	157 (g)
4-Chloro-3-methyphenol	µg/l	4
1,2-Dichlorobenzene	µg/l	2,600
1,4-Dichlorobenzene	µg/l	2,600
1,1-Dichloroethane	µg/l	700,000
1,2-Dichloroethane	µg/l	556
1,1-Dichloroethene	µg/l	79
1,2-Dichloroethene-cis	µg/l	70
1,2-Dichloroethene-trans	µg/l	100
1,2-Dichloroethene (total)	µg/l	
1,2-Dichloropropane	µg/l	116
Diethyl phthalate	µg/l	71
2,4-Dimethylphenol	µg/l	5
Dimethyl phthalate	µg/l	73
Di-n-butyl phthalate	µg/l	4
Ethylbenzene	µg/l	34
Isophorone	µg/l	267
Methylene chloride	µg/l	498
4-Methyl-2-pentanone	µg/l	136
4-Methylphenol	µg/l	34
Naphthalene	µg/l	15
2-Nitrophenol	µg/l	149
Pentachlorophenol	µg/l	3.83
Phenol	µg/l	40
PCBs	µg/l	0.008

TABLE 1

PROPOSED EFFLUENT GOALS FOR DISCHARGE OF TREATED GROUNDWATER AMERICAN CHEMICAL SERVICE, INC., NPL SITE

(3 of 3)

Constituent	Units	*Recommended Effluent Goal* Discharge to Wetlands
Tetrachloroethene	µg/l	24
Tetrahydrofuran	µg/l	4,800
Toluene	µg/l	52
1,1,1-Trichloroethane	µg/l	89
Trichloroethene	µg/l	189
Trichlorofluoromethane	µg/l	30,000
Vinyl chloride	µg/l	5,246
Xylenes, p	µg/l	12
Xylenes, m	µg/l	37
Xylenes-m,p (total)	µg/l	

BENCH SCALE TREATABILITY STUDIES

VENDOR REPORT

ULTROX Division of Zimpro Environmental, Inc.

July, 1995

ULTROX

A Division of Zimpro Environmental, Inc.

7755 Center Avenue, Ste. 1119
Huntington Beach, CA 92647
Phone: (714) 545-5557
Fax: (714) 557-5396

FROM: Bill Himebaugh PROJECT NUMBER:

DATE: July 28, 1995

TOTAL PAGES: 23

FAX TRANSMITTAL

TO: Phil Heck

COMPANY: Montgomery Watson

LOCATION: Salt Lake City, UT

FAX NUMBER: (801) 272-0430

MESSAGE: Please see attached.

If you have any problems with this fax message, please call (714) 545-5557.

ULTROX

A Division of Zimpro Environmental, Inc.

7755 Center Avenue, Ste. 1119
Huntington Beach, CA 92647
Phone: (714) 545-5557
Fax: (714) 557-5396

July 28, 1995

Mr. Phil Heck
Montgomery Watson
4525 South Wasatch Blvd., Ste. 200
Salt Lake City, UT 84124

Dear Mr. Heck:

Please find attached a report of our findings based upon the completion of two oxidation tests on the low concentration groundwater and one test of the combined high concentration groundwater.

Due to an internal communications error on the part of Ultrox division of Zimpro Environmental, samples were not sent to the Montgomery Watson Analytical Testing Services Laboratory in Madison, Wisconsin for analysis. While we received a contract to conduct these tests, the contractual requirements were not communicated to the Ultrox laboratory and therefore samples were not submitted. Because this error was entirely the fault of Ultrox division of Zimpro, and we never returned the signed contract to Montgomery Watson, we will not invoice Montgomery Watson for the costs indicated in the contract.

Ultrox performed benzene analyses on the untreated samples and on some of the treated samples. Fortunately, sufficient data was provided by the single UV/Oxidation test of the low concentration groundwater to be able to offer a full scale system price. Therefore, we humbly submit this report with our sincerest appologies for this error in performing our obligations to Montgomery Watson. Rest assured, this situation has been brought to the attention of the hierarchy of Zimpro Environmental, and measures have been implemented to assure that this problem will not be repeated.

We appreciate your patience and understanding. Should you have any questions, please give me a call.

Sincerely,

William S. Himebaugh
Sales Manager - Ultrox

ULTROX

A Division of Zimpro Environmental, Inc.

7755 Center Avenue, Ste. 1119
Huntington Beach, CA 92647
Phone: (714) 545-5557
Fax: (714) 557-5396

ULTROX DIVISION OF ZIMPRO ENVIRONMENTAL, INC.

LABORATORY TREATABILITY STUDY REPORT

FOR

MONTGOMERY WATSON AMERICAS, INCORPORATED SALT LAKE CITY, UTAH

An Evaluation of
Ultrox® UV/Oxidation of
Groundwater from the
American Chemical Services Site

Submitted by:

William S. Himebaugh
Ultrox Division of Zimpro Environmental, Inc.
July 27, 1995

TABLE OF CONTENTS

1.0 INTRODUCTION 1

2.0 TECHNOLOGY DESCRIPTION 1
2.1 Treatabiity Study Objectives 3

3.0 EXPERIMENTAL PROCEDURES 4
3.1 Materials 4
3.2 Sample Handling 4
3.3 Preparation and Calibration Procedures 5
3.4 Oxidation Test Procedures 7
3.5 Analytical Procedures 7

4.0 RESULTS AND CONCLUSIONS 8

5.0 COMMERCIAL 9
5.1 Design Assumptions 9
5.2 Cost Assumptions 9
5.3 System Equipment 9
5.4 Estimated System Capital Cost 10
5.5 Estimated Operating Costs 10
5.6 Estimated Maintenance Costs 11

APPENDIX 12
Results
Terms & Conditions

1.0 INTRODUCTION

Montgomery Watson Americas, Inc. (Montgomery Watson) provided Ultrox division of Zimpro Environmental, Inc. sample groundwater from two wells at the American Chemical Services site to conduct a laboratory treatability study. The two groundwater samples can be characterized containing the primary contaminants benzene and tetrahydrofuran (THF). The groundwater from the low concentration well was spiked with benzene to achieve the more representative concentration of 10 mg/l. The concentrated groundwater sample was not spiked and had a total organic carbon concentration of 82,810 mg/l.

The scope of work for the treatability study included a series of two oxidation tests per water sample; one where dosages of ultraviolet (UV) light, ozone (O_3) and hydrogen peroxide (H_2O_2) were examined and the other where Fenton Reagent was evaluated. However, only the Fenton Reagent was applied for the concentrated groundwater.

The objective was to determine the most cost effective treatment approach in reducing the primary contaminants - Benzene and THF in the groundwaters. In total, Ultrox performed three (3) oxidation tests - two on the low concentration groundwater and one on the concentrated.

2.0 TECHNOLOGY DESCRIPTION

The Ultrox® technology is an Advanced Oxidation Process (AOP) which utilizes ozone (O_3), hydrogen peroxide (H_2O_2), and ultraviolet light (UV) to destroy organic compounds in water. This process has the distinct advantage of on-site destruction of organic compounds. This is in contrast to other treatment methods such as granular activated carbon adsorption (GAC), where compounds are captured and transferred to disposal sites, or air stripping, which merely transforms the problem compounds from the water phase to the vapor phase. Compounds are attacked by the chemical oxidants alone and by free radicals which are produced by combining ozone with hydrogen peroxide and/or with UV. The oxidation strength of these species is detailed in comparison to others in Table 1. The ultimate result of this destruction is carbon dioxide, water and, in the case of chlorinated compounds, salts. Because different compounds in various wastewaters oxidize with varying efficiencies,

Ultrox Confidential Business Information
Copyright 1995, Ultrox. All Rights Reserved.

(depending upon oxidant dosages, combinations, and UV exposure times) laboratory treatability studies are conducted to optimize these conditions.

The Ultrox® UV/Oxidation system consists of a UV treatment tank containing highly efficient UV lamps. Hydrogen peroxide is water soluble and is metered into the treatment tank influent line. Ozone is produced on site from air and diffused into the UV treatment tank through spargers located in the bottom of the tank. Any residual ozone or VOCs which may collect in the vapor area within the UV treatment tank are destroyed by the D-TOX™/Decompozon™ catalytic air treatment unit. The result is water meeting discharge requirements without toxic byproducts or air emissions. What is more, the operating and maintenance costs are typically significantly lower than GAC or other UV/Oxidation technologies which utilize high intensity UV lamps.

In some cases where organic concentrations exceed 1,000 mg/l, a Fenton reagent may be applied. This method involves the addition of H_2O_2 with iron sulfate with a controlled pH. While this method results in an oxidized iron byproduct, it is effective in destroying higher concentrations than conventional advanced oxidation.

Ultrox Confidential Business Information
Copyright 1995, Ultrox. All Rights Reserved.

TABLE 1

Relative Oxidation Potential (C12 = 1.0)	Species	Oxidation Potential (Volts)
2.23	fluorine	3.03
2.06	hydroxyl radical	2.80
1.78	atomic oxygen (single)	2.42
1.52	ozone	2.07
1.31	hydrogen peroxide	1.78
1.25	perhydroxyl radical	1.70
1.24	permanganate	1.68
1.15	chlorine dioxide	1.57
1.07	hypoiodous acid	1.45
1.00	chlorine	1.36
0.80	bromine	1.09
0.39	iodine	0.54

3.1 Objectives

The objectives were as follows:

- To determine the effectiveness of UV/Oxidation as an alternative for reducing the benzene concentration from 10 mg/l to less than 29 μg with a THF concentration of 3.8 mg/l present;

- To determine the required dosage of ozone and UV light required to reduce the benzene concentration to below 29 μg/l;

- To obtain information necessary to determine equipment, materials, and utility requirements for a full-scale treatment UV/Oxidation system capable of reducing the benzene to below 29 μg/l at flow rates of 20 gpm, 50 gpm and 70 gpm..

Ultrox Confidential Business Information
Copyright 1995, Ultrox. All Rights Reserved.

3.0 EXPERIMENTAL PROCEDURES

3.1 Materials

The bench scale test included the following equipment and materials:

- An Ultrox• bench-scale batch reactor
- An Ultrox• UV radiation lamp
- A 2 lb/day O_3 generator
- 35% H_2O_2 Solution
- Sulfuric Acid Solution (2N)
- Ferrous Sulfate

The Ultrox• bench-scale batch reactor (Figure 1) is a cylindrical, glass vessel with a capacity of 2.4 liters (l). The UV radiation was provided by an Ultrox• UV lamp located inside a quartz sheath which was positioned in the center of the bench-scale reactor. The magnetic stirrer was turned on and remained active throughout the tests to simulate flow dynamics of a full scale system. Ozone was generated by a 2 pound/day Model GL-1 PCI ozone generator. Ozone was introduced as a mixture of 2% ozone in oxygen using a coarse frit gas dispersion tube (sparger) at the bottom of the reactor. All hydrogen peroxide was added at the beginning of the test by a pipette.

3.2 Sample Handling

Ten 1-gallon containers labeled ACS-PGCS-01-Z and two 1-gallon containers labeled ACS-SBP/OFCA-01-Z were received at the Ultrox division laboratory on June 20, 1995. The samples were contained in glass bottles which had been packed in ice and shipped in three coolers. Upon receipt, Ultrox laboratory personnel transferred the sample bottles from the coolers to Ultrox's walk in cooler (4°C). The samples were stored in the cooler until used for testing.

Ultrox Confidential Business Information
Copyright 1995, Ultrox. All Rights Reserved.

3.3 Preparation, Spiking and Calibration Procedures

Low Concentration Groundwater

Prior to the start of the oxidation test, the low concentration groundwater sample was spiked with benzene. A total of 4.2 liters were poured into an Erlenmeyer flask. A total of 75 microliters of benzene was added to the groundwater. The solution was mixed with a mechanical mixer for two (2) minutes at approximately 600 rpm. This resulted in a benzene concentration of 11,644 μg/l. This water was then pumped to the bench-scale reactor via a peristaltic pump (to prevent loss of the volatiles).

Spiked samples were collected and analyzed for total organic carbon (TOC) using a combustion infrared TOC analyzer and benzene using EPA method 602.

At the beginning of each working period, the O_3 output of the ozone generator was determined according to the following procedure:

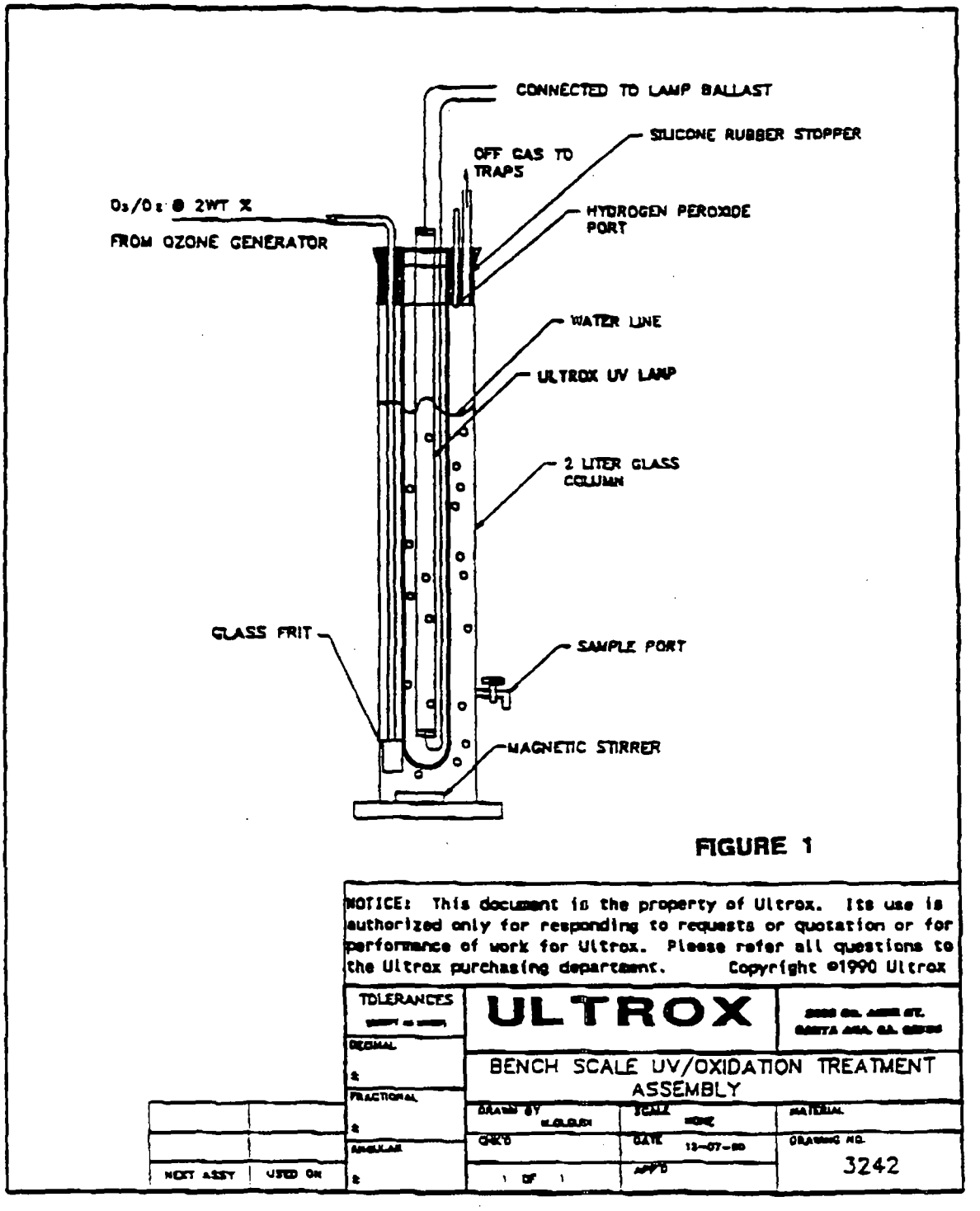
- The O_3 generator was set at the predetermined power level estimated to produce 2 percent O_3 by weight;
- One liter/minute of the generated O_3 was passed through 300 ml of 2 percent potassium iodide (KI) solution in a 500 ml graduated cylinder for 30 to 60 seconds;
- A 50 ml aliquot of the KI solution was acidified with sulfuric acid then titrated with 0.02 Molar (M) sodium thiosulfate solution to a starch endpoint;
- The O_3 concentration was calculated from the volume of the sodium thiosulfate consumed.

High Concentration Groundwater

Prior to the test, the concentrated groundwater stream was diluted with four parts of the low concentration groundwater.

Ultrox Confidential Business Information
Copyright 1995, Ultrox. All Rights Reserved.

Figure 1 - Bench Scale Reactor



Ultrox Confidential Business Information
Copyright 1995, Ultrox. All Rights Reserved.

3.4 Oxidation Test Procedures

UV/Oxidation Test

The UV/Oxidation test was conducted by pumping two liters of the combined wastewater sample into the bench scale reactor via a peristaltic pump. The UV lamp was placed in the center of the bench-scale reactor and the magnetic stirrer was activated. A total of 30 mg of hydrogen peroxide (15 mg/l) was added to the spiked groundwater by pipette. The ozone diffuser was placed in the bottom of the reactor and ozone flow was calibrated to achieve the prescribed continuous dosing rate of 1.125 mg/l/min. Time was monitored and samples were collected after 10, 20 and 40 minutes of treatment.

At the conclusion of each test, the bench scale reactor was thoroughly rinsed twice with distilled water. A detergent is then applied and the reactor is scrubbed with a bottle brush. The reactor is then rinsed twice again with distilled water and air dried (inverted).

Fenton Reagent Test (Low Concentration Groundwater)

A liter sample of benzene spiked, low concentration groundwater was placed in the bench-scale reactor. The pH was reduced to 3.34 by adding 16.5 ml of sulfuric acid (2N). A total of 120 mg/l of hydrogen peroxide was added to react with the 13 mg/l of iron detected in the groundwater sample. Samples were collected after 10, 15 and 20 minutes of retention time.

Fenton Reagent Test (High Concentration Groundwater)

To a one liter sample of the heavily contaminated groundwater, a total of 800 mg/l of hydrogen peroxide was added at two points during the testing. The first 600 mg/l was added in the beginning. After 20 minutes of treatment, an additional 200 mg/l was added. A total of 56 mg of iron sulfate was added after 40 minutes of treatment.

3.5 Analytical Procedures

Ultrox was instructed by Montgomery Watson to ship the treated samples to their analytical laboratory located in Madison Wisconsin. Due to an error in Ultrox's internal communications, the samples were not sent. However, Ultrox analyzed the untreated and some of the treated samples for total organic carbon using EPA method 415.1 and for benzene using EPA method 602.

Ultrox Confidential Business Information
Copyright 1995, Ultrox. All Rights Reserved.

4.0 RESULTS AND CONCLUSIONS

Low Concentration Groundwater

Analytical results indicate that the sample spike resulted in a benzene concentration of 11,644 μg/l. This was reduced to 5 μg/l after 20 minutes of UV exposure with 23 mg/l of ozone and 15 mg/l of hydrogen peroxide.

Results of the Fenton reagent indicate that in the first 20 minutes of treatment, the benzene was reduced from 11,644 μg/l to 8,290 μg/l. This slow reaction rate indicates that either insufficient oxidant was applied or the retention time was too short. Since UV/Oxidation reduced the concentration within the first 20 minutes, it was concluded that the Fenton reagent would not be as effective.

High Concentration Groundwater

The one Fenton reagent test performed on the concentrated groundwater sample. The results indicate that the benzene concentration of the untreated sample was 5,136 μg/l. This was reduced to 3,434 μg/l after 60 minutes of treatment. Results indicate that the untreated sample contained a total organic carbon of 82,810 mg/l. Because Fenton reagent is not a selective process, it is likely that the other compounds contributing to the total organic concentration were competing with the benzene for oxidative species.

Due to the detection of 13 mg/l of iron in the groundwater samples, pretreatment to reduce the concentration to below 5 mg/l is recommended. Iron oxides can foul the interior of the UV treatment tank and limit UV light transmittance. Iron removal can be achieved by adding hydrogen peroxide upstream of the UV treatment tank, precipitating the iron, and filtering the oxidized iron through a sand filter.

Ultrox Confidential Business Information
Copyright 1995, Ultrox. All Rights Reserved.

5.0 COMMERCIAL

The following estimated capital and operating costs are for an Ultrox® UV/Oxidation system design based upon the treatment conditions represented in the 20 minute interval of the low concentration groundwater. Performance is based upon the reduction of benzene from 10 mg/l to less than 5 μg/l given a TOC of 34 mg/l.

5.1 Design Assumptions

- Flow Rate ..... 20, 50, 70 gpm
- Ozone Dosage ..... 23 mg/l
- Hydrogen Peroxide Dosage ..... 15 mg/l
- Retention Time* ..... 20 minutes
- UV Lamp Life ..... 9,000 hours

* Full scale retention time is increased by 30% over the laboratory retention time to account for flow through characteristics of a full scale system (as opposed to the batch treatment conducted in the laboratory).

Ozone generator capacity is sized by the following calculation:
23 mg/l of ozone x X gpm x 3.785 liters/gal x 1,440 hrs/day x 453,592 mg/lb = lbs/day of ozone

5.2 Cost Assumptions

- Power Cost $0.06/kWh
- UV Lamp Cost $60/lamp

5.3 System Equipment

The proposed Ultrox® oxidation system consists of the following major components:

<u>20 GPM System</u>

- 1 Ultrox® F-650 UV/Oxidation Treatment Tank
- 7 lb/day ozone generator
- Air Preparation System consisting of:
  - Air Filter
  - Air Dryer
- Decompozon Air Treatment System
- Programmable Logic Control Panel

System Dimensions: 8'6" x x 6' x 6'8" (L x W x H)
System Dry Weight: 2,500 lbs

Ultrox Confidential Business Information
Copyright 1995, Ultrox. All Rights Reserved.

50 GPM System

- 1 Ultrox® F-1300 UV/Oxidation Treatment Tank
- 14 lb/day ozone generator
- Air Preparation System consisting of:
  - Air Filter
  - Air Dryer
- Decompozon Air Treatment System
- Programmable Logic Control Panel

System Dimensions: 8' x 11' x 6'8" (L x W x H)
System Dry Weight: 5,000 lbs

70 GPM System

- 1 Ultrox® F-2600 UV/Oxidation Treatment Tank
- 21 lb/day ozone generator
- Air Preparation System consisting of:
  - Air Filter
  - Air Dryer
- Decompozon Air Treatment System
- Programmable Logic Control Panel

System Dimensions: 12' x 11' x 6'8" (L x W x H)
System Dry Weight: 6,300 lbs

5.4 Estimated System Capital Cost

The estimated capital costs for the Ultrox® UV/Oxidation systems described in Section 5.3 are provided below. Estimated costs are F.O.B. Rothschild, Wisconsin, and does not include any applicable federal, state or local taxes.

20 GPM UV/Oxidation System	$130,000
50 GPM UV/Oxidation System	$150,000
70 GPM UV/Oxidation System	$165,000

5.5 Estimated Operating Costs (same for each system)

• Electrical Costs for O_3 Production	$0.12/1000 gal
• Electrical Costs for UV	$0.13/1000 gal
• H2O2 Costs	$0.09/1000 gal
Total Operating Costs	**$0.34/1000 gal**

Ultrox Confidential Business Information
Copyright 1995, Ultrox. All Rights Reserved.

5.6 Estimated Maintenance Costs

• Annual UV replacement (amortized)	$0.23/1000 gal
• Air Filter Cartridge replacement	$0.01/1000 gal
Total Maintenance Costs	**$0.24/1000 gal**

Ultrox Confidential Business Information
Copyright 1995, Ultrox. All Rights Reserved.

APPENDIX

RESULTS

TERMS & CONDITIONS

Ultrox Confidential Business Information
Copyright 1995, Ultrox. All Rights Reserved.

RESULTS

TEST RESULTS
AMERICAN CHEMICAL SERVICES

Spiked Low Concentration Groundwater

Test No.	Time (min)	Ozone (mg/l)	H2O2 (mg/l)	TOC (mg/l)	Benzene (ug/l)
1	0	0	0	34	11,644
	10	11	15	35	170
	20	23	15	28	5
UV/O3/H2O2	40	45	15	29	2
2	0	0	0	40	11,644
	10	0	120	NA	NA
	15	0	120	NA	NA
Fenton Reagent	20	0	120	34	8,290

Combined High Concentration Groundwater

Test No.	Time (min)	Ozone (mg/l)	H2O2 (mg/l)	TOC (mg/l)	Benzene (ug/l)
1	0	0	0	82,810	5,136
	20	0	600	NA	NA
	40	0	800	NA	NA
Fenton Reagent	60	0	800	14,200	3,434

TERMS & CONDITIONS

ULTROX DIVISION OF ZIMPRO ENVIRONMENTAL, INC. (ULTROX-SS-6/15/93)
TERMS AND CONDITIONS
FOR SUPPLIES AND SERVICES

1. STATEMENT OF WORK - SCHEDULE - COMPLETE AGREEMENT: This instrument contains the complete statement of terms of agreement between ULTROX (ULTROX) and the party named in this Agreement (Buyer) for supplies and services provided by ULTROX to Buyer, as set forth in the Statement of Work and Schedule agreed upon by the parties, copies of which are attached and incorporated herein by this reference. This Agreement supersedes and merges any prior or contemporaneous, written or oral agreements, commitments, or understandings with respect to the subject matter of this Agreement. The provisions of this Agreement shall prevail between ULTROX and Buyer notwithstanding additional or modified provisions submitted by Buyer to ULTROX hereunder. This Agreement may not be changed, amended, or modified except by a written instrument executed by both parties.

2. PERIOD OF PERFORMANCE:

(a) ULTROX shall accomplish the Statement of Work in accordance with the Schedule set forth herein.

(b) ULTROX shall not be responsible for damages due to any delay or failure to perform services arising out of causes beyond the reasonable control, or which are not occasioned by the fault or negligence of ULTROX (including failure of ULTROX subcontractors, where substitute subcontractors cannot be reasonably made available to ULTROX). If the performance hereunder is delayed or interrupted, the Statement of Work, Schedule and other provisions of this Agreement shall be equitably adjusted to reflect the effects of such delay or interruption.

(c) The Services performed by ULTROX shall be deemed complete and accepted at the earlier of: (1) the date when submissions have been accepted by Buyer, or (2) thirty (30) days after the date when such submissions are delivered to Buyer for final acceptance.

3. PAYMENT:

(a) Buyer shall pay ULTROX for supplies and services in the amount(s) agreed upon by the parties in writing, attached and incorporated herein by reference.

(b) ULTROX shall be reimbursed for any federal, state, local or foreign sales, use, excise, duties or other taxes which Buyer does not directly pay and are applicable to the sale of the services provided by this Agreement.

(c) Unless otherwise agreed in a payment schedule, ULTROX shall be entitled to invoice Buyer monthly for all supplies and services provided during the preceding month. Terms are net cash, without discount, payable within thirty (30) calendar days after date of invoice in U.S. dollars.

(d) If a total estimated cost has been set forth in this Agreement, such estimate shall not be deemed to establish a fixed price for performance hereunder; provided, however, Buyer shall not be obligated to reimburse ULTROX for amounts in excess of the total estimated cost nor shall ULTROX be obligated to continue performance or otherwise incur costs in excess of the total estimated cost, unless the Buyer has by express written authorization directed ULTROX to continue with work in excess of the estimate.

4. BUYER RESPONSIBILITIES: Buyer shall:

(a) Provide full information as to Buyer requirements for any order.

(b) Assist ULTROX by making available or delivering to ULTROX all information in Buyer possession or under Buyer control pertinent to the services herein including (1) previous reports; (2) reports of other consultants, as required; and (3) any other data pertaining to this Agreement, all of which ULTROX may rely upon in performing services hereunder.

(c) Guarantee access to and make all provisions for ULTROX to enter upon public and private property as required for ULTROX to perform services hereunder.

(d) Provide such accounting, independent cost estimating, auditing, legal and insurance counseling services as may be required for this Agreement.

(e) Designate in writing a person to act as Buyer representative with respect to the work to be performed for this Agreement. Such person shall have complete authority to transmit instructions, receive information, interpret and define policies and decisions with respect to materials, equipment, elements, and systems pertinent to ULTROX supplies and services.

(f) Promptly examine all preliminary and final documents presented by ULTROX.

(g) Furnish approvals and permits from all governmental authorities having jurisdiction for ULTROX services performed and such approvals and consents from others as may be necessary for completion of ULTROX services.

(h) Bear all costs incident to compliance with the requirements of this Paragraph 4.

5. DELIVERY AND ACCEPTANCE: Unless otherwise provided in writing by the parties hereto, delivery will be F.O.B. point of shipment, and title and liability for loss or damage to goods tendered shall pass to Buyer upon delivery to carrier for shipment and all claims filed against carrier shall be the responsibility of buyer with acceptance of goods accomplished by buyer at point of manufacture.

6. CHEMICAL SUBSTANCES IDENTIFICATION: Buyer shall properly label all chemical substances, hazardous materials, hazardous substances, and/or hazardous wastes provided to ULTROX, and shall provide proper information regarding such materials as required pursuant to any applicable Federal, state or local legislation. Such legislation includes, but is not limited to the Occupational Safety and Health Act (OSHA), the Resources Conservation and Recovery Act (RCRA), the Toxic Substances Control Act (TSCA), and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), and Superfund Amendment and Reauthorization Act (SARA).

7. CANCELLATION OR TERMINATION: Either party may terminate this Agreement in its entirety at any time by giving written notice of termination to the other. Such termination may be based on the convenience of the party terminating and shall be effective five (5) days after receipt of notice thereof by the addressee, unless a later date is agreed to in writing by the parties. In the event of termination, Buyer shall remain responsible for all charges for services performed and expenses incurred by ULTROX in accordance with this Agreement up to and including the effective date of termination.

8. CHANGES: Buyer may at any time by written order make changes in drawings and specifications, require additional work or direct the omission of work set forth in this Agreement. If such changes cause and increase or decrease in the amount of work hereunder or in the time required for performance, an equitable adjustment shall be made and this Agreement shall be modified in writing.

9. PUBLICATION - PUBLICITY: Neither party shall use the name of the other party in any news release, public announcement, advertisement, or other form of publicity without securing the prior written consent of the other party.

(ULTROX-SS-6/15/93)

10. RESPONSIBILITY/WARRANTY - LIMITATION OF LIABILITY:

(a) The sole responsibilities for ULTROX in providing the supplies and services required hereunder are: (1) the supplies and services shall conform to applicable specifications and requirements for this Agreement; and, (2) the supplies and services shall conform to sound engineering practices in the locale of performance.

(b) ULTROX warrants the performance of this Agreement shall be free from defects in ULTROX workmanship and materials. ULTROX shall maintain and enforce all warranties received from subcontractors, suppliers, or vendors of materials, supplies and equipment for performance of this Agreement.

(c) Within one (1) year from Buyer acceptance of the services and supplies provided hereunder or within eighteen months from delivery, whichever is earlier, Buyer may require ULTROX to remedy by correction, replacement or repair, at the site of Buyer or ULTROX home offices, any defect in ULTROX workmanship or ULTROX material, pursuant to written direction by Buyer, establishing such defect and the causes for such defect.

(d) ULTROX shall not be liable under this Agreement for failure or defects due to ordinary wear and tear, corrosion or erosion, or as a result of improper operation, improper maintenance, or operating conditions more severe than or different from, those identified in this Agreement.

(e) Notwithstanding the obligations provided hereunder, in no event shall ULTROX be liable in excess of the amounts actually paid to ULTROX for performance of this Agreement. This limit may be increased upon Buyer's written request and agreement to pay an additional fee for such increase. All limit increases must be requested prior to commencement of services. The Buyer agrees to indemnify ULTROX for all liability in excess of limits determined herein. Computation of liability hereunder shall include all attorney fees and defense costs.

(f) In the event Buyer makes a claim against ULTROX, at law or otherwise, for any alleged error, omission or other act arising out of the performance of ULTROX's professional services, and Buyer fails to prove such claim, then Buyer shall pay all costs, including attorney's fees, incurred by ULTROX in defending itself against the claim

(g) THE WARRANTIES AND RESPONSIBILITIES OF ULTROX HEREIN AND THE RIGHTS AND REMEDIES OF BUYER HEREUNDER ARE EXCLUSIVE AND IN SUBSTITUTION FOR ALL OTHER WARRANTIES, OBLIGATIONS AND REMEDIES, INCLUDING IMPLIED WARRANTY OF MERCHANTABILITY, IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR USE OR PURPOSE, IMPLIED WARRANTY FROM COURSE OF DEALING, USAGE OR TRADE, OR ANY OBLIGATION OR LIABILITY OF CONTRACTOR ARISING FROM TORT, OR FOR LOSS OF USE, REVENUE OR PROFIT, OR FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES.

11. EQUAL OPPORTUNITY: The seven point Equal Opportunity clause set forth in Executive Order 11246, as amended, and Executive Orders 11375 and 11598 are made a part of this Agreement.

12. PROPRIETARY KNOW-HOW, PATENTED PRODUCTS: Performance of this Agreement may require ULTROX to disclose data and information to Buyer, some of which will be ULTROX proprietary know-how or Confidential Business Information (CBI). Such proprietary know-how or confidential information, if in written form, shall be clearly identified and appropriately marked at the time of disclosure to Buyer. Buyer agrees to keep in strictest confidence any and all such information of ULTROX (1) disclosed to it by ULTROX under this Agreement, (2) which Buyer has previously acquired, or (3) which Buyer acquires from its onsite work at the offices of ULTROX except:

(a) Information which at the time of disclosure is in the public knowledge;

(b) Information which after disclosure becomes part of the public knowledge by publication or otherwise; except by breach of this Agreement by Buyer;

(c) Information which Buyer can establish by written record or documentation was in its possession at the time of disclosure by ULTROX and was not acquired, directly or indirectly, from ULTROX; and

(d) Information which Buyer receives from third parties with an independent right to such information, and provided that such information was not obtained by said third party, directly or indirectly, from ULTROX. Any other disclosure, reproduction or use of ULTROX proprietary know-how by Buyer shall require written approval from ULTROX. ULTROX hereby grants to Buyer a nonexclusive right to use, but not sell, reproduce or manufacture, ULTROX proprietary know-how incorporated into the services provided hereunder, for the purposes of such services. ULTROX also agrees to protect the confidentiality of any Buyer's identified proprietary information and to only disclose such proprietary information on a "need-to-know" basis.

13. REUSE OF DOCUMENTS: All documents including designs, drawings, and specifications furnished by ULTROX pursuant to this Agreement are instruments of ULTROX's services with respect to the Project which is the subject matter of this Agreement and are not intended or represented to be suitable for reuse by Buyer or others on extensions of the Project or any other project. Any such reuse without specific written verification of adaptation by ULTROX is not authorized by ULTROX and buyer shall indemnify and hold harmless ULTROX from all claims, damages, losses, and expenses including attorney's fees arising out of or resulting therefrom. Any such verification or adaptation by ULTROX will entitle ULTROX to further compensation at rates to be agreed upon by Buyer and ULTROX in advance of such verification or adaptation.

14. INSURANCE: ULTROX shall maintain the following insurance:

Workmen's Compensation		Statutory
Employer's Liability	Bodily Injury	$100,000
Comprehensive General Liability	Bodily Injury	$500,000 per person $500,000 per occurrence
Comprehensive General Liability	Property Damage	$500,000
Comprehensive Auto Liability	Bodily Injury	$500,000 per person $500,000 per occurrence
Comprehensive Auto Liability	Property Damage	$500,000

15. INDEPENDENT CONTRACTOR: ULTROX personnel shall not be considered employees of Buyer and the relationship of ULTROX to Buyer by reason of this Agreement shall be that of independent contractor.

16. ASSIGNMENT: Neither this Agreement nor any rights or obligations under this Agreement shall be assigned or otherwise transferred by either party without the prior written consent of the other, except that ULTROX may assign this Agreement to the Owner of ULTROX or firms owning or controlling such Owner.

17. APPLICABLE LAW: This Agreement shall be governed by the laws of the State of California, United States of America.

ISOMETRIC VIEW OF ULTROX SYSTEM

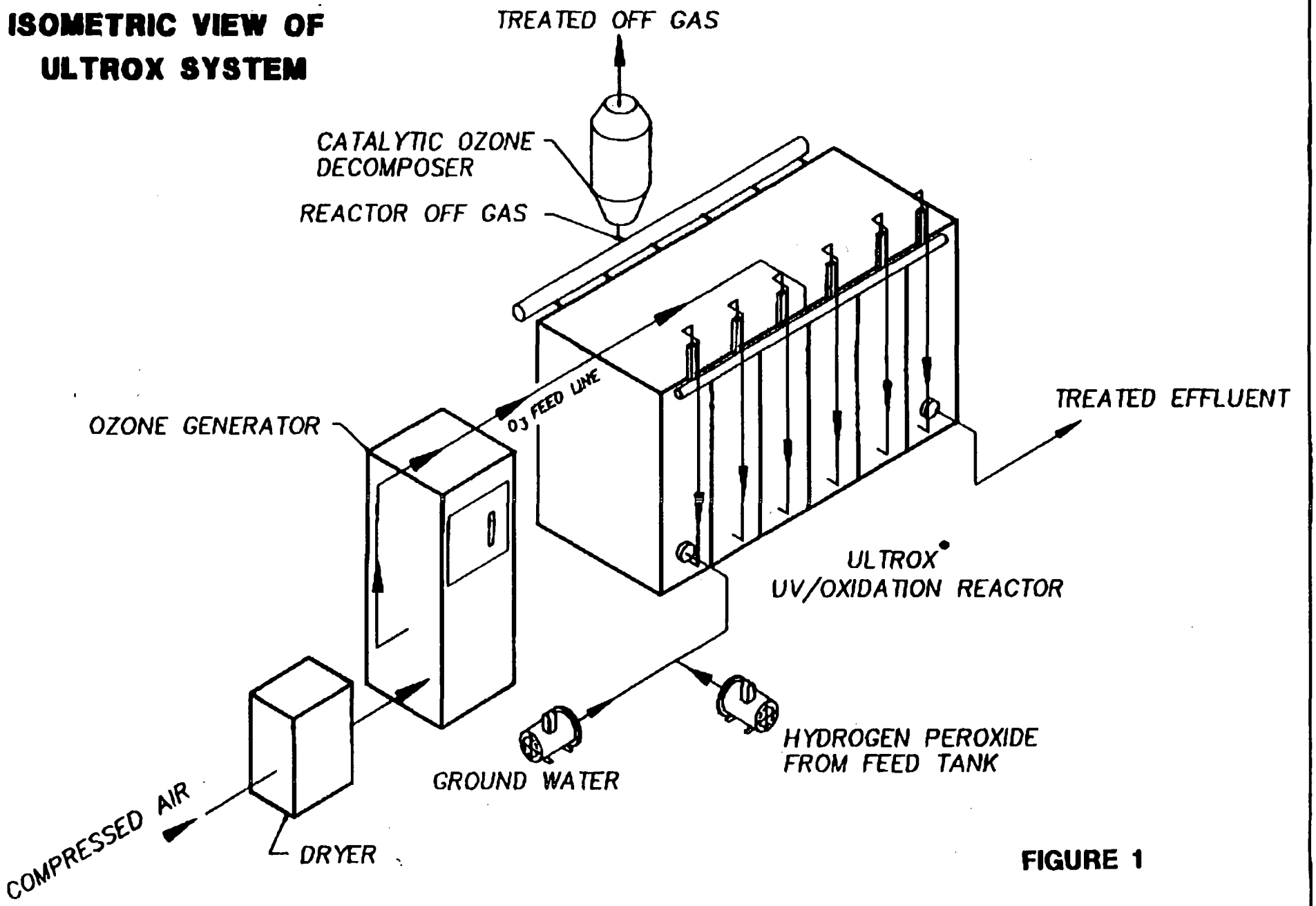


FIGURE 1

BENCH SCALE TREATABILITY STUDIES

VENDOR REPORT

Vulcan Peroxidation Systems, Inc.

July, 1995

July 28, 1995

Mr. Ron Schlicker
Montgomery Watson
4525 S. Wasatch Blvd., Ste. 200
Salt Lake City, UT 84124

Via Fax No. (801) 272-0430

RE: Advanced Oxidation Treatability Study Testing Report
Assessment of the **perox-pure™** UV/Oxidation
Process for Treatment of Organic Contaminants in Groundwater
from the American Chemical Service, Inc. NPL Site

Dear Mr. Schlicker:

Vulcan Peroxidation Systems Inc., (VPSI) has completed the laboratory treatability testing for the assessment of the **perox-pure™** UV/Oxidation Process for treatment of the low strength groundwater (referred to as PGCS) and the blended mixture of low and high strength groundwater, each from the American Chemical Service Inc., NPL Site (ACS NPL Site). The proposed treatment goals for each wastestream are shown in Attachment A. Three flow conditions were specified for the treatment system; 20 gpm, 50 gpm and 70 gpm. The testing results and an assessment of the full-scale process design are presented below.

Description of Groundwater

On June 30, 1995 two (2) 55 gallon drums of low strength PGCS groundwater and three (3) five gallon containers of high strength water were received at the VPSI testing facility in Tucson, Arizona. The waters were received at ambient temperature with headspace.

Characterization analysis was performed on each of the two water samples to determine parameters important to UV/Oxidation treatment. The results are shown in Table 1. The PGCS groundwater had properties which were more or less "typical" for a groundwater, except for relatively high levels of TOC, alkalinity, and turbidity. Because of the TOC and alkalinity levels, pH adjustment and catalyst addition were evaluated as part of the testing matrix. The high strength groundwater contained very high concentrations of each of the characterization parameters. The very high levels of TOC and other parameters made the blended water more difficult to treat.

Peroxidation Systems
Vulcan Peroxidation Systems Inc., a Vulcan Chemicals Company
5151 E. Broadway, Suite 600 Tucson, Arizona 85711 520-790-8383 FAX 520-790-8008

Table 1

Sample Characterization Results
For the ACS NPL Site Groundwaters

	PGCS	High Strength
Visual Color and Appearance	Pale Orange; Clear	Dark brown; Cloudy
pH	7.4	6.1
TDS (mg/l)	510	4,400
Turbidity (NTU)	19.4	659
Total Iron (mg/l)	1.60	204
Chloride (mg/l)	26	2,250
COD (mg/l)	51	29,042
TOC (mg/l)	23.2	6860
Alkalinity (mg/l)	520	800
Hardness (mg/l)	520	1200
TSS (mg/l)	<5	183
NO_3 (mg/l)	0.880	26.4

A VOC analysis for each of the two groundwaters was provided to VPSI by Montgomery Watson prior to conducting treatability testing. The results from the analysis are summarized in Table 2 showing only the contaminants detected above analytical detection limits. As seen the PGCS groundwater contained insignificant concentrations of contaminants, however, previous analytical results performed by Montgomery Watson detected levels of benzene on the order of 10,000 μg/l. Therefore, it was agreed by VPSI and Montgomery Watson to spike benzene to 10,000 μg/l in the PGCS water prior to testing.

Table 2

Summary of Montgomery Watson VOC Analysis
Contaminants Detected in PGCS and High Strength Groundwaters

Contaminant (µg/l)	High Strength	PGCS
Chloroethane	<0.022	0.2
Vinyl Chloride	80	0.3
Chloroethane	230	0.7
Trichlorofluoromethane	34	<0.03
1,1-DCE	80	<0.02
Dichloromethane	22,000	<0.01
T-1,2-DCE	30	0.4
1,1-DCA	74,200	0.9
C 1,2-DCE	451	0.3
Chloroform	1940	<0.03
1,1,1-TCA	16500	<0.01
1,2-DCA	909	<0.02
Benzene	7150	26
TCE	3670	<0.02
Toluene	22600	1
PCE	2450	0.06
Chlorobenzene	2.68	<0.03
Ethyl Benzene	664	3
m,p Xylene	425	0.7
o Xylene	984	<0.03
Styrene	33	<0.04
1,1,2,2-TCA	4	<0.02
1-Methylethylbenzene	34	<0.02

Contaminant (µg/l)	High Strength	PGCS
Bromobenzene	1	<0.03
2-Chlorotoluene	3	<0.02
n-Propylbenzene	34	<0.04
4-Chlorotoluene	6	<0.02
1,3,5-Trimethylbenzene	109	<0.01
1,1-Dimethylbenzene	41	<0.02
1,2,4-Trimethylbenzene	396	<0.03
1,3-Dichlorobenzene	0.3	<0.03
1-Methylpropylbenzene	13	<0.02
1,4-Dichlorobenzene	1	<0.02
1-Methyl-4 (1-methylethyl) benzene	24	<0.02
1,2-Dichlorobenzene	10	0.9
n-butylbenzene	52	<0.03
Naphthalene	38	<0.05
Acetone	241,000	<10
MEK	272,000	<10
MIBK	29,600	<10

UV/Oxidation Testing

UV/Oxidation testing was conducted on both the PGCS groundwater alone and a blend of PGCS groundwater with the high strength groundwater. The results of testing are discussed below.

PGCS Groundwater

A total of four (4) **perox-pure™** UV/Oxidation tests were performed on the PGCS groundwater evaluating the effects of initial pH adjustment, the use of catalyst, and increased UV density on the destruction rate of benzene. The test conditions are shown in Table 3. Pretreatment was not necessary.

Table 3

Bench-Scale **perox-pure™** UV/Oxidation Test Conditions
Treatment of the PGCS Groundwater

Test	Initial pH	H_2O_2 Dose (mg/l)	UV Density[1]	Catalyst (Formula; mg/l)
1	7.3	100	S	None
2	5.1	100	S	None
3	4.5	100	S	I; 3
4	5.0	100	F	None

[1] S - Medium UV density; F - high UV density.

The treatment results are shown in Table 4. Benzene was the only contaminant above the proposed discharge goals. As seen by the treatment results,initial pH adjustment (Test 2) and catalyst addition (Test 3) increased benzene destruction rates by 2 and greater than 8 times, respectively, as compared to treatment at the ambient conditions (Test 1). Utilization of the higher UV density (F) in Test 4 also increased the destruction rate, however, the increase was not significant enough to warrant the use in the full scale process design. Therefore, the best treatment results were achieved in Test 3 performed at an initial pH of 4.5, using 3 mg/l of Catalyst Formula I, and the S UV density.

Table 4

Bench-Scale **perox-pure™** UV/Oxidation Treatment Results
VOC Destruction in the PGCS Groundwater

Contaminant (µg/l)	Oxidation Time (min.)			
	0	**0.5**	**1**	**2**
Test 1				
Benzene	11,972	5,089	2,272	74
Test 2				
Benzene	8,483	2,224	75	<1
Test 3				
Benzene	10,227(1)	<1	<1	<1
	Oxidation Time (min.)			
	0	**0.25**	**0.5**	**1**
Test 4				
Benzene	10,227(1)	347	1	<1

(1) Sample not analyzed. Concentration shown is an average of Tests 1 and 2 influent concentration.

Blended Groundwater

A total of five (5) **perox-pure™** UV/Oxidation tests were performed on the blended groundwater. The test conditions are shown in Table 5. The test matrix evaluated the effects of blending ratio of PGCS groundwater to high strength groundwater (i.e. 4:1 and 9:1), H_2O_2 dosage, UV density, and catalyst addition. Pretreatment of the high strength groundwater was required for removal of iron and TSS. This was accomplished by adjusting the pH to 9 with sodium hydroxide, addition of polymer as flocculant aid, followed by 5 micron filtration.

Table 5

Bench-Scale **perox-pure™** UV/Oxidation Test Conditions
Treatment of the Blended Groundwater

Test	Blended Ratio PGCS: High Strength	Initial pH	H_2O_2 Dose (mg/l)	UV[1] Density	Catalyst (Formula; mg/l)
1	4:1	4.4	2000	S	I; 5
2	4:1	4.5	2000	F	I; 5
3	4:1	4.5	2000	F	---
4	9:1	4.5	2000	F	---
5	4:1	4.5	1000	F	---

[1] S - medium UV density; F - high UV density.

The treatment results are shown in Table 6 for VOC contaminants which were detected above the proposed effluent goals (Attachment A). Poor treatment was observed at each of the tested conditions. The best destruction rates were achieved in Test 4 performed at a 9:1 blending ratio, an initial pH of 4.5, a H_2O_2 dosage of 2000 mg/l, using the high UV density.

Table 6

Bench-Scale **perox-pure™** UV/Oxidation Treatment Results
VOC Destruction in the Blended Groundwater

Contaminant (µg/l)	Oxidation Time (min.)			
	0	**2**	**4**	**8**
Test 1				
Methylene Chloride	2174	2600	2120	1925
Cis-1,2-DCE	325	209	121	20
1,1,1-TCA	778	1196	1096	913
MEK	95,983	76,804	1872	1632
Benzene	5,281	2,883	1,151	133
MIBK	12,397	8,740	5,467	2,498
Toluene	651	344	151	17
Ethyl Benzene	<50	21	14	1
Xylenes-m/p	81	46	25	5
Xylenes-o	63	42	24	6
Contaminant (µg/l)	**Oxidation Time (min.)**			
	0	**1**	**2**	**4**
Test 2				
Methylene Chloride	1,956	1,974	1,804	1,665
Cis-1,2-DCE	265	89	46	19
1,1,1-TCA	790	920	907	702
MEK	141,000	60,208	1,693	881
Benzene	6,409	1,625	402	105
MIBK	13,033	5,632	2,828	1,418
Toluene	643	155	40	9

Ethyl Benzene	<50	15	7	<1
Xylenes-m/p	82	24	10	3
Xylenes-o	63	28	9	3
	Oxidation Time (min.)			
Contaminant (μg/l)	**0**	**1**	**2**	**4**
Test 3				
Methylene Chloride	1,771	2,066	1,854	1,599
Cis-1,2-DCE	217	113	55	13
1,1,1-TCA	578	956	910	614
MEK	107,000	61,190	1,421	607
Benzene	4,956	1,984	543	53
MIBK	11,438	6,266	3,437	817
Toluene	522	208	65	4
Ethyl Benzene	<50	15	7	<1
Xylenes-m/p	61	30	13	1
Xylenes-o	54	31	12	2
Test 4				
Methylene Chloride	1,097	1,084	791	640
Cis-1,2-DCE	144	32	6	3
1,1,1-TCA	347	455	413	274
MEK	45,142	29,837	16,460	1,609
Benzene	3,384	522	28	8
MIBK	4,875	2,116	401	8
Toluene	178	26	2	<2
Ethyl Benzene	<100	<10	<1	<1
Xylenes-m/p	<100	<10	<1	<2

Xylenes-o	<100	<10	<1	<1
Test 5				
Methylene Chloride	2,141	2,115	1,744	1,664
Cis-1,2-DCE	323	144	64	12
1,1,1-TCA	869	929	803	627
MEK	107,282	92,338	60,941	35,995
Benzene	5,056	2,248	485	53
MIBK	11,764	9,036	4,106	1,228
Toluene	489	209	46	4
Ethyl Benzene	<100	24	9	<1
Xylenes-m/p	<100	27	8	1
Xylenes-o	<100	20	8	1

Full-Scale Design Assessment

Full-scale **perox-pure™** UV/Oxidation process conditions and treatment costs are assessed based on the pseudo first order destruction rate constants achieved in each of the bench-scale treatment tests. A full-scale oxidation time is determined from the destruction rate constants achieved in the testing and the specified treatment objectives. The necessary power demand is then determined based on the required oxidation time, the full-scale flow rate, and the UV density used during testing. A summarized full-scale process assessment is presented below for both the PGCS groundwater and the blended groundwater.

PGCS Groundwater

Effective treatment of the PGCS groundwater was achieved at each of the tested **perox-pure™** Process Conditions. Pretreatment of the as received water was not necessary. Table 7 summarizes the projected power demand and are operating costs for each process condition and flow rate. The power demand is based on 15 kW of operating power per lamp. The treatment costs are presented in $/1000 gal and based on eletricity cost, chemical costs (H_2O_2, concentrated acid, and catalyst) and lamp replacement costs. The costs do not reflect re-adjustment of the effluent pH to discharge standards. The cost basis is as follows:

50% H_2O_2 @ $0.42/lb
Concentrated Acid @ $0.08/lb
Catalyst @ $5.00/lb
Electricity @ $0.05/kWh
Lamp Replacement @ $800/each for 3000 hours

Table 7

Summary of Projected **perox-pure™** Process Conditions and Operating Costs[1]
Treatment of the PGCS Groundwater

Full-Scale Process Conditions	Flow Condition (gpm)					
	20		50		70	
Test 1 Ambient Conditions	$4.95	90 kW	$4.82	225 kW	$4.79	315 kW
Test 2 With pH adjustment to 5.0	$3.70	60 kW	$3.57	150 kW	$3.54	210 kW
Test 3 With pH adjustment and Catalyst	$1.83	15 kW	$1.57	30 kW	$1.40	30 kW

[1] Operating Costs are in $/1000 gal.

As shown in Table 7, the full-scale process conditions which achieved the least required power demand and lowest operating costs were pH adjustment and catalyst addition. At these conditons the required equipment size to treat benzene in the PGCS groundwater from 10,000 μg/l to below the effluent goal of 29 μg/l would be an S-30 kW **perox-pure™** system. The equipment costs, specifications, process flow diagram, and statement of the performance guarantee and warranty for the system is included in the attachments.

Blended Groundwater

UV/Oxidation treatment of the blended groundwater was more or less ineffective, as shown by the poor contaminant destruction rates (Table 6). The blended groundwater is less amendable to treatment than the PGCS groundwater due to the very high TOC level contributed by the high strength groundwater (i.e. 6860 mg/l). Based on the levels of target VOCs in the high strength groundwater, the TOC level is approximately 90% due to non-

target organic compounds. High levels of TOC inhibit the UV/Oxidation process by absorbing available UV energy, and therefore, competing with H_2O_2 for UV energy required to generate hydroxyl radicals. Additionally, the background TOC scavenges hydroxyl radicals away from reacting with target contaminants. Both interferences significantly decrease target contaminant destruction rates.

Based on the testing results, treatment of the blended groundwater to below the proposed effluent goals would require greater than 2000 kW of power demand at each of the three flow conditions. It has been VPSI experience that equipment sizing for treatment of this magnitude has not been economically feasible, and therefore, treatment costs will not be shown. Rather, VPSI proposes alternative treatment utilizing a hybrid system relying on additional treatment technology to pretreat the high strength water for TOC removal prior to blending with the PGCS groundwater. Proposed alternatives for pretreatment of the high strength groundwater include activated carbon, Fenton's Oxidation, and proprietary advanced oxidation technologies (AOTs) which VPSI has the capability to provide. In order to evaluate the feasibility and treatment costs associated with these alternative treatment systems, VPSI would need to conduct further laboratory testing. Additional test work would require approximately 2 to 3 weeks to complete and could be conducted without the need for more water. It is believed by VPSI that if 80%-90% removal of TOC can be achieved via pretreatment of the high strength water, that an approximate 10 times reduction in the required UV/oxidation power demand required to treat the blended water could be achieved.

Conclusions

The treatability testing results demonstrate that effective treatment of the PGCS groundwater can be achieved using the **perox-pure™** UV/Oxidation Process. The proposed effluent goals can be achieved using an S-30 kW **perox-pure™** system, with the addition of acid and catalyst to enhance the contaminant destruction rates. The treatment costs under these process conditions range from $1.40 per 1000 gallons up to $1.83 per 1000 gallons depending on the flow rate. However, the blended groundwater is not as amenable to UV/Oxidation treatment due to a very high TOC level contributed from the high strength groundwater. VPSI recommends additional test work be conducted to evaluate the feasibility of a hybrid UV/Oxidation treatment system, which utilizes an additional technology to pretreat the high strength groundwater for TOC removal prior to blending with the PGCS groundwater.

If you have any questions regarding the report, please contact Bob Scherrer at our Pittsburgh, Pennsylvania office at (412) 934-2240 or myself at our corporate office at (520) 790-8383.

Sincerely,

Jeffrey W. Prellberg /NAO

Jeffrey W. Prellberg
Process Engineer

cc: Vince Brunotts, VPSI - Pittsburgh, PA
Bob Scherrer, VPSI - Pittsburgh, PA
Lisa Thornton, VPSI - Tucson, AZ
File

ATTACHMENT A

PROPOSED EFFLUENT GOALS FOR DISCHARGE OF TREATED GROUNDWATER AMERICAN CHEMICAL SERVICE, INC., NPL SITE

Attachment A

Proposed Effluent Goals for Discharge of Treated Groundwater
American Chemical Service, Inc., NPL Site

Organics (µg/l)	Recommended Effluent Goal
Acetone	700,000
Benzene	29
bis (2-Chloroethyl) ether	14
bis (2-Ethylhexyl) phthalate	49
2-Butanone (MEK)	7,156
Butyl benzyl phthalate	3,400
Chloroethane	70,000,000
Chloromethane	157 (g)
4-Chloro 3-methyphenol	4
1,2-Dichlorobenzene	2,600
1,4-Dichlorobenzene	2,600
1,1-Dichloroethane	700,000
1,2-Dichloroethane	556
1,1-Dichloroethene	79
1,2-Dichloroethene-cis	70
1,2-Dichloroethene-trans	100
1,2-Dichloroethene (total)	
1,2-Dichloropropane	116
Diethyl phthalate	71
2,4-Dimethylphenol	5
Dimethyl phthalate	73
Di-n-butyl phthalate	4
Ethylbenzene	34
Isophorone	267
Methylene chloride	498

Attachment A (cont'd.)

Proposed Effluent Goals for Discharge of Treated Groundwater
American Chemical Service, Inc., NPL Site

Organics (µg/l)	Recommended Effluent Goal
4-Methyl-2-pentanone (MIBK)	136
4-Methylphenol	34
Naphthalene	15
2-Nitrophenol	149
Pentachlorophenol	3.83
Phenol	40
PCBs	0.008
Tetrachloroethene	24
Tetrahydrofuran	4,800
Toluene	52
1,1,1-Trichloroethane	89
Trichloroethene	189
Trichlorofluoromethane	30,000
Vinyl Chloride	5,246
Xylenes, p	12
Xylenes, m	37
Xylenes-m,p (total)	

ATTACHMENT B

STANDARD perox-pure™ EQUIPMENT WARRANTY

STANDARD perox-pure EQUIPMENT WARRANTY

VPSI will provide a warranty covering both the performance and operation of the **perox-pure™** UV/Oxidation system Equipment.

I. Performance Warranty

VPSI warrants that the performance of the **perox-pure™** system will meet the agreed upon effluent requirements, providing that the following conditions are met:

a.) The influent conditions and flow rate do not exceed those specified.
b.) The unit is operated and maintained in accordance with the Operations and Maintenance Manual either through a VPSI Service Agreement or by customer personnel.

Performance Test Procedure

If customer believes VPSI's equipment is not operating within the Performance Specification, customer may invoke the Performance Warranty through notification in writing to VPSI. VPSI will respond to the guarantee by sending a technical service representative to the site. If non-performance is found to be caused by VPSI equipment, VPSI will modify, repair, or replace such equipment as necessary to remedy the situation and to create conformance with the contract at no cost to customer. If non-performance is found to be caused by other than VPSI equipment, or lack of sufficient on-site maintenance, this situation will be documented and all VPSI personnel time at the site will be billed at prevailing rates plus expenses at cost plus 10%.

II. Mechanical Equipment Warranty

VPSI warrants the equipment for twelve (12) months from date of start-up against defects in material or workmanship. Equipment must be operated and maintained in accord with the Operation and Maintenance Manual or the warranty is void. Equipment damaged by improper operation or damage resulting from equipment modifications not approved by VPSI will not be warranted. The following items have specific warranty conditions.

Lamps - Lamp drives and lamp temperature must remain in accord with manufacturer's specifications. The supplier warrants useful lamp output to be maintained for a minimum 3000 hours of operation with no more than 3 on-off cycles per day.

Quartz Tubes - At the anticipated operating temperatures, quartz is unreactive to any chemical except hydrofluoric acid. Expected life of quartz tubes is unlimited except for breakage from excessive stress. Tubes will be supported to resist normal stresses but cannot be guaranteed against breakage from careless handling, unforeseen flow or pressure fluctuations or cracks due to mechanical stress.

Expendable Parts - Parts not covered under the warranty include o-rings, seals/gaskets, tube cleaner shuttles and pump rebuild kits.

ATTACHMENT C

VPSI START-UP SERVICES

VPSI START-UP AND ON-GOING SERVICES

VPSI will provide a comprehensive program of installation, start-up and on-going services. VPSI is uniquely equipped to provide the highest level of technical and field service support for this site. VPSI is the only UV/Oxidation firm in the industry with a firmly established network of full time field service personnel dedicated to the start-up and on-going support of **perox-pure™** installations.

All of VPSI's Service Personnel are direct employees who have successfully completed OSHA's 40 hour training session. The main field service person who will be servicing this installation is based in Chicago, IL.

The service provided by VPSI for this project will include the following:

* Installation Supervision - VPSI field service personnel will be on-site prior to and during equipment delivery to ensure that the installation goes smoothly and that there will be no unforseen obstacles when the equipment arrives at the site.

Our field service personnel will also be available to answer any question which may arise at the site during the system installation. When the unit is placed at the site our field service personnel will discuss all site specific details which pertain to the proper hook-up and start-up of the UV/Oxidation system and provide an overview of safety considerations.

* Start-up Services - VPSI will provide personnel for on-site leak testing, final start-up and equipment performance prove-out at the site. Our field service and process engineering personnel will be on-site to implement the final equipment prove-out performance testing plan and demonstrate the performance of the UV/Oxidation treatment system per the equipment specification.

* On-site Training Service - VPSI will provide personnel to fully train your on-site personnel in the proper operation and maintenance of the VPSI system. Our field personnel will also provide chemical safety training for H_2O_2 handling at the site.

* Hydrogen Peroxide Supply Service - VPSI will provide the H_2O_2 required for the **perox-pure™** system, delivered in bulk to the remediation site, at a price of $0.42 per poind on a 50% solution basis. The H_2O_2 price includes the use of a VPSI Hydrogen Peroxide Storage/Feed Module which contains a bulk storage tank, safety shower, two feed pumps, spare parts, and controls.

* Analytical Services in Support of Start-up - As part of the Installation/Start-up Service described in Attachment II, VPSI would provide analytical services in support of start-up. A modified EPA Method 601/602 analysis with 24 hour turnaround would be utilized for this purpose. This would allow VPSI quick turnaround to adjust and optimize the treatment parameters.

* Analytical Monitoring Services - VPSI Environmental Laboratories is a fully

ATTACHMENT D

EQUIPMENT PROCUREMENT OPTIONS

EQUIPMENT PROCUREMENT OPTIONS

VPSI offers the **perox-pure™** equipment under several different supply options that can be tailored to meet the specific needs of The Operating Group.

Option I - Equipment Purchase (no VPSI Service Agreement)

VPSI can supply the **perox-pure™** equipment through a direct purchase. Under this option there would be not project involvement by VPSI after the Installation/Start-up unless specifically requested by The Operating Group . Parts and Service would then be provided on a time and material basis.

Option II - Equipment Purchase with VPSI Technical Service Agreement

VPSI can supply the **perox-pure™** Equipment through a direct purchase option and provide a Technical Service Agreement (TSA). Under this option, The Operating Group would purchase the **perox-pure™** system, and VPSI would provide all required parts, labor and routine service for one monthly fee.

Option III - Equipment Lease (no VPSI Service Agreement

VPSI can supply the **perox-pure™** Equipment through an equipment lease with a minimum six month term. Under this option there would be no project involvement by VPSI after Installation/Start-up unless specifically requested by The Operating Group. Parts and Service would then be provided on a time and material basis.

If desired, The Operating Group may purchase the **perox-pure™** Equipment at any time with credit given for a portion of the fees paid.

Option IV - Lease with VPSI Full Service Package (FSA)

VPSI can supply the **perox-pure™** Equipment under this option with no capital investment with a minimum six month term and the monthly fee would include a complete service package as previously described. This monthly fee would include all required parts, labor, and services.

If desired, The Operating Group may purchase the **perox-pure™** Equipment at any time with credit given for a portion of the fees paid.

ATTACHMENT E

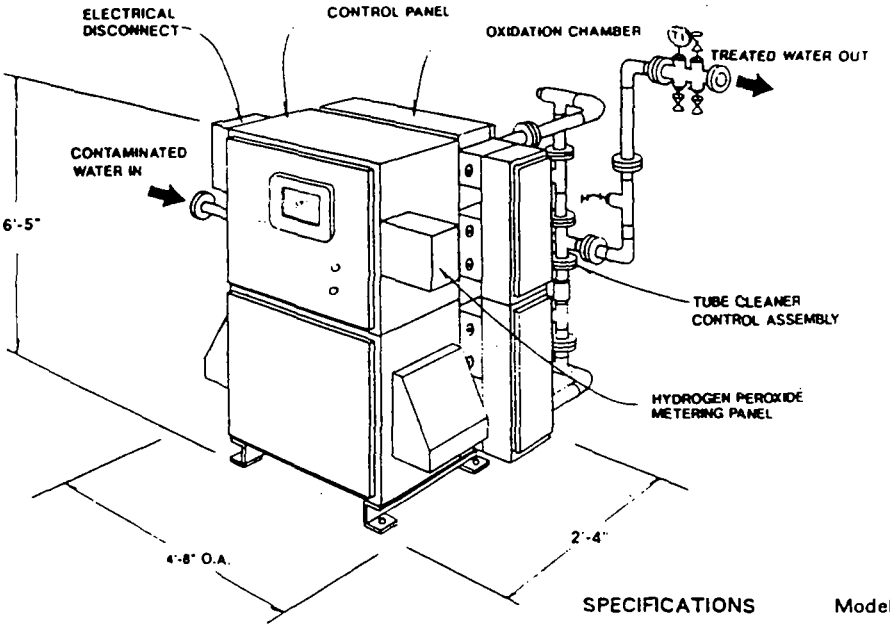
EQUIPMENT CATALOG SHEETS

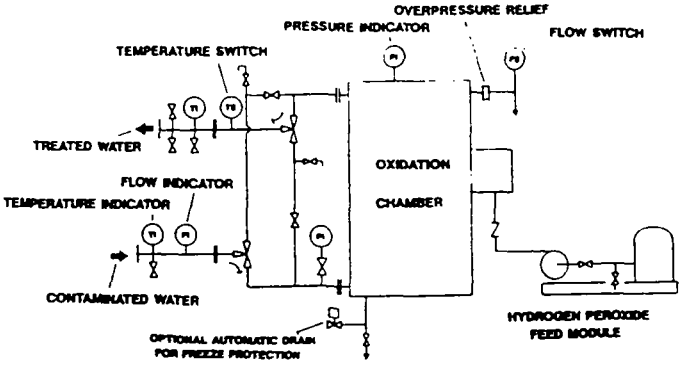
perox-pure™

ORGANIC DESTRUCTION PROCESS

MODULAR TREATMENT SYSTEMS

MODEL S-30





SPECIFICATIONS	Model S-30	
Flow Rate:		
Maximum	60 gpm	100 gpm
Connections:	150# Flange	150# Flange
Inlet:	1 1/2"	2"
Outlet:	2"	2"
Power Supply:	3 pH/60Hz/480V, 30KW, 40 Amps	
Electrical Encl.:	NEMA 3R	
Material -		
Wetted Parts:	316 SS, Quartz, Fluoroelastomers, TFE	
External Parts:	Enameled Steel	
Weight -		
Shipping:	1500 lbs.	
Operating:	2000 lbs.	

The perox-pure™ chemical oxidation system consists of modular, skid-mounted equipment designed to treat water contaminated by dissolved organic compounds. Bench-scale process evaluations will determine pretreatment requirements (if any) and the oxidation time necessary for the desired treatment level. Full-scale oxidation chamber volume, UV requirements and oxidant dosage are then selected.

The perox-pure™ system incorporates corrosion resistant fluorocarbon-lined oxidation chambers and horizontally mounted medium pressure UV lamps. Indicators are provided to monitor performance of each lamp. A sequential hydrogen peroxide addition feature provides easy process optimization for maximum economy. In addition, a patented tube cleaning device maximizes performance and minimizes maintenance time. The cleaning device is automatic and self propelled, requiring no external actuating mechanism or sliding shaft seals. Other design features include shop-wired and tested control panels interlocked with personnel and process safety features to shut off power and display the cause at preset conditions. Installation is quick and easy.

The perox-pure™ system and its components are covered by numerous issued and pending patents.

Peroxidation Systems

Vulcan Peroxidation Systems Inc., a Vulcan Chemicals Company

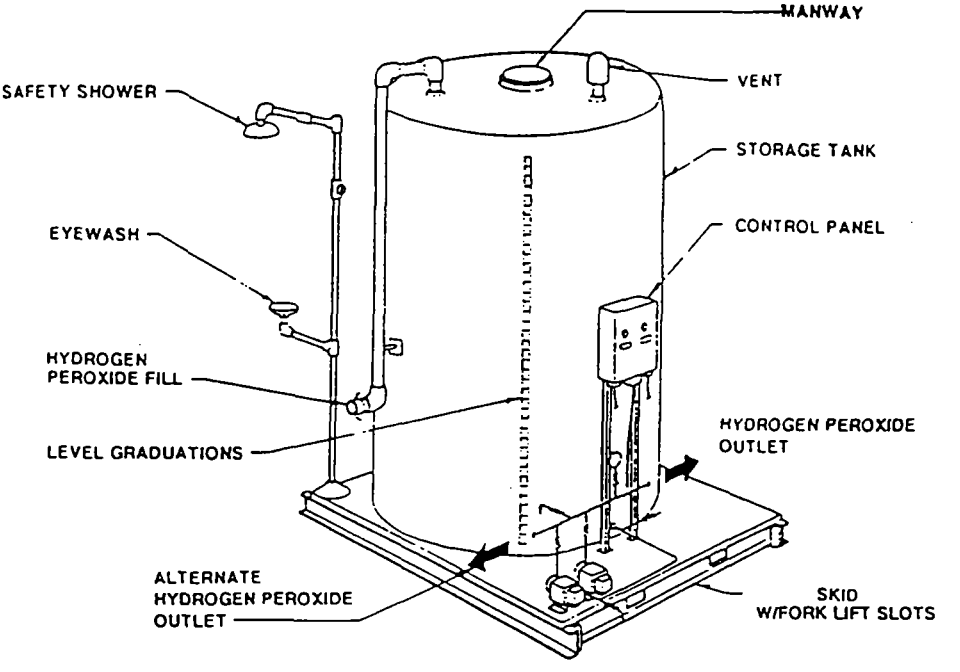
5151 E. Broadway, Suite 600 Tucson, Arizona 85711 520-790-8383 FAX 520-790-8008

PeroxPure
ORGANIC DESTRUCTION PROCESS

HYDROGEN PEROXIDE STORAGE/FEED MODULE

MODEL PM-1000B

1000 GALLON
CHEMICAL STORAGE MODULE

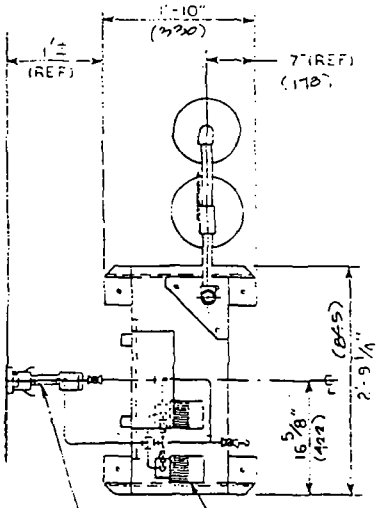


Specifications	PM-1000B
Working Capacity	1000 Gal
Outlet Connection	1/4" Tube Fitting
Length	6'-8"
Width	5'-4"
Max Height	9'-0"
Power Supply	1 ph/60 Hz/120V
	110 Watts peak per pump
Pumps:	
Qty:	Two (2)
Type:	Positive Displacement, diaphragm
Control:	(2) Off-On Switches in Control Panel
Capacity:	To meet application
Material:	
Wetted Parts:	High Density Polyethylene with UV Inhibitors, Fluoroelastomer, PTFE, PVC, Stainless Steel
Exterior Parts:	Aluminum, Stainless Steel, Fiberglass, Galvanized Steel, PVC
Weight:	800 pounds Empty
	10,800 pounds Full

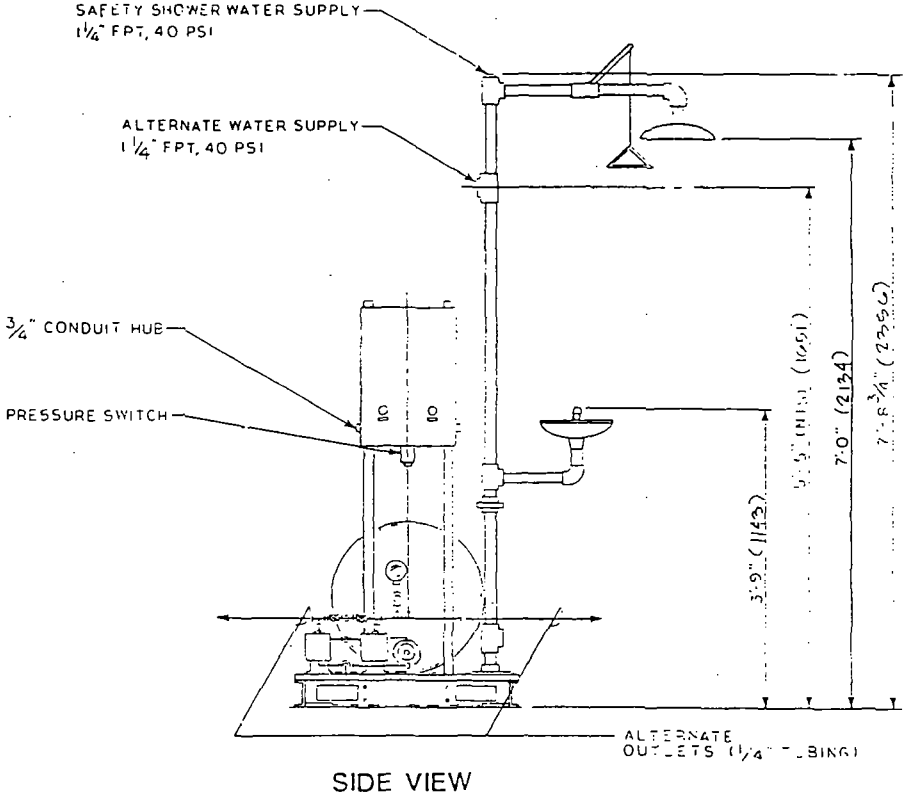
Peroxidation Systems
5151 E. Broadway, Suite 600 Tucson, Arizona 85711 520-790-8333 FAX 520-790-8008

PEROXSTOR™
HYDROGEN-PEROXIDE SERVICE

AM/CM - 000 Acid/Catalyst Feed Module



PLAN



SIDE VIEW

Peroxidation Systems

5151 E. Broadway, Suite 600 Tucson, Arizona 85711 520-790-8383 FAX 520-790-8008

ATTACHMENT F

PROCESS FLOW DIAGRAM

JOB NO. _____

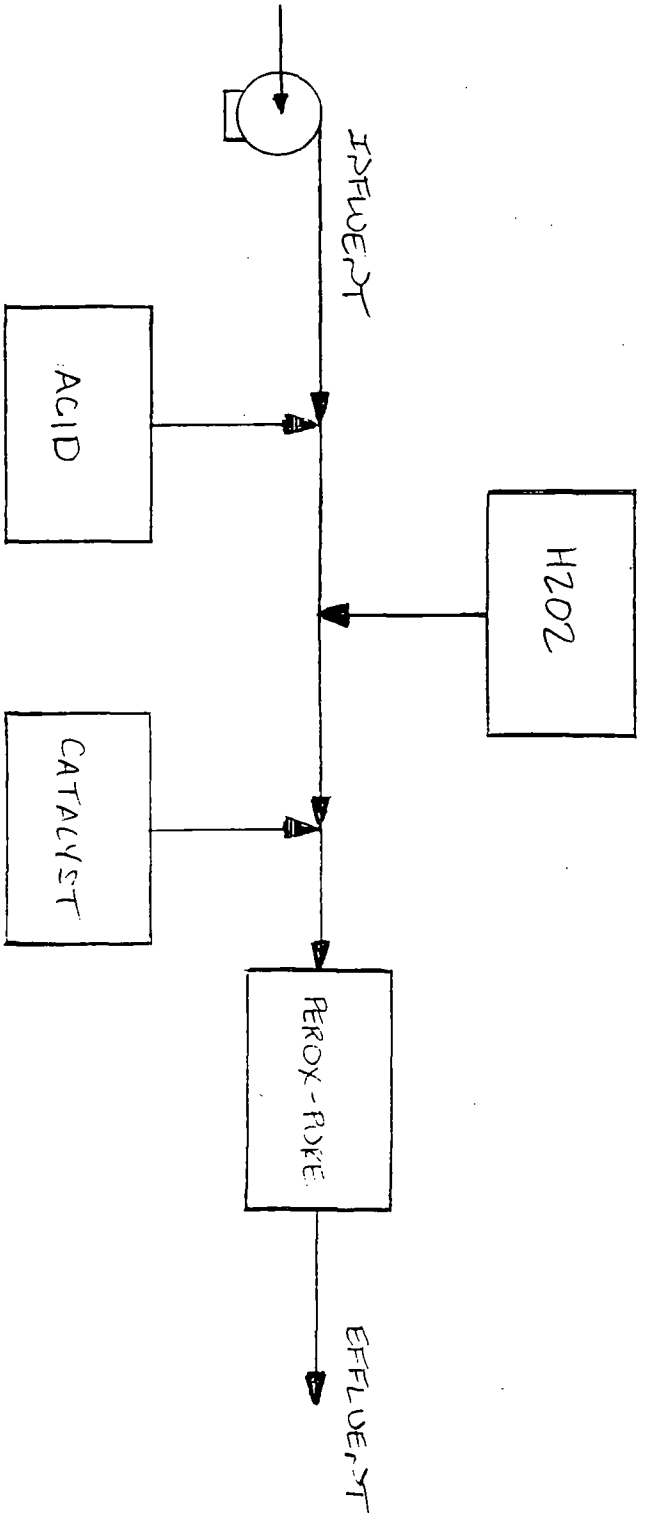
Peroxidation Systems
Vulcan Peroxidation Systems Inc., a Vulcan Chemicals Company

SHT 1 OF 1

SUBJECT: PROCESS FLOW DIAGRAM

BY: PLT CHKD BY: _____ APPD BY: _____

DATE: 7/28/95 DATE: DATE:



ATTACHMENT G

PRICING

EQUIPMENT PRICING

Below find pricing for the recommended **perox-pure™** system. The pricing provided is for Equipment Procurement Option I as detailed in Attachment D. Pricing for the other Equipment Procurement Options is available upon request. Pricing is as follows:

30 kW **perox-pure™** Module	$ 65,100
PM-1000 Hydrogen Peroxide Storage/Feed Module	Included*
AM/CM Acid/Catalyst Feed Module	$ 4,000
System Installation/Start-up	$ 4,250

The scope of services provided in the System Installation/Start-up is detailed in Attachment C. Normal delivery is 10 - 12 weeks after receipt of approved drawings. Prices are FOB Tucson, AZ. Please note that taxes, permits, if any and freight are not included.

* The PM-1000 Hydrogen Peroxide Storage/Feed Module is included at no charge with a VPSI Hydrogen Peroxide Supply Agreement.

BENCH SCALE TREATABILITY STUDIES

VENDOR REPORT

Solarchem Environmental Systems

July, 1995

801 Hillborn Ct.
Suisun City, CA 94585-4116

Telephone (707) 435-9390
Facsimile (707) 434-8441

Solarchem

July 24, 1995

Phil Heck
Montgomery Watson
4525 South Wasatch Blvd.
Suite 200
Salt Lake City, UT 84124

Dear Phil,

Here is the complete proposal for the treatment system for American Chemical Service. It is essential the same as the information faxed to you to July 20th, 1995 except for some of the omitted explanatory data.
I look forward to your decision soon and please give me a call if you have any questions or need any clarification.

Yours sincerely,

SOLARCHEM ENVIRONMENTAL SYSTEMS
PER:

Martin J. Crawford
Sales Engineer

801 Hillborn Ct.
Suisun City, CA 94585-4116

Telephone (707)435-9390
Facsimile (707)434-8441

Solarchem

FACSIMILE NO.	:	801-272-0430
NO. OF PAGES	:	2
DATE	:	July 25, 1995
TO	:	Phil Heck
FROM	:	Martin Crawford
SUBJECT	:	Revision of Costs

Phil,

Please insert this page 5-2 into the proposal you will receive today by federal express. Also, the capital cost of $91,674 should be replace $69,221 in the EXECUTIVE SUMMARY.
I look forward to your decision and please feel free to contact me if you should have any questions.

Yours sincerely,

SOLARCHEM ENVIRONMENTAL SYSTEMS
PER:

Martin J. Crawford
Sales Engineer

Proposal To

Montgomery Watson

for the supply of a

Rayox® UV/Oxidation

Groundwater Treatment System

for

American Chemical Service, Inc.
Griffith, IN

NO. P533 **JULY 20, 1994**

CONTENTS

EXECUTIVE SUMMARY

SECTION 1 DESIGN VALIDATION

1.1 Design Test Summary
1.2 Design Test Results
1.3 Electrical Energy per Order (EE/O)
1.4 Scale-Up Calculation

SECTION 2 SYSTEM DESCRIPTION

2.1 PHASE 1
2.1.1 Process Description
2.1.2 Equipment Specification

2.2 PHASE 2
2.2.1 OPTION 1
2.2.1.1 Process Description
2.2.1.2 Equipment Specification
2.2.2 OPTION 2
2.2.2.1 Process Description
2.2.2.2 Equipment Specification

2.3 PROCESS CONTROL SPECIFICATION

SECTION 3 SYSTEM PERFORMANCE

3.1 PHASE 1
3.1.1 Performance of **Rayox®** System
3.1.2 Operating Requirements

3.2 PHASE 2
3.2.1 OPTION 1
3.2.1.1 Performance of **Rayox®** System
3.2.1.2 Operating Requirements
3.2.2 OPTION 2
3.2.2.1 Performance of **Rayox®** System
3.2.2.2 Operating Requirements

SECTION 4 SCOPE OF SUPPLY

4.1 Solarchem Supply
4.2 Supply by Others

SECTION 5 QUOTATION

5.1 Equipment Purchase
5.2 Performance Guarantee and Warranty
5.3 General Terms and Conditions

SECTION 6 STATEMENT OF QUALIFICATIONS

6.1 Overview
6.2 Key Features of **Rayox®** Technology
6.3 Case Histories
6.4 Key Personnel

Supplement Information DRAWINGS

EXECUTIVE SUMMARY

In response to Montgomery Watson's request for quotation, Solarchem is pleased to offer this proposal for a **Rayox®** UV/oxidation system to treat groundwater at the American Chemical Service facility in Griffith, IN.

Initially (Phase 1), the pumping of the groundwater is anticipated to be at flowrates up to 50 gpm, with the main contaminant in the water being benzene. After the first year (Phase 2), pumping from another plume where the system size limiting contaminant is DCM is expected at flowrates up to 15 gpm, in addition to Phase 1 flow. Solarchem has prepared this proposal for three systems, based on the phases of treatment and the following options:

Phase 1: A 1 x 30 kW **Rayox®** system utilizing Solarchem's patented **Rayox® -F** process.

Phase 2: Two options are proposed for the treatment of the Phase 2 flow:

- Separate treatment of the flow from the high DCM plume. This would require a 1 x 30 kW **Rayox®** system utilizing Solarchem's patented **Rayox®-T** process, in addition to the system listed above under Phase 1.

- Treatment of the mixed flow from the various plumes would require a 6 x 30 kW **Rayox®** system utilizing Solarchem's patented **Rayox® -A** process.

The **Rayox®** system uses UV light together with hydrogen peroxide and proprietary catalysts to treat the water to the required levels. The optimal **Rayox®** systems for this application were determined through design tests using a 1 kW **Rayox®** pilot unit on actual water performed by Solarchem in July, 1994. This testing enables Solarchem to provide a performance guarantee that the system will meet the treatment requirement.

Key advantages of the **Rayox®** system are as follows:

- Low wavelength, high-powered lamps, with optimal spectral output in the region where most organic pollutants are destroyed
- Proven lamp quartz cleaning mechanism, which maximizes the equipment availability while ensuring the integrity of the treatment process
- Proven, reliable programmable logic controller (PLC) for operator safety and remote diagnostics
- Proprietary ENOX catalysts for the enhanced destruction of organic pollutants like chlorinated alkanes such as methylene chloride (DCM) and dichloroethane (DCA)

The selling price for the proposed **Rayox®** systems is as follows:

1. Phase 1 $70,999, with an estimated operating cost of $2.85 / 1,000 gal.

2. Phase 2 ~~$69,221~~ $91,679, with an estimated operating cost of $13.46 / 1000 gal.

(Option 1) (if the streams can be treated separately)

3. Phase 2 $179,689, with an estimated operating cost of $23.58 / 1000 gal.
(Option2) (if the streams must be treated together)

The above capital costs include for the peroxide, acid, caustic and ENOX catalyst dosing systems, as required. The operating costs include for electrical power, replacement lamps, peroxide and other chemical reagents, as required.

SECTION 1

DESIGN VALIDATION

1.1 DESIGN TEST SUMMARY

A design test was carried out at Solarchem's Markham, Ontario laboratory on two samples of water taken from the site. The design test was carried out with the following objectives in mind:

- demonstrate that the **Rayox®** process can treat the benzene in the low strengh groundwater down to the required discharge level of 29 ppb, and
- provide the capital and operating costs for the **Rayox®** system to treat the low strength groundwater at a flowrate of 42 gpm, and
- investigate treatments for reducing the concentration of dichloromethane in the high strength groundwater. Options include treating the high strength groundwater separately from the low strength water, or combining both streams for treatment.

The design test has confirmed that:

- In Phase 1 (low strength stream), treatment of the low strength groundwater to the required effluent criteria will be obtained with a 1 x 30 kW **Rayox®** reactor operating at a power consumption of 21.7 kW, and using pH adjustment to 3, ENOX 510 catalyst, and 200 ppm hydrogen peroxide.

- In Phase 2, one possible approach is treatment of dichloromethane in the high strength groundwater with **Rayox®-T**. Another approach is to combine the two streams and treat with a 6 x 30 kW **Rayox®-A** system.

1.2 DESIGN TEST RESULTS

Solarchem carried out validation testing on the actual groundwater in July, 1995. Tests were conducted on the low strength and high strength groundwater samples as well as on a blended sample of 4 parts low strength to 1 part high strength water by volume. Sample water was spiked with approximately 10 ppm of benzene to achieve a similar initial concentration to what was expected in the full scale. Peroxide and ENOX catalyst were added, sample pH was adjusted, and the exposure to UV light was varied until the required treatment was obtained. Low strength groundwater testing was performed on an 8 gallon batch in a 1 kW pilot-scale **Rayox®** reactor. Tests of the high strength groundwater and the 4:1 blended sample were carried out in a 130 ml and a 1 L reactor

respectively. Samples were taken during the design test to ensure the consistency of the treatment.

Rayox® F was identified as the most effective treatment for the low strength groundwater. In Figure 1, the concentration of benzene is plotted against UV dose in kWh/1000 gallons, which is a measure of the exposure to UV radiation. VOC analysis confirmed that the water would meet the required discharge requirements. Optimization would be carried out during commissioning to establish the minimum peroxide and ENOX doses, which are dependent on the actual influent water concentrations.

The 4:1 Blend of low strength to high strength groundwater was most effectively treated by Solarchem's **Rayox® A** process. Figure 2 shows the concentration levels of both benzene and dichloromethane levels at different UV doses.

Figure 3 shows the treatment of the high strength groundwater by the **Rayox® T** process. With this alternate process, the measure of treatment effectiveness is obtained by plotting dichloromethane concentration against the hydrogen peroxide added in ppm.

1.3 ELECTRICAL ENERGY PER ORDER (EE/O)

The EE/O is the principal scale-up parameter used by Solarchem, and is defined as the energy in kWh required to reduce the target concentration in 1000 gallons by one order of magnitude (or 90%). EE/O has the units kWh per 1000 gallons per order.

For example, in the low strength groundwater design test, benzene was reduced from 8800 ppm to 19 ppm with a UV dose of 9.1 kWh/1000 gallons. Equation (1) is used to calculate the EE/O:

$$EE/O = \frac{\text{UV dose (kWh/1000 gallons)}}{\log(\text{init/final})} = \frac{9.1}{\log(8800/19)} = 3.4 \quad (1)$$

Similarly for the 4:1 blend of low strength to high strength groundwater, the EE/O can be estimated from the reduction of dichloromethane from 658 ppm to 101 ppm after exposure to 40 kWh/1000 gallons of UV light.

$$EE/O = \frac{\text{UV dose (kWh/1000 gallons)}}{\log(\text{init/final})} = \frac{40}{\log(658/101)} = 49.1 \quad (1)$$

Calculated EE/O values are then used to scale from the bench to full scale using the Equation (2):

$$kW = \frac{EE/O \times Flow\ (gpm) \times 60 \times \log (init/fin)}{Flow\ (gpm) \times 60 \times \log (init/final)} \quad (2)$$

Hence, once (a) the flowrate, (b) the influent concentration, and (c) the effluent or final concentration are all fixed, the total lamp power in kW is found.

1.4 SCALE-UP CALCULATION

For the low strength groundwater, from Equation (2):

$$kW = \frac{3.4 \times 42 \times 60 \times \log (10000/29)}{1000}$$

Total kW required = 21.7

In the full-scale, a total lamp power of 21.7 kW is required, which will be met with a 1 x 30 kW **Rayox®** system.

For the combined low strength and high strength groundwater, we assume 42 gpm low strength groundwater will be combined with 13 gpm high strength giving a design influent dichoromethane concentration of 5.2 ppm. The system can then be sized to meet the discharge requirement of 0.5 ppm dichloromethane, from Equation (2):

$$kW = \frac{49.1 \times 55 \times 60 \times \log (5.2/0.5)}{1000}$$

Total kW required = 164.9

In the full-scale, a total lamp power of 164.9 kW is required, which can be met with a 6 x 30 kW **Rayox®** system.

For the high strength groundwater alone, the dichloromethane concentration was reduced by 300 ppm for every 1000 ppm of hydrogen peroxide dosed. Assuming treatment remains linear at the low DCM concentrations, **Rayox® T** should be effective for destruction of the dichloromethane in the high strength groundwater. However, effective treatment of all volatile organic compounds in the high strength groundwater has not been confirmed. Further optimization of the treament of the high strength stream should be carried-out at Solarchem.

SECTION 2

SYSTEM DESCRIPTION

2.1 PHASE 1

2.1.1 PROCESS DESCRIPTION

Groundwater is pumped at flowrates up to 42 gpm. Hydrogen peroxide, sulfuric acid and **ENOX510** catalyst (required only if the raw water contains less than 10 ppm iron) are injected and mixed with the water in static mixers before treatment in the 30 kW **Rayox®** system. Inside the reactor, the UV light combines with hydrogen peroxide and **ENOX510** molecules to form highly reactive oxidizing species which destroy the target organic compounds in the groundwater. The pH of the water exiting the reactor is raised to 8 prior to discharge through the injection of caustic soda to allow for subsequent metals removal.

The **Rayox®** reactor is a cylindrical stainless steel vessel at the center of which is a single high powered Solarchem ultraviolet lamp. A quartz sleeve separates the lamp from the water. The quartz sleeve is kept clean automatically by a patented air-actuated quartz cleaner that wipes the surface at regular intervals.

The system operates under the control of a PLC (Programmable Logic Controller). The main functions of the PLC software are to control the process, monitor the system status and alert the operator to any fault conditions. The system is fail-safe for operator and equipment safety. The PLC can be programmed to control the whole remediation cycle including the operation of the well pumps, and can be designed to interface with a centralized plant control system.

A keypad with alphanumeric display on the control panel allows the operator to monitor the operating status of the system. Alarm and status messages are displayed on the alphanumeric message annunciator.

A modem can be incorporated *(optional)* to enable remote diagnostics and reprogramming as required. Upon system shutdown, the PLC can activate an autodialer *(optional)*, which in turn will alert the operating personnel, or Solarchem's service department, to the shutdown condition.

2.1.2 EQUIPMENT SPECIFICATION

Rayox® *Reactor System*

Rayox® Reactor	: One (1) 30 kW Solarchem UV lamp : Fully shielded for protection from UV light : Air cooling fan on lamp end

Quartz Cleaner	:	Automatic action for cleaning UV reactor quartz sleeve
	:	Pneumatic drive
	:	40 micron filter, pressure regulator, oilier
	:	Proximity switches to detect operation
	:	Adjustable cycle frequency via PLC
Air Compressor *(Optional)*	:	Reciprocating instrument air compressor

Hydraulic System

Treatment Capacity	:	42 gallons per minute
Pipe Diameter	:	2" 316L stainless steel, schedule 10
Maximum Hydraulic Capacity	:	70 gallons per minute
Minimum Flowrate	:	10 gallons per minute
Materials of Construction	:	316 or 316L stainless steel, quartz, Teflon (wetted) and Viton
Sample Points	:	Influent and effluent
Maximum System Pressure	:	25 psig
System Test Pressure	:	50 psig
Pressure Loss @ 42 gpm	:	10 psi
Pump	:	Supplied by Purchaser
Flow Measurement	:	Magnetic flowmeter
Flow Totalizer	:	Integral digital flow totalizer

Electrical System

Electrical Supply Required :-

Rayox® System	:	480 VAC, 60 Hz, 3 Phase protected supply
Full Load Running Current	:	74 Amps
Air Compressor/Auto dialer *(Optional)*	:	120 VAC, 60 Hz, 15 Amp dedicated wall outlets
High Voltage **Rayox®** System	:	Housed in a NEMA 1 ventilated and drip-proof enclosure
	:	480 VAC for Lamp Power Supply
	:	1 x 30 kW Lamp Power Supply
	:	480/120 VAC Transformer
	:	Transformers in the high voltage enclosure are capable of rugged long term performance
	:	Power factor better than 0.9 at full power
Low Voltage **Rayox®** System	:	120 VAC for cooling fans, air solenoids, metering pump controls, and PLC
	:	24 VDC for interlock and input devices

Physical Specifications

The **Rayox®** system is mounted on one (1) skid. Physical specifications for the skid are as follows:

Approximate Overall Dimensions	:	4'W x 4'L x 7.5'H **Rayox®** Reactor Skid (see attached Drawing No. 000-RD-000111)
Required Height Clearance	:	10.5'
Skid Material	:	Structural steel, with acid wash primer, chemical resistant 2 part epoxy paint
System Weight (dry)	:	2,500 lbs

Chemical Reagents Delivery Systems

All chemical reagents delivery systems components are mounted on separate stainless steel frames suitable for floor or wall installation. Each skid includes an electrical junction box. Typical drawings depicting the outlines and dimensions of the proposed hydrogen peroxide and caustic soda delivery systems are attached to this Proposal (Drawing No. 000-RX-400001, Sheets 1 of 3 and 3 of 3).

Specifications for the chemical reagents delivery systems are as follows:

Approximate Dimensions per skid	:	1'W x 1'L x 4'H
Hydrogen Peroxide System	:	50% Hydrogen Peroxide
	:	Estimated requirement 20 gpd
	:	Delivery via metering pump
	:	Prominent Model Gamma4
	:	Installed spare metering pump *(Optional)*
	:	Proportional flow control to influent flowrate *(Optional)*
	:	Manual override on stroke length/speed
	:	Electronic Solid State low flow switch
	:	Rotameter
	:	Pressure indicator on pump discharge
	:	Externally adjustable stainless steel back pressure /check valve
	:	Pulsation damper
	:	Automatic priming valve
	:	Static mixer in process line
ENOX Delivery System	:	**ENOX 510**
	:	Estimated requirement 11 gpd
	:	Delivery via metering pump

	: Installed spare metering pump *(Optional)*
	: Proportional flow control to influent flowrate *(Optional)*
	: Manual override on stroke length/speed
	: Electronic Solid State low flow switch
	: Rotameter
	: Pressure indicator on pump discharge
	: Externally adjustable stainless steel back pressure/check valve
	: Pulsation damper
	: Static mixer in process line
	: Automatic priming valve
Acid Delivery System *(Optional)*	: 93% Sulfuric Acid
	: Estimated required 13 gpd
	: In-line pH probe
	: Installed spare pH probe *(Optional)*
	: Panel mount PID controller
	: Delivery via electronically controlled metering pump
	: Installed spare metering pump *(Optional)*
	: Pressure indicator on pump discharge
	: Automatic Teflon shutoff valve at point of injection
	: Externally adjustable stainless steel back pressure /check valve
Caustic Delivery System *(Optional)*	: 50% Caustic Soda
	: Estimated requirement 5 gpd
	: In-line pH probe
	: Installed spare pH probe *(Optional)*
	: Panel mount PID controller
	: Delivery via electronically controlled metering pump
	: Installed spare metering pump *(Optional)*
	: Pressure indicator on pump discharge
	: Externally adjustable stainless steel back pressure /check valve
	: Static mixer in process line

Regulatory Compliance

- Certified by CSA, an OSHA accredited Nationally Recognized Testing Laboratory (NRTL)
- Conforms to NFPA National Electric Code (NEC)

2.2 PHASE 2

2.2.1 OPTION 1

2.2.1.1 PROCESS DESCRIPTION

In addition to the water treated as described in 1.1 above, groundwater from the high concentration sources is pumped at flowrates up to 15 gpm for treatment in an additional **Rayox®** system. Hydrogen peroxide, sulfuric acid are injected and mixed with the water in static mixers before treatment in the 30 kW **Rayox®** system. The **Rayox®** system will utilize Solarchem's **Rayox®-T** process, requiring the groundwater to be heated prior to treatment in the UV reactor. Heating the water will be accomplished with a heat exchanger connected to the plant's steam supply. Inside the reactor, the UV light combines with hydrogen peroxide and ENOX 510 to form highly reactive oxidizing species which destroy the target organic compounds in the groundwater. The pH of the water exiting the reactor is raised to 8 prior to discharge through the injection of caustic soda.

The **Rayox®** reactor is a cylindrical stainless steel vessel at the center of which is a single high powered Solarchem ultraviolet lamp. A quartz sleeve separates the lamp from the water. The quartz sleeve is kept clean automatically by a patented air-actuated quartz cleaner that wipes the surface at regular intervals.

The system operates under the control of a PLC (Programmable Logic Controller). The main functions of the PLC software are to control the process, monitor the system status and alert the operator to any fault conditions. The system is fail-safe for operator and equipment safety. The PLC can be programmed to control the whole remediation cycle including the operation of the well pumps, and can be designed to interface with a centralized plant control system.

A keypad with alphanumeric display on the control panel allows the operator to monitor the operating status of the system. Alarm and status messages are displayed on the alphanumeric message annunciator.

A modem can be incorporated *(optional)* to enable remote diagnostics and reprogramming as required. Upon system shutdown, the PLC can activate an autodialer *(optional)*, which in turn will alert the operating personnel, or Solarchem's service department, to the shutdown condition.

2.2.1.2 EQUIPMENT SPECIFICATION

Rayox® *Reactor System*

Rayox® Reactor	:	One (1) 30 kW Solarchem UV lamp
	:	Fully shielded for protection from UV light
	:	Air cooling fan on lamp end
Quartz Cleaner	:	Automatic action for cleaning UV reactor quartz sleeve
	:	Pneumatic drive
	:	40 micron filter, pressure regulator, oilier
	:	Proximity switches to detect operation
	:	Adjustable cycle frequency via PLC
Air Compressor *(Optional)*	:	Reciprocating instrument air compressor

Hydraulic System

Treatment Capacity	:	13 gallons per minute
Pipe Diameter	:	1" 316L stainless steel, schedule 10
Maximum Hydraulic Capacity	:	30 gallons per minute
Minimum Flowrate	:	10 gallons per minute
Materials of Construction	:	316 or 316L stainless steel, quartz, Teflon (wetted) and Viton
Sample Points	:	Influent and effluent
Maximum System Pressure	:	25 psig
System Test Pressure	:	50 psig
Pressure Loss @ 13 gpm	:	7 psi
Pump	:	Supplied by Purchaser
Flow Measurement	:	Magnetic flowmeter
Flow Totalizer	:	Integral digital flow totalizer
Heat Exchanger	:	316 L stainless steel, steam heated (steam by others)
Reaction Tank	:	1,000 gallon plug flow reactor, FRP construction

Electrical System

Electrical Supply Required :-

Rayox® System	:	480 VAC, 60 Hz, 3 Phase protected supply
Full Load Running Current	:	74 Amps
Air Compressor/Auto dialer *(Optional)*	:	120 VAC, 60 Hz, 15 Amp dedicated wall outlets
High Voltage **Rayox®** System	:	Housed in a NEMA 1 ventilated and drip-proof enclosure
	:	480 VAC for Lamp Power Supply
	:	1 x 30 kW Lamp Power Supply

	:	480/120 VAC Transformer
	:	Transformers in the high voltage enclosure are capable of rugged long term performance
	:	Power factor better than 0.9 at full power
Low Voltage **Rayox®** System	:	120 VAC for cooling fans, air solenoids, metering pump controls, and PLC
	:	24 VDC for interlock and input devices

Physical Specifications

The **Rayox®** system is mounted on one (1) skid. Physical specifications for the skid are as follows:

Approximate Overall Dimensions	:	4'W x 4'L x 7.5'H **Rayox®** Reactor Skid (see attached Drawing No. 000-RD-000111)
Required Height Clearance	:	10.5'
Skid Material	:	Structural steel, with acid wash primer, chemical resistant 2 part epoxy paint
System Weight (dry)	:	2,500 lbs

Chemical Reagents Delivery Systems

All chemical reagents delivery systems components are mounted on separate stainless steel frames suitable for floor or wall installation. Each skid includes an electrical junction box. Typical drawings depicting the outlines and dimensions of the proposed hydrogen peroxide and caustic soda delivery systems are attached to this Proposal (Drawing No. 000-RX-400001, Sheets 1 of 3 and 3 of 3).

Specifications for the chemical reagents delivery systems are as follows:

Approximate Dimensions per skid	:	1'W x 1'L x 4'H
Hydrogen Peroxide System	:	50% Hydrogen Peroxide
	:	Estimated requirement 63 gpd
	:	Delivery via metering pump
	:	Prominent Model Gamma4
	:	Installed spare metering pump *(Optional)*
	:	Proportional flow control to influent flowrate *(Optional)*
	:	Manual override on stroke length/speed
	:	Electronic Solid State low flow switch
	:	Rotameter
	:	Pressure indicator on pump discharge
	:	Externally adjustable stainless steel back

		pressure /check valve
	:	Pulsation damper
	:	Automatic priming valve
	:	Static mixer in process line
Acid Delivery System *(Optional)*	:	93% Sulfuric Acid
	:	Estimated required 5 gpd
	:	In-line pH probe
	:	Redundant in-line pH probe *(Optional)*
	:	Panel mount PID controller
	:	Delivery via electronically controlled metering pump
	:	Installed spare metering pump *(Optional)*
	:	Pressure indicator on pump discharge
	:	Automatic Teflon shutoff valve at point of injection
	:	Externally adjustable stainless steel back pressure /check valve
Caustic Delivery System *(Optional)*	:	50% Caustic Soda
	:	Estimated requirement 4 gpd
	:	In-line pH probe
	:	Redundant in-line pH probe *(Optional)*
	:	Panel mount PID controller
	:	Delivery via electronically controlled metering pump
	:	Installed spare metering pump *(Optional)*
	:	Pressure indicator on pump discharge
	:	Externally adjustable stainless steel back pressure /check valve
	:	Static mixer in process line

2.2.2 OPTION 2

2.2.2.1 PROCESS DESCRIPTION

Groundwater from both sources will be combined and fed (by others) at flowrates up to 65 gpm for treatment in a single **Rayox®** train, consisting of 6 x 30 kW reactors. Hydrogen peroxide, sulfuric acid and **ENOX910** catalyst are injected and mixed with the water in static mixers before treatment in the 180 kW **Rayox®** system. The **Rayox®** system will utilize Solarchem's **Rayox®**-A process. Inside the reactor, the UV light combines with hydrogen peroxide and **ENOX910** molecules to form highly reactive oxidizing species

which destroy the target organic compounds in the groundwater. The pH of the water exiting the reactor is raised to 8 prior to discharge through the injection of caustic soda.

The **Rayox®** reactor is a cylindrical stainless steel vessel at the center of which is a single high powered Solarchem ultraviolet lamp. A quartz sleeve separates the lamp from the water. The quartz sleeve is kept clean automatically by a patented air-actuated quartz cleaner that wipes the surface at regular intervals.

The system operates under the control of a PLC (Programmable Logic Controller). The main functions of the PLC software are to control the process, monitor the system status and alert the operator to any fault conditions. The system is fail-safe for operator and equipment safety. The PLC can be programmed to control the whole remediation cycle including the operation of the well pumps, and can be designed to interface with a centralized plant control system.

A keypad with alphanumeric display on the control panel allows the operator to monitor the operating status of the system. Alarm and status messages are displayed on the alphanumeric message annunciator.
A modem can be incorporated *(optional)* to enable remote diagnostics and reprogramming as required. Upon system shutdown, the PLC can activate an autodialer *(optional)*, which in turn will alert the operating personnel, or Solarchem's service department, to the shutdown condition.

2.2.2.2 EQUIPMENT SPECIFICATION

Rayox® ***Reactor System***

Rayox® Reactor	:	Six (6) 30 kW Solarchem UV lamp
	:	Fully shielded for protection from UV light
	:	Air cooling fan on lamp end
Quartz Cleaner	:	Automatic action for cleaning UV reactor quartz sleeve
	:	Pneumatic drive
	:	40 micron filter, pressure regulator, oilier
	:	Proximity switches to detect operation
	:	Adjustable cycle frequency via PLC
Air Compressor *(Optional)*	:	Reciprocating instrument air compressor

Hydraulic System

Treatment Capacity	:	55 gallons per minute
Pipe Diameter	:	2" 316L stainless steel, schedule 10
Maximum Hydraulic Capacity	:	60 gallons per minute
Materials of Construction	:	316 or 316L stainless steel, quartz, Teflon (wetted) and Viton

Sample Points	:	Influent and effluent
Maximum System Pressure	:	25 psig
System Test Pressure	:	50 psig
Pressure Loss @ 55 gpm	:	16 psi
Pump	:	Supplied by Purchaser
Flow Measurement	:	Magnetic flowmeter
Flow Totalizer	:	Integral digital flow totalizer

Electrical System

Electrical Supply Required :-

Rayox® System	:	480 VAC, 60 Hz, 3 Phase protected supply
Full Load Running Current	:	256 Amps (128 per skid)
Air Compressor/Auto dialer *(Optional)*	:	120 VAC, 60 Hz, 15 Amp dedicated wall outlets
High Voltage **Rayox®** System	:	Housed in a NEMA 1 ventilated and drip-proof enclosure
	:	480 VAC for Lamp Power Supply
	:	6 x 30 kW Lamp Power Supply
	:	480/120 VAC Transformer
	:	Transformers in the high voltage enclosure are capable of rugged long term performance
	:	Power factor better than 0.9 at full power
Low Voltage **Rayox®** System	:	120 VAC for cooling fans, air solenoids, metering pump controls, and PLC
	:	24 VDC for interlock and input devices

Physical Specifications

The **Rayox®** system is mounted on two (2) skids. Physical specifications for each skid are as follows:

Approximate Overall Dimensions	:	4'W x 4'L x 7.5'H **Rayox®** Reactor Skid (see attached Drawing No. 000-RD-000254)
Required Height Clearance	:	10.5'
Skid Material	:	Structural steel, with acid wash primer, chemical resistant 2 part epoxy paint
System Weight (dry)	:	7,500 lbs

Chemical Reagents Delivery Systems

All chemical reagents delivery systems components are mounted on separate stainless steel frames suitable for floor or wall installation. Each skid includes an electrical junction box. Typical drawings depicting the outlines and dimensions of the proposed hydrogen peroxide and caustic soda delivery systems are attached to this Proposal (Drawing No. 000-RX-400001, Sheets 1 of 3 and 3 of 3).

Specifications for the chemical reagents delivery systems are as follows:

Approximate Dimensions per skid	:	1'W x 1'L x 4'H
Hydrogen Peroxide System	:	50% Hydrogen Peroxide
	:	Estimated requirement 265 gpd
	:	Delivery via metering pump
	:	Prominent Model Gamma4
	:	Installed spare metering pump *(Optional)*
	:	Proportional flow control to influent flowrate *(Optional)*
	:	Manual override on stroke length/speed
	:	Electronic Solid State low flow switch
	:	Rotameter
	:	Pressure indicator on pump discharge
	:	Externally adjustable stainless steel back pressure /check valve
	:	Pulsation damper
	:	Automatic priming valve
	:	Static mixer in process line
ENOX Delivery System	:	**ENOX 910**
	:	Estimated requirement 347 gpd
	:	Delivery via metering pump
	:	Installed spare metering pump *(Optional)*
	:	Proportional flow control to influent flowrate *(Optional)*
	:	Manual override on stroke length/speed
	:	Electronic Solid State low flow switch
	:	Rotameter
	:	Pressure indicator on pump discharge
	:	Externally adjustable stainless steel back pressure/check valve
	:	Pulsation damper
	:	Static mixer in process line
	:	Automatic priming valve
Acid Delivery System	:	93% Sulfuric Acid

(Optional)	: Estimated required 20 gpd
	: In-line pH probe
	: Redundant in-line pH probe *(Optional)*
	: Panel mount PID controller
	: Delivery via electronically controlled metering pump
	: Installed spare metering pump *(Optional)*
	: Pressure indicator on pump discharge
	: Automatic Teflon shutoff valve at point of injection
	: Externally adjustable stainless steel back pressure /check valve
Caustic Delivery System *(Optional)*	: 50% Caustic Soda
	: Estimated requirement 8 gpd
	: In-line pH probe
	: Redundant in-line pH probe *(Optional)*
	: Panel mount PID controller
	: Delivery via electronically controlled metering pump
	: Installed spare metering pump *(Optional)*
	: Pressure indicator on pump discharge
	: Externally adjustable stainless steel back pressure /check valve
	: Static mixer in process line

2.3 PROCESS CONTROL SPECIFICATION

All three of the proposed systems described above operate under the control of a Programmable Logic Controller (PLC). The main functions of the PLC software are to control the process and monitor the system status, and to alert the operator to any fault conditions. The system is fail-safe for the operator's safety and equipment protection. Alarm and status messages are displayed on the alpha-numeric annunciator on the control panel. Control system specifications are as follows:

Control System

Control Panel	: NEMA 12 Enclosure
	: System Start/Stop buttons
	: Lamp selector switch
	: Digital display flow indicator
	: Lamp current, power and voltage display
	: Alphanumeric fault and system status display

	:	Integral operator interface for testing components during servicing
Programmable Logic Controller	:	Model TI-435
Telephone Auto-dialer *(Optional)*	:	Delivers up to three pre-recorded messages by telephone in the event of a system fault
Dial-up Modem *(Optional)*	:	Allows remote monitoring, diagnosis

Fail-safe Operation

Flow	:	Alarm and automatic system shutdown on influent flowrate out of range
	:	Alarm and shutdown on leak detection
Hydrogen Peroxide Delivery	:	Alarm and shutdown on low peroxide flow
	:	Alarm on low peroxide level in storage tank
Temperature	:	Alarm and shutdown on high water temperature within reactor
Lamp	:	Alarm and shutdown on lamp failure
	:	Alarm and shutdown on lamp cooling fan failure
	:	Power interlock on HV cabinet door
	:	Alarm and shutdown on UV access covers
Quartz Cleaner	:	Alarm on failure to operate Alarm on low air pressure
pH adjustment	:	Alarm on pH out of range on influent and effluent stream

SECTION 3

SYSTEM PERFORMANCE

The proposed **Rayox®** water treatment system will treat the water to the specified discharge limits. Specific performance guarantees and estimated operating requirements are as follows:

3.1 PHASE 1

3.1.1 PERFORMANCE OF RAYOX® *SYSTEM*

The proposed **Rayox®** system will treat Phase 1 groundwater at flowrates up to 42 gpm from the maximum influent concentrations to the required effluent concentration listed below. This performance guarantee is based on tests performed on actual water at Solarchem's laboratory.

Treatment flow rate	:	42	gpm
Peroxide Dose	:	200	ppm
Power consumption	:	30 kW	

Treatment Specification:	Influent ppb	Effluent ppb
Benzene	10,000	<29

Typical Water Chemistry:

C.O.D.	55	ppm	
pH	7.3		
TSS	165	ppm	
Iron	5.1	ppm	
Chloride	12	ppm	
Nitrate	<1	ppm	
Alkalinity	450	ppm	as $CaCO_3$

UV Absorbance:	λ, nm	Absorbance/cm
	200	1.8
	220	1.25
	240	0.95
	260	0.8

3.1.2 OPERATING REQUIREMENTS

Chemical Reagents

The proposed **Rayox®** system requires the addition of hydrogen peroxide, sulfuric acid, **ENOX 510** and caustic soda to the influent water. The estimated consumption of each of the reagents for the maximum flow rate of 42 gpm is shown in the table below.

The sizes of the chemical reagents storage tanks are dictated not only by the consumption rate, but also by the cost of delivery and the space available. The recommended sizes for these storage tanks are shown in the table below and are offered as options in this proposal.

Chemical	Estimated Usage gal/day	Size of Storage Tank (U.S. Gallons)
Hydrogen Peroxide, 50%	20	1,000
Sulfuric Acid, 93%	13	1,000
Caustic Soda, 50%	5	1,000
ENOX 510, 5% (if required)	11	1,000

Utilities

The utilities required to operate the **Rayox®** reactor are indicated below.

Electrical Power : 480 VAC, 60 Hz, 3 phase supply, protected
: Full load running current 74 amps

Instrument Air : 2 scfm, 80 - 100 psi
(See optional air compressor)

Estimated Operating Cost

A breakdown of the operating cost per 1000 gallons and per year (350 days) for 42 gpm are shown below:

	Operating Costs $/1000 gallons	$/yr
Electrical Power (at $0.07/kWh)	$0.83	$17,569
Lamp Replacement	0.33	6,985
50% Peroxide (at $0.25/lb, 200 ppm)	0.83	17,667
ENOX510 Catalyst (if needed)	0.50	10,600
pH adjustment (to pH 3 and then pH 8)	0.36	7,654
Total Operating Cost	$2.85	$60,475

3.2 PHASE 2

3.2.1 OPTION 1

3.2.1.1 PERFORMANCE OF RAYOX® SYSTEM

The proposed **Rayox®** system should treat additional Phase 2 groundwater at flowrates up to 13 gpm from the maximum influent concentrations to the required effluent concentration listed below. This performance guarantee is subject to additional tests to be performed on actual water at Solarchem's laboratory.

Treatment flow rate	:	13 gpm
Peroxide Dose	:	2000 ppm
Power consumption	:	30 kW

Treatment Specification:	Influent ppb	Effluent ppb
DCM	22,000	<498

Typical Water Chemistry:

C.O.D.	15,000	ppm	
pH	5.4		
TSS	629	ppm	
Iron	726	ppm	
Chloride	5,790	ppm	
Nitrate	<10	ppm	
Bromide	90	ppm	
Alkalinity	910	ppm	as $CaCO_3$

UV Absorbance:	λ, nm	Absorbance/cm
	200	105
	220	35
	240	18
	260	12

3.2.1.2 OPERATING REQUIREMENTS

Chemical Reagents

The proposed **Rayox®** system requires the addition of hydrogen peroxide, sulfuric acid and caustic soda to the influent water. The estimated consumption of each of the reagents for the flow rate of 13 gpm is shown in the table below.
The sizes of the chemical reagents storage tanks are dictated not only by the consumption rate, but also by the cost of delivery and the space available. The recommended sizes for these storage tanks are shown in the table below and are offered as options in this proposal.

Chemical	Estimated Usage gal/day	Size of Storage Tank (U.S. Gallons)
Hydrogen Peroxide, 50%	63	1,000
Sulfuric Acid, 93%	5	1,000
Caustic Soda, 50%	4	1,000

Utilities

The utilities required to operate the additional **Rayox®** reactor are indicated below.

Electrical Power	:	480 VAC, 60 Hz, 3 phase supply, protected
	:	Full load running current 74 amps
Instrument Air	:	2 scfm, 80 - 100 psi
(See optional air compressor)		

Estimated Operating Cost

A breakdown of the operating cost per 1000 gallons and per year (350 days) for the new system at 13 gpm are shown below:

	Operating Costs $/1000 gallons	$/yr
Electrical Power (at $0.07/kWh)	$2.68	$17,559
Lamp Replacement	1.07	7,011
50% Peroxide (at $0.25/lb, 2000 ppm)	8.35	54,683
Steam	0.78	5,111
pH adjustment (to pH 3 and then pH 8)	0.58	3,807
Total Operating Cost	$13.46	$88,171

3.2.2 *OPTION 2*

3.2.2.1 PERFORMANCE OF RAYOX® *SYSTEM*

The proposed **Rayox®** system should treat the combined groundwater flow at flowrates up to 55 gpm from the maximum influent concentrations to the required effluent concentration listed below. This performance guarantee is subject to additional tests to be performed on actual water at Solarchem's laboratory.

Treatment flow rate	:	55 gpm
Peroxide Dose	:	2000 ppm
Power consumption	:	180 kW

Treatment Specification:	Influent ppb	Effluent ppb
Benzene	< 10,000	<29
DCM	4,400	<498

Typical Water Chemistry:

C.O.D.	3,000	ppm	
pH	5.5 - 7		
TSS	250	ppm	
Iron	150	ppm	
Chloride	1,167	ppm	
Nitrate	<10	ppm	
Bromide	<10	ppm	
Alkalinity	540	ppm	as $CaCO_3$

UV Absorbance:	λ, nm	Absorbance/cm
	200	25
	220	9
	240	5
	260	3.75

3.2.2.2 OPERATING REQUIREMENTS

Chemical Reagents

The proposed **Rayox®** system requires the addition of hydrogen peroxide, sulfuric acid, **ENOX 910** and caustic soda to the influent water. The estimated consumption of each of the reagents for the maximum flow rate of 55 gpm is shown in the table below.

The sizes of the chemical reagents storage tanks are dictated not only by the consumption rate, but also by the cost of delivery and the space available. The recommended sizes for these storage tanks are shown in the table below and are offered as options in this proposal.

Chemical	Estimated Usage gal/day	Size of Storage Tank (U.S. Gallons)
Hydrogen Peroxide, 50%	265	1,000
Sulfuric Acid, 93%	20	1,000
Caustic Soda, 50%	8	1,000
ENOX 910 2%	347	1,000

Utilities

The utilities required to operate the additional **Rayox®** reactor are indicated below.

Electrical Power	:	480 VAC, 60 Hz, 3 phase supply, protected
	:	Full load running current 256 amps
Instrument Air	:	2 scfm, 80 - 100 psi (per skid)
(See optional air compressor)		

Estimated Operating Cost

A breakdown of the operating cost per 1000 gallons and per year (350 days) for the new system at 55 gpm are shown below:

	Operating Costs	
	$/1000 gallons	$/yr
Electrical Power (at $0.07/kWh)	$3.80	$105,336
Lamp Replacement	1.51	41,857
50% Peroxide (at $0.25/lb, 2000 ppm)	8.35	231,349
ENOX 910 Catalyst	9.50	262,897
pH adjustment (to pH 3 and then pH 8)	0.42	11,702
Total Operating Cost	$23.58	$653,141

SECTION 4

SCOPE OF SUPPLY

4.1 SOLARCHEM SUPPLY

PHASE 1

Solarchem proposes to supply the following equipment and to provide the following services:

Equipment:

One (1)	Pre-piped, pre-wired and fully shop-tested **Rayox®** skid consisting of one (1) 30 kW reactor and power supply; flanged two inch (2") influent and effluent piping connections; system controller (PLC), fully programmed
One (1)	Hydrogen peroxide delivery system
One (1)	**ENOX510** delivery system
One (1)	Operating and Maintenance Manual

Optional Equipment:

One (1)	Air compressor
One (1)	Modem
One (1)	Autodialer
One (1)	Acid delivery system
One (1)	Caustic delivery system
Two (2)	pH control systems consisting of probes, transmitters and controllers
Four (4)	1,000 gallon HDPE storage tank for chemical storage, each complete with low level switch

PHASE 2, OPTION 1

Solarchem proposes to supply the following equipment and to provide the following services:

Equipment:

One (1)	Pre-piped, pre-wired and fully shop-tested **Rayox®** skid consisting of one (1) 30 kW reactor and power supply; one **Rayox®-T** reactor; flanged one inch (1") influent and effluent piping connections; system controller (PLC), fully programmed
One (1)	Hydrogen peroxide delivery system
One (1)	Operating and Maintenance Manual
One (1)	Heat exchanger

Optional Equipment:

One (1)	Air compressor
One (1)	Modem
One (1)	Autodialer
One (1)	Acid delivery system
One (1)	Caustic delivery system
Two (2)	pH control systems consisting of probes, transmitters and controllers
Three (3)	1,000 gallon HDPE storage tank for chemical storage, each complete with low level switch

PHASE 2, OPTION 2

Solarchem proposes to supply the following equipment and to provide the following services:

Equipment:

Two (2)	Pre-piped, pre-wired and fully shop-tested **Rayox®** skid consisting of three (3) 30 kW reactor and power supplies; flanged two inch (2") influent and effluent piping connections; system controller (PLC), fully programmed
One (1)	Hydrogen peroxide delivery system
One (1)	**ENOX910** delivery system
One (1)	Operating and Maintenance Manual

Optional Equipment:

One (1)	Air compressor

One (1)	Modem
One (1)	Autodialer
One (1)	Acid delivery system
One (1)	Caustic delivery system
Two (2)	pH control systems consisting of probes, transmitters and controllers
Four (4)	1,000 gallon HDPE storage tank for chemical storage, each complete with low level switch

4.2 SUPPLY BY OTHERS

In order to clarify the scope of Solarchem's supply, it has been assumed for the purposes of this proposal that the following items are supplied by others:

Installation of the system including:

- provision of an industrial indoor environment, 40°F to 95°F, sealed or painted concrete floor
- unloading, placing, leveling, and anchoring equipment
- electrical hook-up
- connecting piping to and from **Rayox®** system
- 1/4" OD tubing between metering pump and peroxide storage tank, and between metering pump and **Rayox®** skid
- electrical wiring between metering pump and **Rayox®** skid
- provisional of a lockable electrical disconnect in vicinity of **Rayox®** system
- provision of utilities including power (480V/120V) and instrument air *(see optional air compressor)*

SECTION 5

QUOTATION

Solarchem proposes to supply the **Rayox**® system and to provide commissioning and/or maintenance services, all as described in this proposal under the commercial terms indicated below:

5.1 EQUIPMENT PURCHASE

PHASE 1

• Selling price for 30 kW **Rayox**® System as Described	$60,265
Hydrogen Peroxide dosing system	$6,732
ENOX510 dosing system	$4,002
Net Selling Price	**$ 70,999**

- Items Priced Separately :

Sulfuric acid dosing system	$6,156
Caustic soda dosing system	$5,679
1,000 gallon cross-linked HDPE tank for peroxide	$3,075
1,000 gallon cross-linked HDPE tank for **ENOX510**	$3,075
1,000 gallon cross-linked HDPE tank for sulfuric acid	$3,075
1,000 gallon cross-linked HDPE tank for caustic soda	$3,075
Air compressor	$535
Modem	$305
Auto-dialer	$469

- Payment Terms: 40% of Purchase Price with Purchase Order
  50% on notification of readiness to ship
  10% 30 days after delivery

- Delivery: F.O.B. : Markham, Ontario
  Taxes : Not included
  Customs Clearance : Not included

- Delivery Schedule: 8 - 10 weeks from receipt of down payment
  To be confirmed at time of order

- This offer is valid for a period of sixty (60) days from July 20, 1994.

Quotation

PHASE 2, OPTION 1

• Selling price for 30 kW **Rayox®** System as Described	$81,829
Hydrogen Peroxide dosing system	$6,732
Heat exchanger	$3,113
Net Selling Price	**$ 91,674**

- Items Priced Separately :

Sulfuric acid dosing system	$6,156
Caustic soda dosing system	$5,679
1,000 gallon cross-linked HDPE tank for peroxide	$3,075
1,000 gallon cross-linked HDPE tank for sulfuric acid	$3,075
1,000 gallon cross-linked HDPE tank for caustic soda	$3,075
Air compressor	$535
Modem	$305
Auto-dialer	$469

- Payment Terms: 40% of Purchase Price with Purchase Order
  50% on notification of readiness to ship
  10% 30 days after delivery

- Delivery: F.O.B. . Markham, Ontario
  Taxes : Not included
  Customs Clearance : Not included

- Delivery Schedule: 8 - 10 weeks from receipt of down payment
  To be confirmed at time of order
- This offer is valid for a period of sixty (60) days from July 20, 1994.

PHASE 2, OPTION 2

• Selling price for 180 kW **Rayox®** System as Described	$168,955
Hydrogen Peroxide dosing system	$6,732
ENOX910 dosing system	$4,002
Net Selling Price	**$ 179,689**

- Items Priced Separately :

Sulfuric acid dosing system	$6,156
Caustic soda dosing system	$5,679
1,000 gallon cross-linked HDPE tank for peroxide	$3,075
1,000 gallon cross-linked HDPE tank for **ENOX910**	$3,075

1,000 gallon cross-linked HDPE tank for sulfuric acid	$3,075
1,000 gallon cross-linked HDPE tank for caustic soda	$3,075
Air compressor	$535
Modem	$305
Auto-dialer	$469

- Payment Terms: 40% of Purchase Price with Purchase Order
  50% on notification of readiness to ship
  10% 30 days after delivery

- Delivery: F.O.B. : Markham, Ontario
  Taxes : Not included
  Customs Clearance : Not included

- Delivery Schedule: 8 - 10 weeks from receipt of down payment
  To be confirmed at time of order

- This offer is valid for a period of sixty (60) days from July 20, 1994.

5.2 PERFORMANCE GUARANTEE AND WARRANTY

Performance Guarantee

Solarchem warrants that the **Rayox**® water decontamination system specified in this proposal, will, if installed in accordance with Solarchem instructions and if operated and maintained in accordance with the instructions contained in the Solarchem Operation and Maintenance Manual delivered with the **Rayox**® system, perform in accordance with the performance specified in Section 3.1.1.

Manufacturers Warranty

Material Warranty

Solarchem warrants that, for a period of 12 months from delivery FOB Solarchem's warehouse (Incoterms 1980) of **Rayox**® to the Buyer, Solarchem will replace or repair non-consumable parts of **Rayox**® proved to be defective in material or workmanship provided that the Buyer gives prompt written notice of each defect to Solarchem, and provided that the equipment is installed in accordance with Solarchem instructions and operated and maintained in accordance with the instructions contained in the Solarchem Operation and Maintenance Manual delivered with the **Rayox**® system. Travel time and expenses are charged at cost. Solarchem will be liable for the direct labor and material cost of such repair or replacement by the Buyer only if Solarchem gives prior authorization in writing for the repair or replacement involved.

Lamp Warranty

Solarchem lamps are guaranteed to operate at the rated level of contaminant destruction on the following basis, and provided that the service does not exceed 400 starts:

Operating Time	Guaranteed Terms
0 - 100 hours	Lamp replaced at no charge.
101 - 3000 hours	Price prorated by allowing a credit for unused portion of 3000 hours, applied to purchase of the replacement lamp.

There are no representations, warranties or conditions express or implied statutory or otherwise with respect to **Rayox**® or any part thereof except as expressly provided herein and in the immediately proceeding sections.

5.3 TERMS AND CONDITIONS (ATTACHED)

SECTION 6

STATEMENT OF QUALIFICATIONS

6.1 OVERVIEW

Solarchem Environmental Systems is the leading firm in Advanced Oxidation Processes (AOP) and has over eighty commercial installations throughout the world. Its sole business is the development, manufacture, and sale of equipment for the destruction of waterborne organic contaminants by photochemical processes. Solarchem's corporate goal is to maintain its position of leadership through extraordinary commitment to research and development, excellence in design, quality centered manufacturing, and customer oriented service.

Manufacturing

Solarchem occupies a new 19,000 square foot building located in the town of Markham just north of Toronto. Its workshop has a full complement of equipment and tradesmen to manufacture and assemble all systems in-house. In addition, Solarchem works with U.S. fabricators to provide additional fabrication capability to ensure that project schedules can be met during busy times.

Quality plays a major role at Solarchem in the manufacturing cycle with a well established Quality Assurance program. In addition, all systems undergo a detailed hydraulic and electrical function test prior to shipment.

As a vital part of Solarchem's manufacturing and assembly operation, high standards of quality are maintained by documented and thorough inspection procedures for critical purchased components such as power supplies and lamps, as well as for all machined parts. Systems are carefully assembled and thoroughly tested for up to 24 hours, using customer provided water if requested, before shipment. Overall quality control is the responsibility of the Manufacturing Manager. It should be noted that Solarchem's quality assurance procedures have met the exacting standards of the U.S. Navy and NASA as part of recently completed contracts highlighted in Section 5.3 below.

Solarchem is a CSA (Canadian Standards Association) certified manufacturer. CSA is recognized by the U.S. Occupational Safety and Health Administration (OSHA) as an accredited Nationally Recognized Testing Laboratory (NRTL). On August 18, 1993, the Department of Building and Safety of the City of Los Angeles approved CSA as an Electrical Testing Laboratory. Solarchem facilities are inspected regularly to ensure that the high standards of CSA are maintained.

Customer Service

Solarchem maintains service personnel in Toronto ON, and Las Vegas NV to assist owners during system commissioning as well as to provide a full range of after-sales service to customers. Furthermore, Solarchem has contractual arrangements in place with qualified instrument sub-contractors to complement its own service personnel such as to assure rapid response to service requirements throughout North America.

Solarchem's service capability far exceeds the minimum requirement of servicing **Rayox®** systems through the twelve-month warranty period. Optional Periodic Maintenance agreements provide for regular visits by Solarchem Service Personnel to provide scheduled preventative maintenance. Full Service agreements provide all labor and materials for the complete operation of a system.

Engineering

Solarchem's process engineering group provides the practical expertise for designing and installing treatment systems. The process engineering group becomes involved at the design test stage and follows a given project through process specification, materials selection, process control, quality control testing and installation. Individual responsibility is the key to ensuring project congruence and high quality.

Solarchem's product engineering group includes electrical and mechanical engineering personnel as well as mechanical and electrical CAD designers. This group has many years of experience in designing and building UV/oxidation systems.

Project Management

Once a contract has been awarded to Solarchem, the point of contact is transferred from the responsibility of the sales representative to the Director, Installations. He works with the customer's representative to ensure that all of the contract requirements are satisfied in a timely and effective manner. This effort includes issue of drawings, coordinating drawings approval with the owner's representative, issuing Operating and Maintenance manuals, and coordinating Solarchem's training of the owner's operation and maintenance personnel as well as technical supervision during the commissioning of the **Rayox®** system.

Research and Development

Solarchem's most valuable asset is its intellectual property. Even more valuable than its numerous process and product design patents and its non-patentable know how are the expertise and experience of its staff. This staff includes no fewer than four Ph.D. photochemists, dedicated to photochemical contaminants destruction, a resource unmatched in the world.

Continuing projects for Solarchem's R&D staff include extending the application of AOP through the development of innovative processes, improving the commercial application and

competitiveness of existing processes, improving organics analytical capabilities, and researching areas of new application.

6.2 KEY FEATURES OF RAYOX® TECHNOLOGY

- Proprietary Low Wavelength UV Lamps

  Destruction of target compounds during UV oxidation treatment occurs both by hydroxyl radical attack and direct photolysis. Therefore, it is critical for the UV lamp to have maximum energy output in the UV wavelengths where hydrogen peroxide and the target compounds absorb energy the greatest.

  H_2O_2 and the target compounds have maximum UV absorbance peaks below 220 nm. Solarchem UV lamps have far greater output in these wavelengths than any other commercially available UV lamp. Since the light emitted below 225 nm will actually break bonds and destroy the molecule, the Solarchem Lamps are also uniquely able to provide destruction by direct photolysis. The strong output of the Solarchem Lamp below 225 nm also enables more efficient production of hydroxyl radicals from the splitting of peroxide. This means that a **Rayox®** system can be smaller, reducing equipment purchase and operating costs.

- State-of-the-Art Lamp Power Supply

  Solarchem has developed a sophisticated lamp power supply which controls the power fed to the lamp via the PLC through feedback control of the current and voltage. This ensures consistent control of lamp power throughout the life of the lamp, and automatically compensates for fluctuations in the main electrical supply and ambient temperature changes. This provides assurance that the lamp is operating correctly. In addition, linking the power supply to the PLC allows the total UV power to be varied automatically as a function of influent flowrate if so desired.

- Proven Programmable Logic Controller

  Solarchem has installed a PLC in every system already built. Approximately one half of Solarchem's installed PLC's interface directly with plant controllers. A state-of-the-art operator interface mounted on the control panel enables on-line optimization of the **Rayox®** system performance.

- Proven Lamp Cleaning Mechanism

  Solarchem's patented lamp wiping mechanism has been included in all of its installations. The wiper mechanism is air-actuated and does not rely on reverse flow of water. It, therefore, requires fewer replacement parts and no by-pass piping, which reduces complexity. Furthermore, its operation is continuously monitored and verified by the PLC system to ensure its integrity.

- Inherently Simple Design

  The **Rayox®** system is inherently simple by design. For example, a **Rayox®** system does not require a rupture disk to avoid an overpressure condition. Such a condition cannot occur through normal operation of the **Rayox®** system as it is designed to withstand a pressure of 50 psig. This avoids the need to register and maintain such a safety device.

- Proprietary **ENOX** Photocatalysts

  Solarchem has developed four proprietary **ENOX** photocatalysts which can be used, individually or in combination, to optimize the treatment process selected for a given application. One of these **ENOX** photocatalysts is at the heart of a unique photoreduction process, **Rayox®-R**, which significantly improves the treatment of halogenated alkanes like TCA, DCA, CCl_4, and $CHCl_3$, all of which treat slowly by conventional photooxidation technologies. A second **ENOX** photocatalyst is highly active in the visible light range, and has potential solar applications through Solarchem's **Solaqua®** process.

  Solarchem utilize a family of treatment processes which can treat a wide range of water-borne contaminants. Using its proprietary **ENOX** photocatalysts, Solarchem is able to customize the advanced oxidation and/or reduction process for each application, thereby minimizing the capital and operating costs for the client.

- Other **Rayox®** Advantages

  Lamp turn-down capabilities to reduce future power costs
  Vertical reactors with internal baffles for superior turbulence to increase mass and energy transfer
  > 90% power efficiency
  0.92 power factor at full power
  Stainless steel parts, nuts, bolts
  100 message alarm annunciator
  High pressure tolerances (50 psig)
  Lamp power control keeps lamp UV output constant over time

6.3 CASE HISTORIES

Solarchem has designed and built over seventy commercial scale **Rayox®** advanced oxidation systems, approximately three-quarters of which are treating VOC's and semi-volatiles ranging from chlorinated solvents to aromatics in gasoline. As a result of this effort, and the high quality of its work, Solarchem is proud to include major corporations such as ICI, Exxon, Mobil, Hoechst Celanese, W.R. Grace, United Technologies, Uniroyal Chemical, Nestle, Martin Marietta, and agencies of the U.S. government including the U.S. Navy, the U.S. Air Force, and NASA in its current customer base.

This section outlines a brief selection of Solarchem's relevant design and commercial installation experience.

Systems in use:

- At Kelly AFB in San Antonio, Texas where Roy F. Weston, Inc. is the prime engineering contractor, there are two current applications treating groundwater. The first 3 x 30 kW **Rayox®** system will treat vinyl chloride, DCE, and other VOC's at 163 gpm. The second 9 x 30 kW **Rayox®** system will treat DCA, TCA, TCE, and other VOC's at 250 gpm. These systems started up in October 1993.
- At a former dry cleaning operation in Santa Barbara, CA, a 2 x 6 kW **Rayox®** system is treating PCE in groundwater. This system treats 25 gpm of groundwater from 20 ppm PCE down to < 1 ppm, with the remainder polished by GAC.
- At a service station in Carson City, Nevada, a 1 x 30 kW **Rayox®** system was installed in October 1991 to treat BTEX in groundwater. This system destroys BTEX from 1 ppm down to < 5 ppb at a flowrate of up to 10 gpm.
- At a terminal in Albany, NY, a 3 x 30 kW **Rayox® - T** system was installed in November 1991 to treat BTEX in tank bottom water. This system destroys BTEX from 20 ppm down to < 5 ppb at a flowrate of 100 gpm.
- At a location in Troy, Ontario, a 1 x 30 kW **Rayox®** system was installed in February 1992 to treat BTEX in groundwater. This system destroys BTEX from 9 ppm down to < 5 ppb at a flowrate of 26 gpm.
- At a decommissioned refinery in Mississauga, Ontario, a 1 x 10 kW **Rayox®** system was installed in December 1992 to treat BTEX and chlorinated organics in groundwater. This system destroys the target compounds from 3 ppm down to < 10 ppb at a flowrate of 3 gpm.
- At the Six Nations Reserve at Ohswekan, Ontario, a 1 x 30 kW **Rayox®** system was installed in September 1993 to treat NDMA in drinking water. This system destroys NDMA from up to 100 ppt NDMA down to < 5 ppt at flowrates up to 88 gpm.
- At a rubber manufacturing facility in South-Western Ontario, a 1 x 10 kW **Rayox®** system is treating NDMA in rinse water. This system destroys NDMA from 20 ppb NDMA down to < 0.5 ppb ppt at a flowrate of 10 gpm.
- At the Wells G&H Superfund site in Woburn, Mass. a 2 x 5 kW **Rayox®** system is treating up to 30 gpm of groundwater from 2 ppm total chlorinated VOC's to below detection on each of 1,2-DCE, TCE, PCE and vinyl chloride.
- A **Rayox®** system was installed in March 1991 at the Uniroyal Chemical plant in Elmira, Ontario. This nine (9) 30 kW reactor system treats dimethylnitrosamine (NDMA) from 600 ppb to less than 500 ppt at a flow rate of 80 gpm. A second system of 9 x 30 kW reactors treating groundwater containing Chlorobenzene, NDMA, etc. was installed and started up in January 1992.

- At Elmira, Ontario, an 8 x 30 kW **Rayox®** system is treating groundwater at 600 gpm, with NDMA destruction from 20 ppb to < 30 ppt.
- A UV/peroxide based groundwater system has been operating at Nestle plant in Freehold, N.J. since April 1991, treating trichloroethylene (TCE) and other VOCs from 33 ppm to less than 5 ppb at a flow rate of 8 gpm.
- A groundwater system has been operating at the T.R. Miller plant in Brewton, Alabama since July 1990, treating PCP and PAH's from 5 ppm to less than 1 ppb at a flow of 105 gpm. A second system of 2 x 30 kW reactors treating PCP from 8 ppm to less than 9 ppb at a flow of 14 gpm was installed and started up in October 1991.
- At the International Paper site in Joplin, Missouri, a 2 x 30 kW **Rayox®** system is treating up to 120 gpm of groundwater from 1 ppm PCP to < 10 ppb PCP. The system was installed in November 1991.
- A process water system using Solarchem's **Rayox®-R** process to treat rocket fuel (hydrazine, NDMA) for NASA at Kennedy Space Center, Florida was commissioned in June 1993.
- A significant customer is the US Navy for whom we have built a 4 x 30 kW **Rayox®** reactor system to treat the semi-volatile compound nitroglycerine in process wastewater at the Indian Head Naval Ordnance Station.
- A groundwater system treating vinyl chloride, DCE, and other VOC's at Kelly AFB in San Antonio Texas started up in July 1993. The system is a 1 x 30 kW **Rayox®** reactor unit treating the VOC's at 55 gpm.
- A 1 x 30 kW process water **Rayox®** system to treat rocket fuel, (hydrazines, NDMA) at the Martin Marietta plant in Denver, Colorado started up in July 1993.
- At an aerospace company in California, a 1 x 30 kW **Rayox®** system is treating MEK in steam condensate from a carbon regeneration system. This system treats in discrete batches from 35,000 ppm MEK down to < 1 ppm MEK.
- A process water system has been operating at a Domtar plant in Trenton, Ontario since 1988, treating phenols and PCP from 200 ppm to less than 10 ppb at a flow of 2,000 gpd.
- At a location in New Jersey, where ERM is the prime engineering contractor, there is an application under construction to treat groundwater containing PCE, TCE, VC at 200 gpm. This 6 x 30 kW system started up in February 1994.
- At a State Superfund site in California, there is an application under construction to treat groundwater containing PCE, TCE, DCE and TCA at 12 gpm. This 1 x 30 kW **Rayox®** system started up in February 1994.
- At a location in New Zealand, there is an application to treat groundwater containing PCP at 60 gpm. This 4 x 30 kW system was commissioned in July 1994.
- At a location in West Virginia, there is an application to treat process water containing NG at 2 gpm. This 2 x 30 kW system was started-up in December 1994.

- At a location in Maine, there is an application to treat groundwater containing VOC's at 30 gpm. This 30 kW system was started-up in November 1994.
- At a location in Kansas, there is an application to treat groundwater containing various VOC's at 5 gpm. This 1 x 30 kW system was started-up in November 1994.
- At a US Army base in Maryland, there is an application to treat groundwater containing TDG at 30 gpm. This 60 kW system was started-up in January 1995.
- At a location in Michigan, there is an application to treat groundwater containing high concentrations of DCP and TCE. This 60 kW system was started-up in February 1995.
- At a location in North Carolina, there is an application to treat groundwater containing 1,4-Dioxane at 615 gpm. This 270 kW system was started-up in February 1995.
- At a nuclear power plant in Ontario, there is an application to treat process water containing various organic contaminants at 2 gpm. This 10 kW system was started-up in March 1995.
- At Kelly Air Force base in Texas, there is an application to treat groundwater containing VOC's at 200 gpm. This 180 kW system was started-up in March 1995.
- At a manufacturing plant in Massachusetts, there is an application to treat process water containing thiourea and formaldehyde in 2,000 gpd batches. This 60 kW system was started-up in March 1995.

Systems under construction:

- At an aircraft manufacturing plant in Colorado, there is an application to treat groundwater containing acetone at 8 gpm. This 120 kW system is scheduled for start-up in June 1995.
- At McClellan Air Force base in California, there is an application to treat groundwater containing TCE at 380 gpm. This 180 kW system is scheduled for start-up in August 1995.
- At a synthetic resin manufacturing facility in Spain, there is an application to treat groundwater containing substituted dioxanes at 33 gpm. This 90 kW system is scheduled for start-up in August 1995.

6.4 KEY PERSONNEL

This section outlines the caliber of technical support, engineering and research staff available to support any proposed system and its successful application once installed.
The qualifications of Solarchem's forty technical management and staff members stand second to none in the advanced oxidation/reduction field. With four Ph.D.'s in photochemistry, and a strong commitment to product and process enhancement, the company's depth of technical know-how and experience ensure that any **Rayox®** system will operate as required. Additional services and support capabilities are available for a system supplied by Solarchem including the services of a full field service team..

Qualifications and Experience of Key Personnel

R.D. Samuel Stevens, B.Sc., Ph.D.
President and CEO

Dr. Stevens is responsible for the strategic direction and corporate vision of the Company. He also has overall responsibility for the Sales and Marketing activities, including sales management, negotiating commercial terms and conditions, and direction of the sales support functions, as well as marketing planning and promotion. Due to his strong technical background, he also contributes substantially to the technical direction of the Company. He is the inventor or co-inventor of several patents in the area of environmental technology and chemical manufacturing processes. He has written a large number of technical reports and presentations as well as several articles for scientific journals.

Dr. Stevens joined Solarchem in 1984. His background includes several years of experience as a research scientist and R&D Manager in Environment Canada and the Ontario Ministry of Environment. He was a founding partner and Senior Vice President of Concord Scientific Corporation before joining Solarchem.

Dr. Stevens holds a B.Sc. in Chemistry from Mount Allison University and a Ph.D. in Chemistry from the University of New Brunswick. Dr. Stevens also completed Post Doctoral studies at the Department de Chemie Physique de l'Université de Bordeaux. He is a past member of the Natural Sciences and Engineering Research Council of Canada (NSERC), the Canadian counterpart to National Science Foundation in the United States.

P. Daniel Nolan, B.A.Sc., M.A.Sc., P.Eng.
Executive Vice President and General Manager

Dan Nolan has overall responsibility for the operation of the Company, exclusive of the Sales function. He is responsible for the financial performance of the Company. He has functional responsibility for research and development, process and product engineering, manufacturing, finance and administration, including human resources.

Mr. Nolan joined Solarchem in 1992. He has held general management, strategic planning, sales and marketing, manufacturing and process engineering positions in large chemical manufacturing firms. This experience has been applied across the industrial and specialty chemicals manufacturing and the process systems contracting industries. Areas of specific application knowledge include wastewater treatment, potable water treatment, sulfur dioxide abatement and acid recovery and reconcentration. His background includes negotiating commercial contracts with both private sector concerns and Municipal and Federal Government departments.

Dan Nolan graduated from the University of Windsor with a B.A.Sc. and an M.A.Sc. in Chemical Engineering. He is a Registered Professional Engineer in the Province of Ontario.

Keith G. Bircher, B.Sc., P.Eng.
Vice President, Engineering

Keith Bircher has overall responsibility for the Engineering and Research and Development activities at Solarchem. These include the engineering of **Rayox®** systems, design testing and treatability studies of customer waters, field pilot testing, site remediation, and research activities into new products and processes. Mr. Bircher is also responsible for engineering standards and controls as well as Solarchem's continuous improvement program. Mr. Bircher joined Solarchem in 1988.

Keith Bircher has wide ranging experience in chemical manufacturing as well as in business. His background includes engineering management, plant start-up, process design, control and optimization. He has extensive experience in gasifiers, energy from waste processes, and waste incineration as well as in water treatment.

Mr. Bircher holds a B.Sc. degree in Chemical Engineering. He is a Registered Professional Engineer in the Province of Ontario.

T. Peter O'Connor, P.Eng.
Vice President

Peter O'Connor has responsibility for promoting Solarchem's business interests in the United States, based in the Las Vegas office. Prior to joining Solarchem in 1987, he held engineering, design and construction positions with major international oil and chemical corporations. Mr. O'Connor has held several management positions with large international and smaller North American engineering construction groups in both the United States and Canada, associated with oil and gas treating, sulfur recovery, oil refining, copper and tungsten concentrators and a nuclear research reactor.

Peter O'Connor graduated from the University of Toronto with a B.A.Sc. degree in Civil Engineering and received a MIBA degree from United States International University in San Diego, California. He is a Registered Professional Engineer in the States of California and Minnesota.

Terry Spittles
Director, Installations

As Director of Installations, Terry Spittles is responsible for customer satisfaction from the point of sale through commissioning of the **Rayox®** system. He is responsible for co-ordinating all activities with the customer and for internal cost and scheduling control. Mr. Spittles joined Solarchem in 1990.

Prior to joining Solarchem, Terry Spittles worked with ABB Lummus Canada for many years. His responsibilities ranged from Senior Instrument Specialist up to Project Manager. His projects ranged territorially from Europe, North America and Asia. He has served the petrochemical, pulp and paper, metals refining, and chemical process industries.

Ronald C. Hallett, BA.Sc., P. Eng.
Manager, Product Engineering

Ron Hallett is responsible for all aspects of product design other than process engineering design. This includes mechanical, electrical and instrumentation design, including the computer-aided design function. Ron Hallett joined Solarchem in 1988.

Mr. Hallett has 15 years experience in the design of large material handling projects involving air-flow, hydraulics, plant layout and electronic control. He is the author of several patents. He has a wealth of practical mechanical knowledge as well as extensive experience in industrial engineering and quality control.

Ron Hallett holds a B.A. Sc. degree in Mechanical Engineering and he is a Registered Professional Engineer in the Province of Ontario.

Stephen Cater, B.Sc. (Hon. Chemistry), M.Sc., Ph.D
Manager Research and Process Engineering

Steve Cater is responsible for all aspects of process engineering, including the development of new photochemical processes. He directs design tests and treatability studies and is responsible for the operation of Solarchem's analytical laboratory. He is responsible for the process design of **Rayox**® systems. During his years at Solarchem he has been the chief researcher on a number of photochemical projects including the solar photochemical production of hydrogen peroxide, optimization of the **Solair**® air treatment process, and preliminary testing of the **Solvolox**® soil treatment process. Most of his current research is in the area of photochemical oxidation of water-borne and process optimization of the **Rayox**® process. Stephen Cater joined Solarchem in 1986.

Dr. Cater earned his M.Sc. degree in Chemistry from Brock University, and his Ph.D. in Chemistry from the University of Guelph. His Ph.D. was in the area of Organic Photochemistry.

Robert Rayner, B. Comm., CPIM
Manager, Manufacturing

Robert Rayner has overall responsibility for the manufacture of **Rayox**® systems. His responsibility includes procurement of materials and components, production planning, supervision of manufacturing and assembly and shipping. Mr. Rayner is responsible for Solarchem's manufacturing quality program. He joined Solarchem early in 1993.

Bob Rayner has in excess of 12 years experience in all facets of management, primarily in manufacturing companies. His experience has encompassed all areas of logistics including purchasing, warehousing, planning, traffic, customs, master scheduling, forecasting and distribution management. In addition he has successfully managed the implementation of fully integrated manufacturing, planning and control systems.

Bob Rayner has a B.Comm. degree from the University of Toronto, and a certification in Inventory and Production Management.

Michael N. LeBer, CD, BA.Sc. P.Eng.
Manager, Customer Support

Mike LeBer is primarily responsible for providing the technical support to ensure a trouble-free startup and to train customers' personnel. Mr. LeBer is also responsible for providing periodic maintenance and full service maintenance and operation services to customers on a contract basis. As well as maintaining an inventory of spare parts at Solarchem and supplying spare parts to customers, Mr. LeBer maintains a 24 hour emergency technical service capability for customer support. Mike LeBer joined Solarchem in 1991.

Mr. LeBer has an extensive background in maintenance management, product engineering and project management. He has specific experience in equipment automation, troubleshooting training and project startups.

Mike LeBer graduated with a degree in Mechanical Engineering from the University of Toronto. He is a Registered Professional Engineer in the Province of Ontario.

Professor James R. Bolton, B.A.,M.A., Ph.D.
Senior Research Fellow

Jim Bolton fills a critical role at Solarchem in performing basic research and development in the photochemical destruction of organic contaminants. His efforts are applied both in the extension of **Rayox**® technology and in the development of new processes. He has been very active in the **Solair**® and **Solaqua**® development projects. In addition to his work at Solarchem, Jim spends over half his time at the University of Western Ontario, where he actively directs a research program in addition to his teaching duties. Jim Bolton has also held the position of Professor of Chemistry at the University of Minnesota and was a Boese Post-doctoral Fellow at Columbia University. Jim has held consulting positions with the Solar Energy Research Institute in Golden, Colorado and the Renewal Energy Branch, Energy Mines and Resources Canada. He has been the recipient of many distinguished awards in Canada, United States, Japan and China.

Ali Safarzedeh-Amiri, Ph.D
Research Scientist

Ali Safarzadeh-Amiri joined Solarchem as a Research Scientist in 1990 and his research involves the photochemical treatment of air-borne and water-borne pollutants. He has been very active in the development of the sunlight activated **Solaqua®** process for the treatment of water-borne organic pollutants. He holds a process patent.

Ali Safarzadeh-Amiri has spent five years doing Post-Doctoral Research at the University of Toronto, University of Waterloo and the University of Western Ontario. He worked for two years at a private firm, researching photocatalytic oxidation of pollutants. Dr. Safarzadeh-Amiri has authored or co-authored 23 journal articles in various fields of photochemistry and photophysics.

Dr. Safarzadeh-Amiri obtained his Ph.D. degree in Photophysics and Photochemistry from the University of Saskatchewan.

Robert Abernethy, P.Eng., M.B.A.
Sales Engineer

As a Sales Engineer for Solarchem, it is Rob Abernethy's responsibility to develop a thorough understanding of the customer needs to propose the **Rayox®** system which best satisfies these needs.

Since leaving University, Mr. Abernethy has acquired an extensive background as a project engineer for various mining and environmental projects throughout North America. His experience also includes working as a sales and product manager for an Earth Science Company specializing in highly technical instrumentation. Rob Abernethy joined Solarchem in the summer of 1992.

Rob Abernethy graduated from the University of Toronto with a Bachelor of Applied Science degree and went on to complete an MBA program as a Marketing Specialist at York University. He is a Registered Professional Engineer in the Province of Ontario.

Martin Crawford, B.S., M.B.A
Sales Engineer

As a Sales Engineer for Solarchem, it is Martin Crawford's responsibility to develop a thorough understanding of customer needs and to propose the **Rayox®** system which best satisfies these needs.
Mr. Crawford has an extensive background working with commodity and specialty chemical companies in the area of sales, product management and marketing management. In his earlier years he spent several years working as a chemist performing research for the D.O.E. and chemical manufacturing processes. Martin Crawford joined Solarchem in 1994.

He graduated from Central State University in Edmund, Oklahoma with a Bachelor of Science in Chemistry, then completed a Masters of Business Administration at Golden Gate University in San Francisco, California.

Michael Jaubert, Jr., B.S.
Sales Engineer

As a Sales Engineer for Solarchem, it is Michael Jaubert's responsibility to develop a thorough understanding of customer needs and to propose the **Rayox®** system which best satisfies these needs.

Mr. Jaubert has over six years of sales and marketing experience in the hazardous waste treatment industry, specializing in incineration and wastewater treatment. He has an extensive background dealing with the aerospace, chemical, petroleum and other high tech industries. His experience also includes marketing environmental services to government agencies. Michael Jaubert joined Solarchem in 1994.

He graduated from the University of Southwestern Louisiana with a Bachelor of Science degree in Biochemistry and Microbiology.

Douglas Reed, B.Sc.(Hons)
Sales Engineer

As a Sales Engineer for Solarchem, it is Doug Reed's responsibility to develop a thorough understanding of customer needs and to propose the **Rayox®** system which best satisfies these needs.

Previously at Solarchem, Mr. Reed worked on a number of original research projects and has had major responsibility in building and operating a Vitamin D_3 pilot plant. He has also worked as a Project Scientist on over 40 **Rayox®** design tests and on site demonstration programs. Doug Reed joined Solarchem in 1985 and has acted as a Sales Engineer since 1991.

Doug Reed graduated from the University of Toronto with a B.Sc.(Hons.) specializing in Analytical and Organic Chemistry. While a student, he was the recipient of a NSERC Research Award.

Bachar Mourad, M.Sc. Mech.Eng
Sales Support Engineer

Bachar Mourad currently provides custom engineering support for sales and marketing personnel. His principal responsibility is the preparation of technical and commercial proposals. He has accumulated a broad experience in project engineering and management from working with Stone & Webster on a variety of petroleum and water treatment related projects.

Bachar Mourad completed his undergraduate and graduate studies in Mechanical Engineering in Boston. He holds a B.Sc. degree from Northeastern University and an M.Sc. from Tufts University. His certification as a Professional Engineer by the Association of Professional Engineers of Ontario is pending. Bachar Mourad joined Solarchem in 1994.

Robert F. Notarfonzo, B.A.Sc., M.B.A.
Market Analyst/Sales Engineer

Rob Notarfonzo's primary responsibility is in the area of market assessment and development. He also matches customer needs to **Rayox®** systems. He joined Solarchem in early 1993.

Before joining Solarchem, Mr. Notarfonzo was in charge of market research, market assessment, and financial analysis for the Ontario Waste Management Corporation.

Rob Notarfonzo obtained his Masters in Business Administration from Wilfrid Laurier University after graduating from the University of Waterloo's Chemical Engineering program.

Michael Madigan, Dipl. Elect. Eng., M.I.E.I.
Electrical Engineer

Mike Madigan's principal responsibilities are electrical design, PLC programming, and system automation. He also is responsible for continued product development and automation. He joined Solarchem in 1990.

Mr. Madigan received his Diploma in Electrical Engineering. Previous to joining Solarchem his experience includes material handling, packaging and process control both in Canada and Ireland.

Sandro Pecile, B.A. Sc., P.Eng
Project Engineer

Sandro Pecile is responsible for the mechanical design of all manufactured systems. He also supplies support for all field service technicians. He joined Solarchem in 1989.

Mr. Pecile received his Mechanical Engineering degree from the University of Toronto.

Timothy D. Riddle, B.A.Sc.
Project Engineer

Tim Riddle is responsible for all electrical and Autocad three dimensional drawings at Solarchem. He was involved with the final stages of development of the **Rayox®** reactor.

Mr. Riddle joined Solarchem in 1991 after completing his Mechanical Engineering degree from the University of Toronto.

Karen Simms, B.Sc. Chem. Eng., P. Eng.
Process Engineer

Karen Simms is responsible for providing process engineering input during specification, design, construction and commissioning of all manufactured systems. She is also involved in continuing research and process development. She joined Solarchem in 1994.

Ms. Simms received her Chemical Engineering degree from the University of Alberta and worked as a process engineer in the wastewater treatment field prior to joining Solarchem.

Wayne Lem, B.A.Sc., P. Eng.
Process Engineer

Wayne Lem is responsible for all process engineering for systems. His primary responsibility is to determine the optimal and most cost-effective system configuration. Wayne is responsible for sizing equipment and providing input on process control for systems. He is also continually involved in research and process development. He joined Solarchem in 1994.

Mr. Lem received his Chemical Engineering degree from the University of Toronto and worked as a process engineer in the field of water treatment prior to joining Solarchem.

Ernest Selvadurai
Service Technologist

Ernie Selvadurai's primary responsibilities are commissioning systems after delivery, customer training, system test before shipment, maintenance, warranty, contract services and individual customer contact. He joined Solarchem in August, 1990.
Mr. Selvadurai is a graduate of Seneca College's Electronic Engineering Technology program. He subsequently completed several courses in electronics at the University of Toronto This was followed by five years experience as a service engineer in the sensor design industry.

David L. Mulholland
Service Technician

David Mulholland is responsible for the installation, repair and maintenance of **Rayox®** systems. His primary responsibility is providing on-site service and technical support to customers requiring advice and/or maintenance to systems in service.

David Mulholland has worked in the electrical field for more than twenty years in the capacity of Electrical Systems Test Specialist and Electrical Engineering Technician. Accordingly, during this time he has earned extensive experience with electrical/electronic PLC control systems.

Vera Reichman

Chemical Technician

Vera Reichman is responsible for the analysis of design test samples and carries out a portion of the pilot scale studies on water treatment. She joined Solarchem in 1987.

Ms. Reichman completed a course of study in Chemical Engineering Technology at the Institute of Technology in Haifa, Israel. Since graduating, she has worked as a junior Chemical Engineer at two research laboratories in Israel.

FIGURE 1
Rayox F Treatment of Low Strength Groundwater

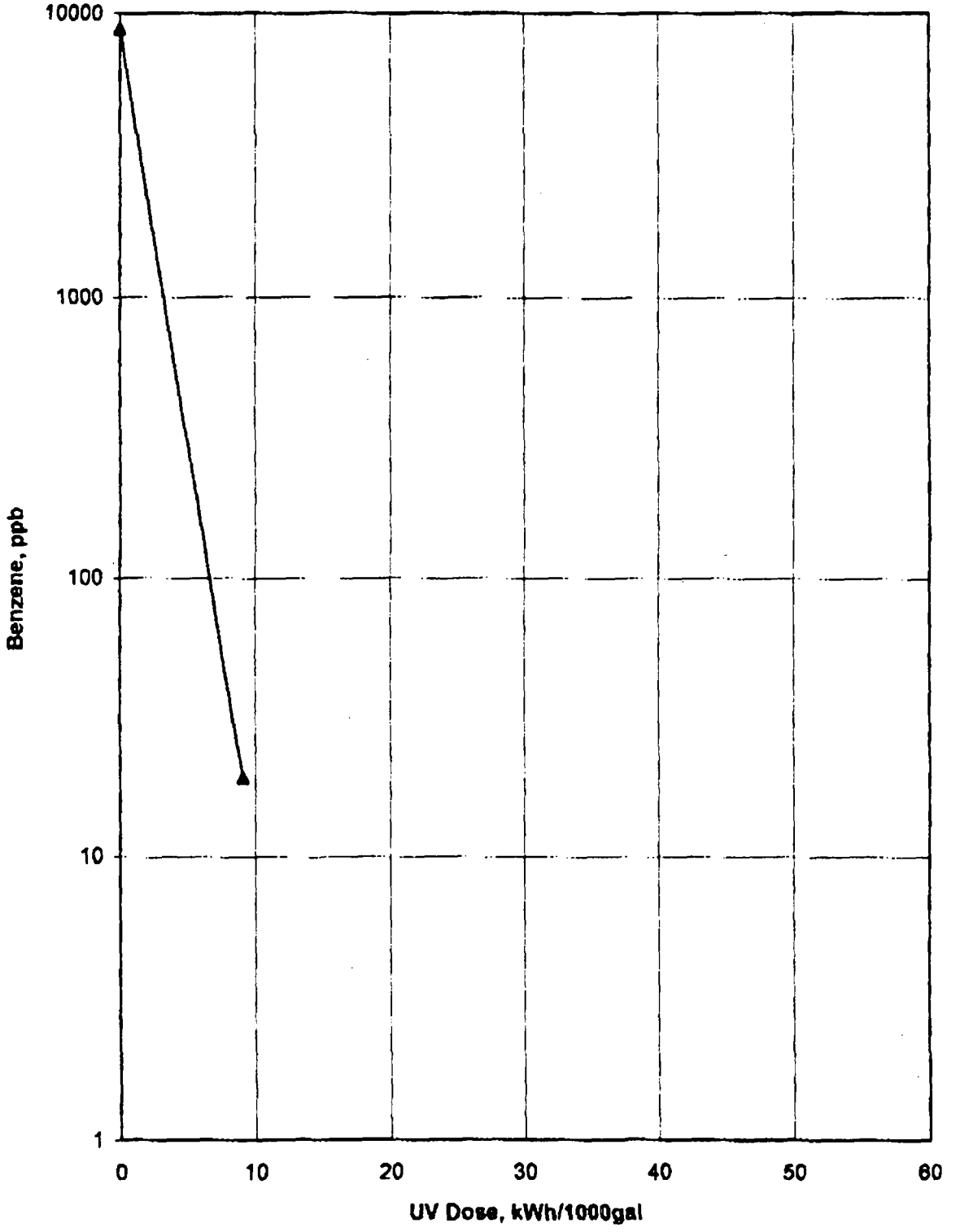


FIGURE 2
Rayox A Treatment of 4:1 Blend

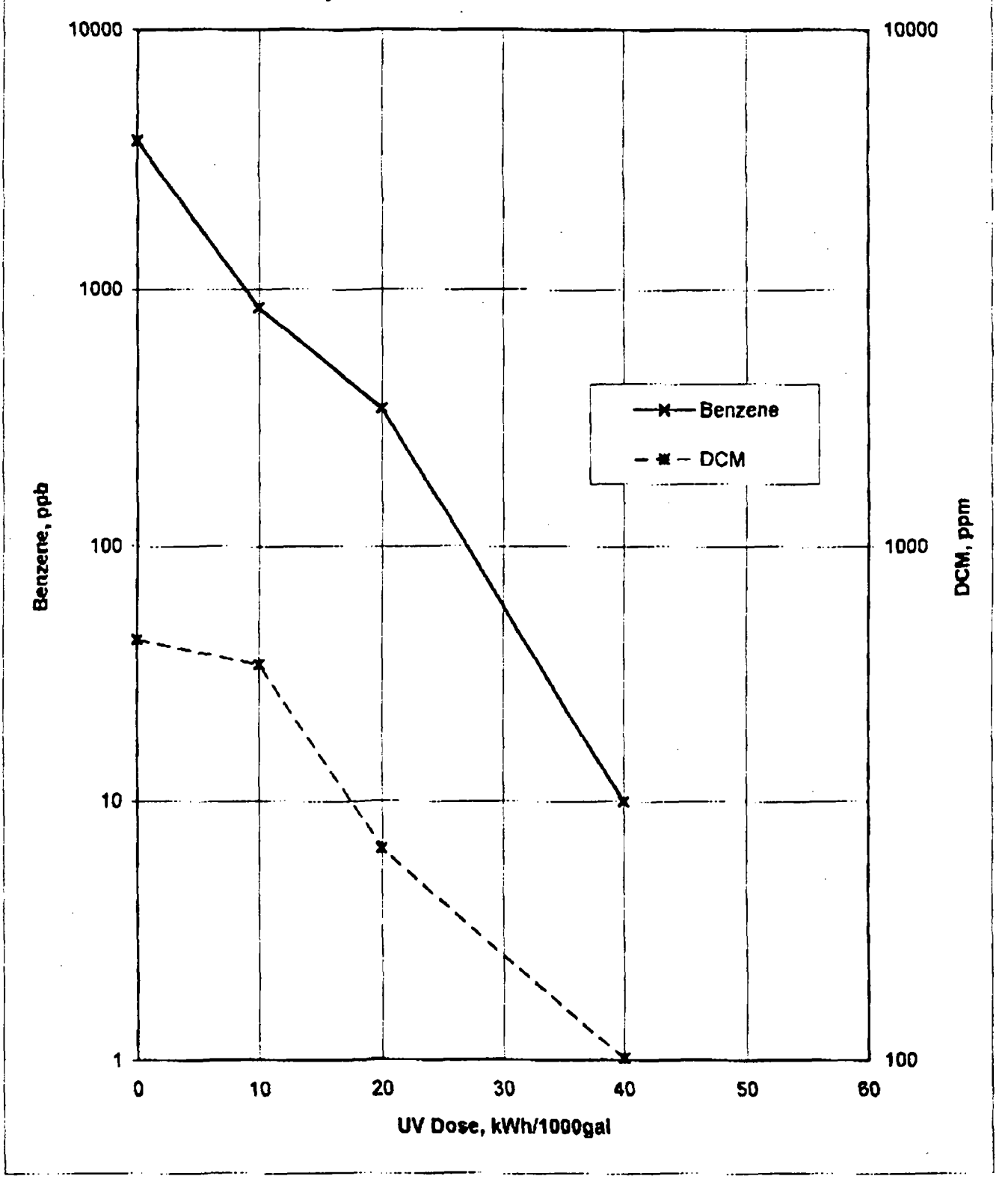
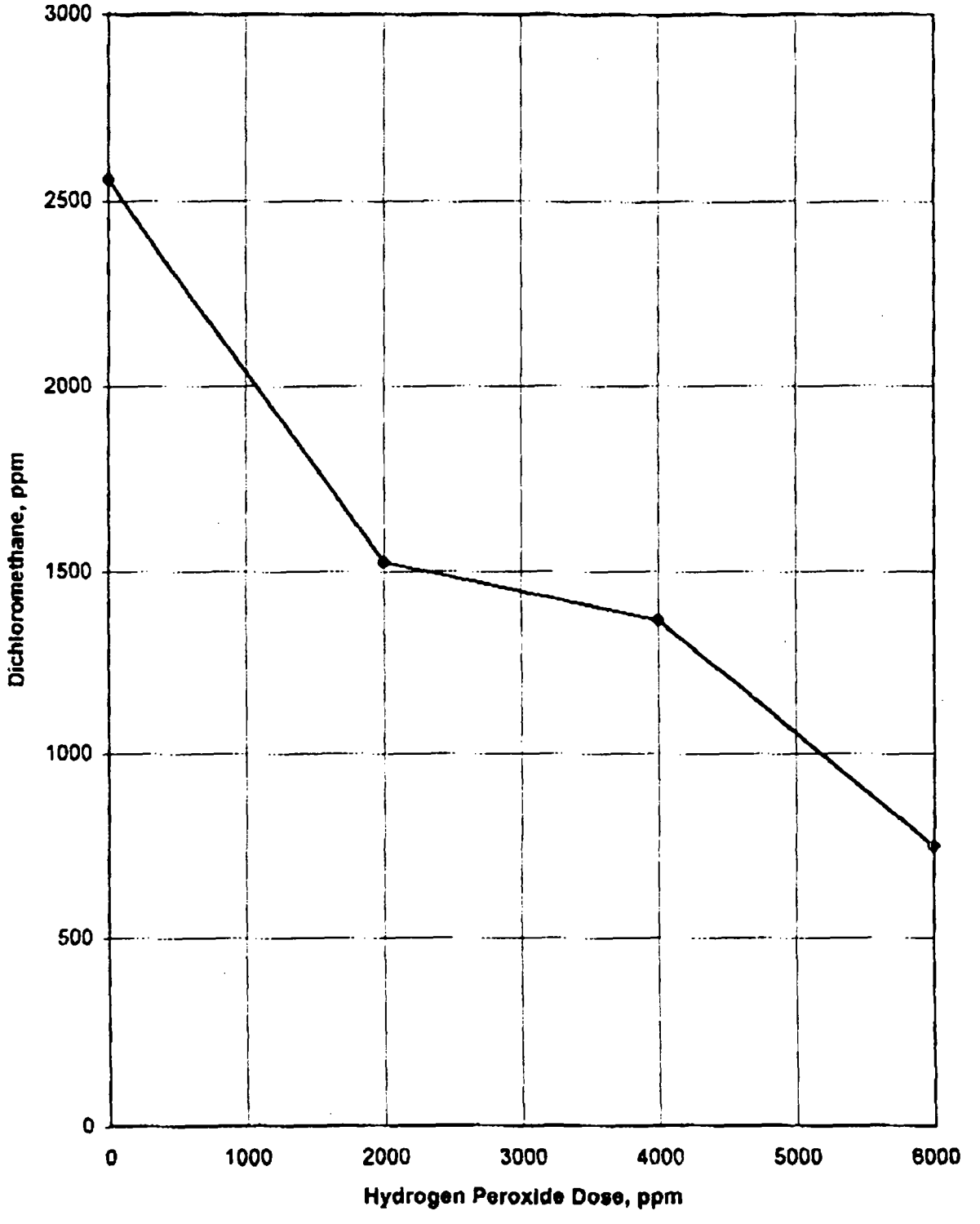
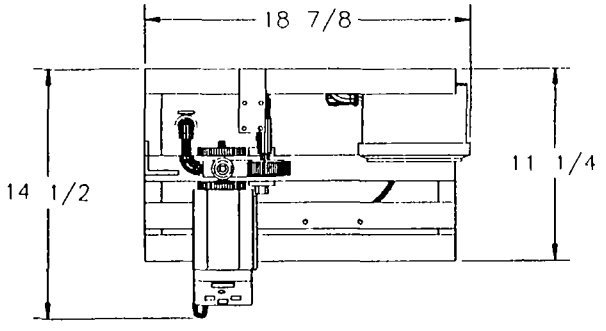
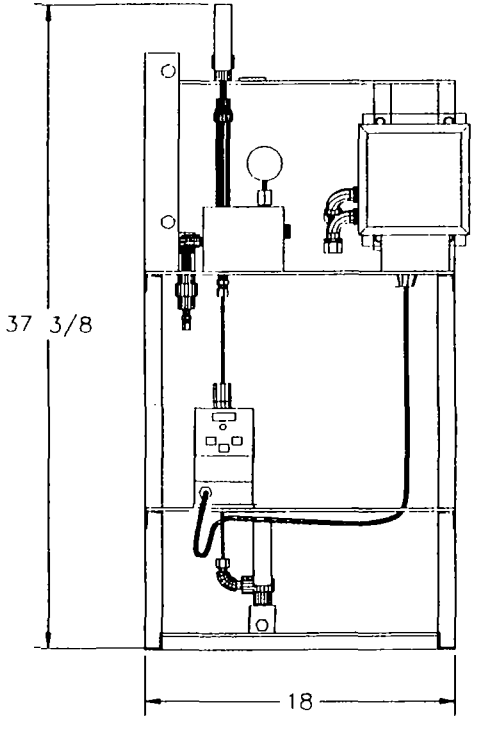


FIGURE 3
Rayox T Treatment of High Strength Groundwater

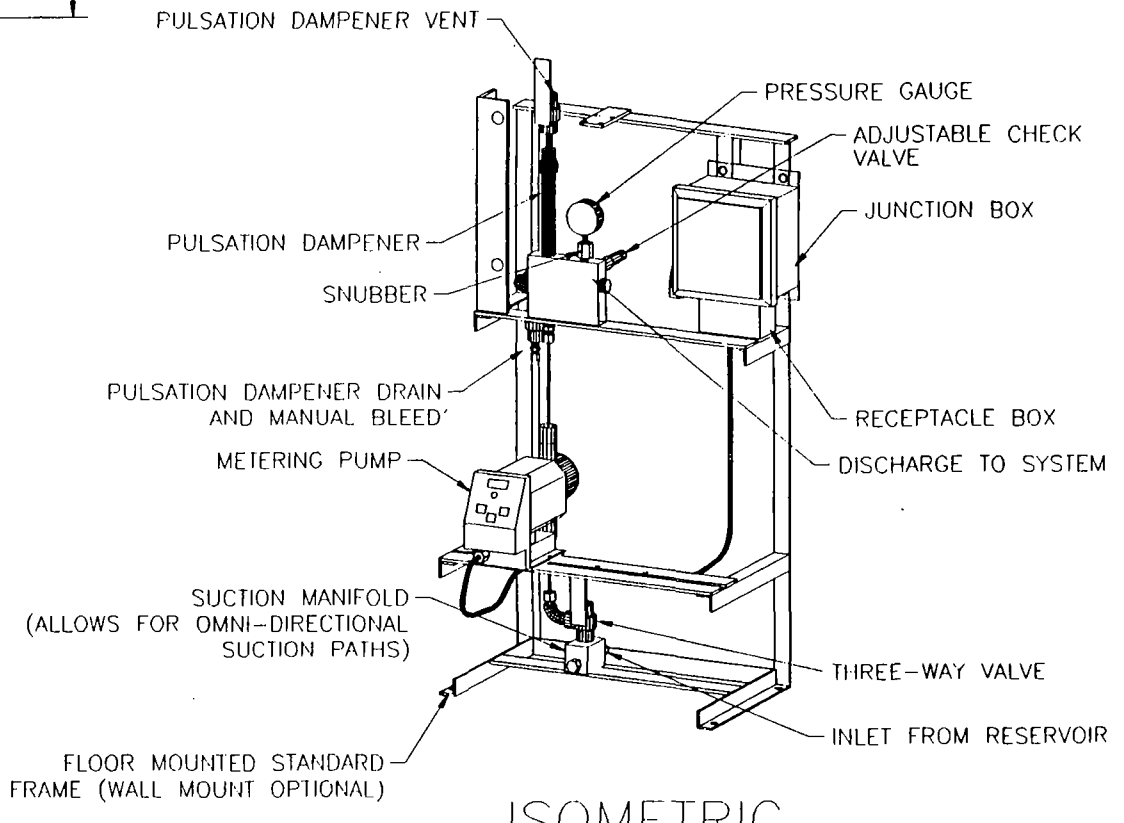




PLAN



FRONT ELEVATION



ISOMETRIC

ACID/CAUSTIC

THIS DRAWING, ITS SPECIFICATIONS AND DESIGNS, IS THE PROPERTY OF SOLARCHEM ENVIRONMENTAL SYSTEMS AND IS SUBJECT TO RETURN UPON REQUEST. IT IS SUBMITTED ON THE CONDITION THAT IT WILL NOT BE USED OR REPRODUCED IN ANY WAY WITHOUT SOLARCHEM'S WRITTEN APPROVAL.

REVISIONS

REV	DESCRIPTION	DATE	APPVD
F	E.C.O 00582 - S. P.	2 DEC 93	
B	E.C.O 00424 - J.K.M.B	5 Apr/93	
C	E.C.O 00532 - S. P.	27 Sep/93	
D	E.C.O 00548 - J.K.M.B	18 Nov/93	
E	E.C.O 00566 - T. D. R	15 Dec/93	

NOTES

3D - FILE R00141

FINISH

MATERIAL

DIMENSIONS IN INCHES (unless otherwise specified)

TOLERANCES (unless otherwise specified)

ANGULAR	± 0°30'	DECIMAL 2 PLACES	± .010
FRACTIONAL	± 1/32	DECIMAL 3 PLACES	± .005
DECIMAL 1 PLACE	± .015	DECIMAL 4 PLACES	± .0005

Solarchem
7320 SMOKE RANCH RD
LAS VEGAS, NEVADA
U.S.A 89128
130 ROYAL CREST CT.
MARKHAM, ONTARIO
CANADA L3R 0A1

	NAME	SIGN	DATE
DRAFT	T. D. R.		23 Jul/92
DESIGN			
CHECK	S. P.		
APPR	J. M.		

TITLE: METERING PUMP FRAME DETAIL

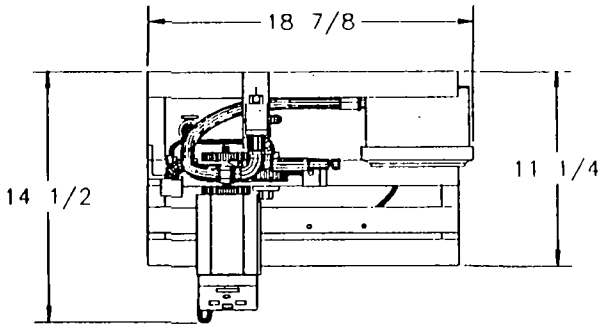
SHEET No: SHEET 3 OF 3

SCALE: NONE

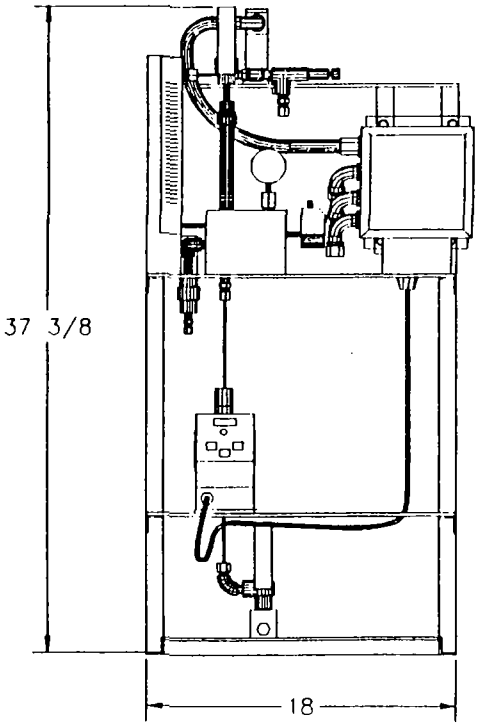
DWG No: 000-RX-400001

REV: F

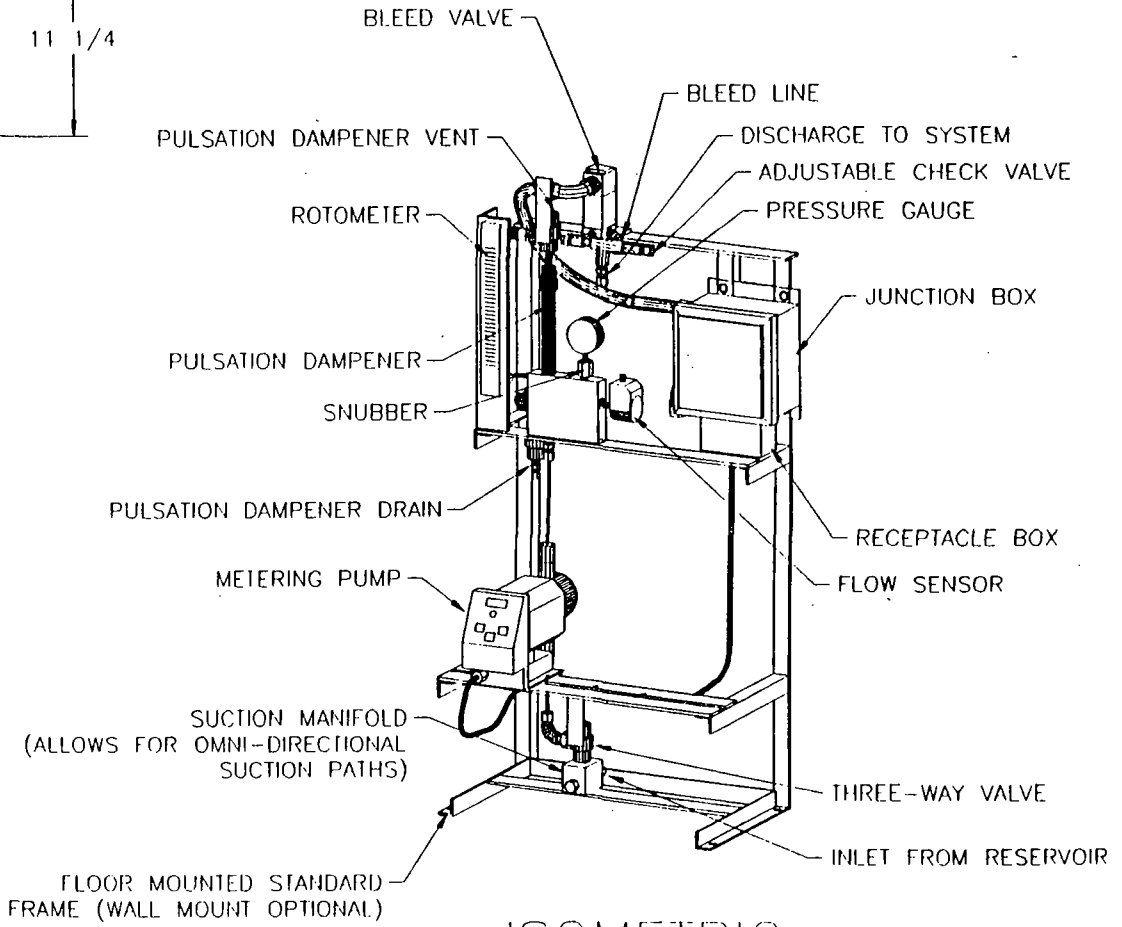
000-RX-63003



PLAN



FRONT ELEVATION



ISOMETRIC

ENOX

THIS DRAWING, ITS SPECIFICATIONS AND DESIGNS, IS THE PROPERTY OF SOLARCHEM ENVIRONMENTAL SYSTEMS AND IS SUBJECT TO RETURN UPON REQUEST. IT IS SUBMITTED ON THE CONDITION THAT IT WILL NOT BE USED OR REPRODUCED IN ANY WAY WITHOUT SOLARCHEM'S WRITTEN APPROVAL.

REVISIONS

REV	DESCRIPTION	DATE	APPVD
F	E.C.O 00562 - S. P.	2 DEC 93	
B	E.C.O 00424 - J.K.M.B.	5 Apr/93	
C	E.C.O 00533 - S. P.	27 Sep/93	
D	E.C.O 00548 - J.K.M.B.	18 Nov/93	
E	E.C.O 00566 - T. D. R.	15 Dec/93	

NOTES

3D - FILE R00140

FINISH

MATERIAL

DIMENSIONS IN INCHES (unless otherwise specified)

TOLERANCES (unless otherwise specified)

ANGULAR	± 0°30'	DECIMAL 3 PLACES	± .010
FRACTIONAL	± 1/32	DECIMAL 3 PLACES	± .005
DECIMAL 1 PLACE	± .015	DECIMAL 4 PLACES	± .0005

Solarchem
7320 SNOW RANCH RD
LAS VEGAS, NEVADA
U.S.A 89128
130 ROYAL CREST CT.
MARKHAM ONTARIO
CANADA L3R 0A1

	NAME	SIGN	DATE
DRAFT	T. D. R.		15 DEC/93
DESIGN			
CHECK	S. P.	S.P.	
APPR	J. H.	R.H.	

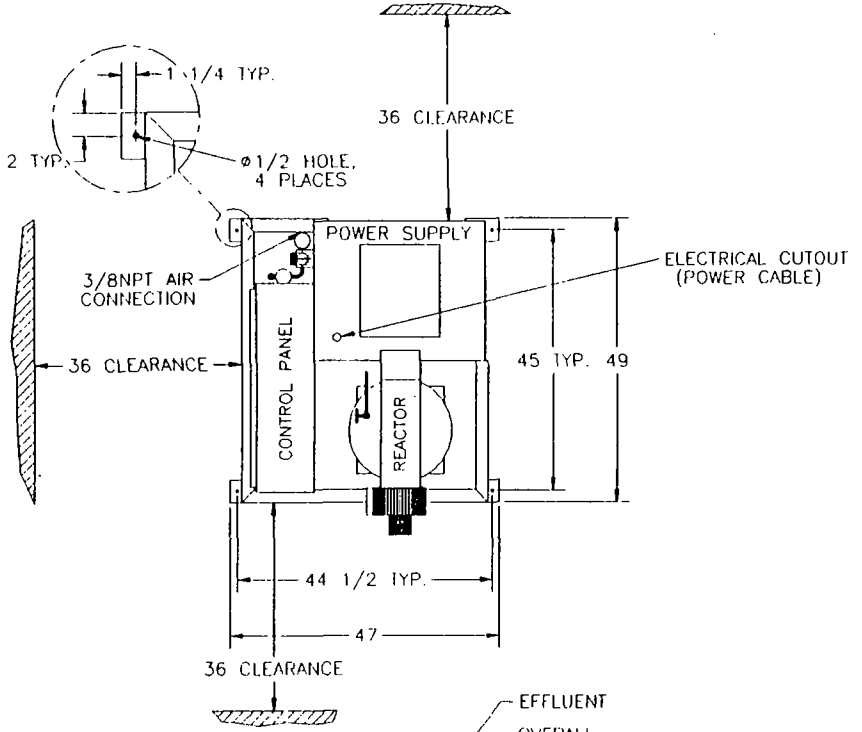
TITLE: METERING PUMP FRAME DETAIL

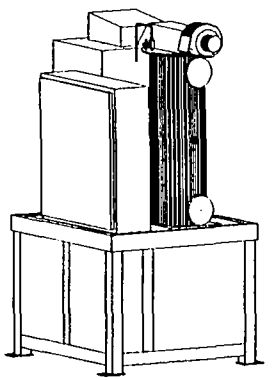
SHEET No. SHEET 2 OF 3

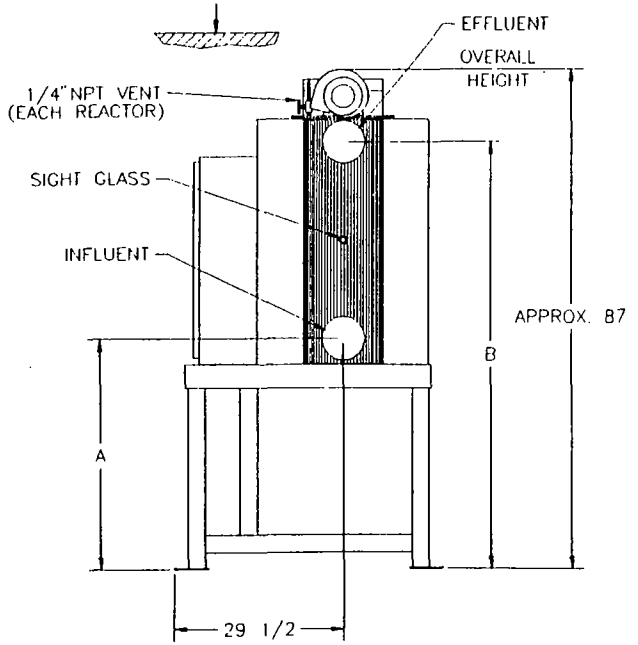
DWG No. 000-RX-400001

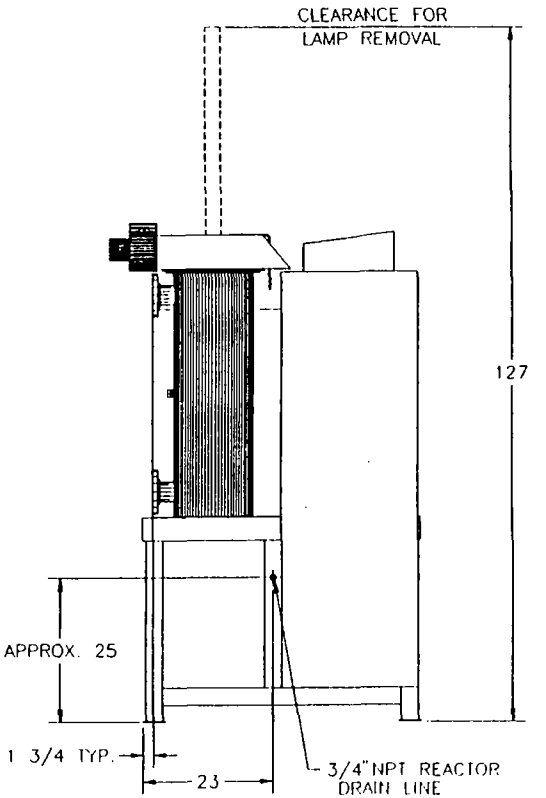
SCALE NONE

REV F









THIS DRAWING, ITS SPECIFICATIONS AND DESIGNS, IS THE PROPERTY OF SOLARCHEM ENVIRONMENTAL SYSTEMS AND IS SUBJECT TO RETURN UPON REQUEST. IT IS SUBMITTED ON THE CONDITION THAT IT WILL NOT BE USED OR REPRODUCED IN ANY WAY WITHOUT SOLARCHEM'S WRITTEN APPROVAL.

REVISIONS

REV	DESCRIPTION	DATE	APPVD
A	E.C.O. 00144 - J.K.M.B.	8 May/92	
B	E.C.O. 00514 - T. D. R.	29 Jul/93	
C	E.C.O. 00588 - T. D. R.	21 Feb/94	
D	E.C.O. 00813 - S. P.	1 JUN 94	
E	E.C.O. 00842 - J.M.	24 JUN 94	

NOTES

1. APPROX. WEIGHT: 2500 lbs.
2. REFER TO PIPING DRAWING FOR REACTOR NOZZLE ORIENTATION.
3. MINIMUM 36" CLEARANCE ACCESS AS SHOWN.
4. UNIT TO BE MOUNTED ON 3" RAISED CONCRETE PAD.
5. REFER TO P & I.D. DRAWING FOR ACTUAL PIPE SIZE.

PORT SIZE	APPROX. DIM'S	
	A	B
1	39	*74-3/4
1-1/2	39-3/4	*74
2	39-3/4	74
3	39-3/4	74
4	40-1/4	73-1/2

* WHERE THERE ARE LOW FLOWS INVOLVED, THE REACTOR EFFLUENT MAY BE OUT OF THE TOP PLATE RATHER THAN OUT THE SIDE

FINISH

MATERIAL

DIMENSIONS IN INCHES (unless otherwise specified)

TOLERANCES (unless otherwise specified)

ANGULAR ± 0°30' DECIMAL 2 PLACES ± .010
FRACTIONAL ± 1/32 DECIMAL 3 PLACES ± .005
DECIMAL 1 PLACE ± .015 DECIMAL 4 PLACES ± .0005

Solarchem
7320 SMOKE RANCH RD
LAS VEGAS, NEVADA
U.S.A. 89128
130 ROYAL CREST CT.
MARKHAM, ONTARIO
CANADA L3R 0A1

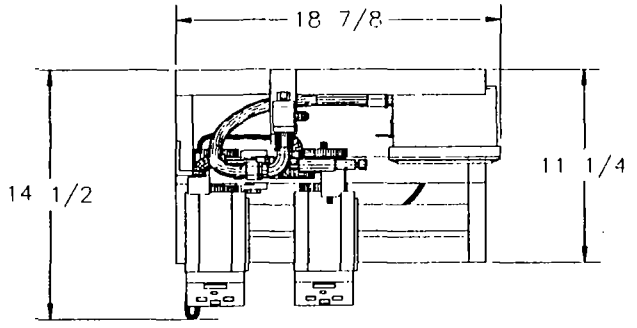
	NAME	SIGN	DATE
DRAFT.	T. D. R.		19 Dec/91
DESIGN			
CHECK	J. M.		
APPR.	R. M.		

TITLE: RAYOX 1 x 30kW REACTOR OUTLINE DETAIL

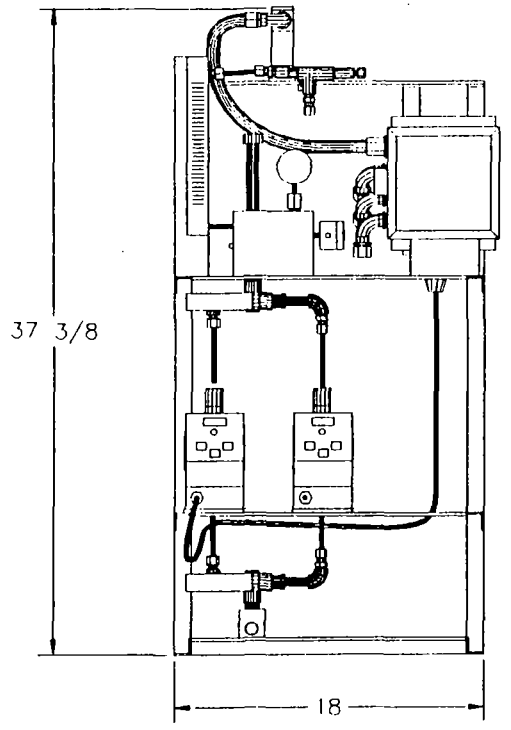
SHEET No. SHEET 1 OF 1 — SCALE NONE

DWG. No. 000-RD-000111 — REV E

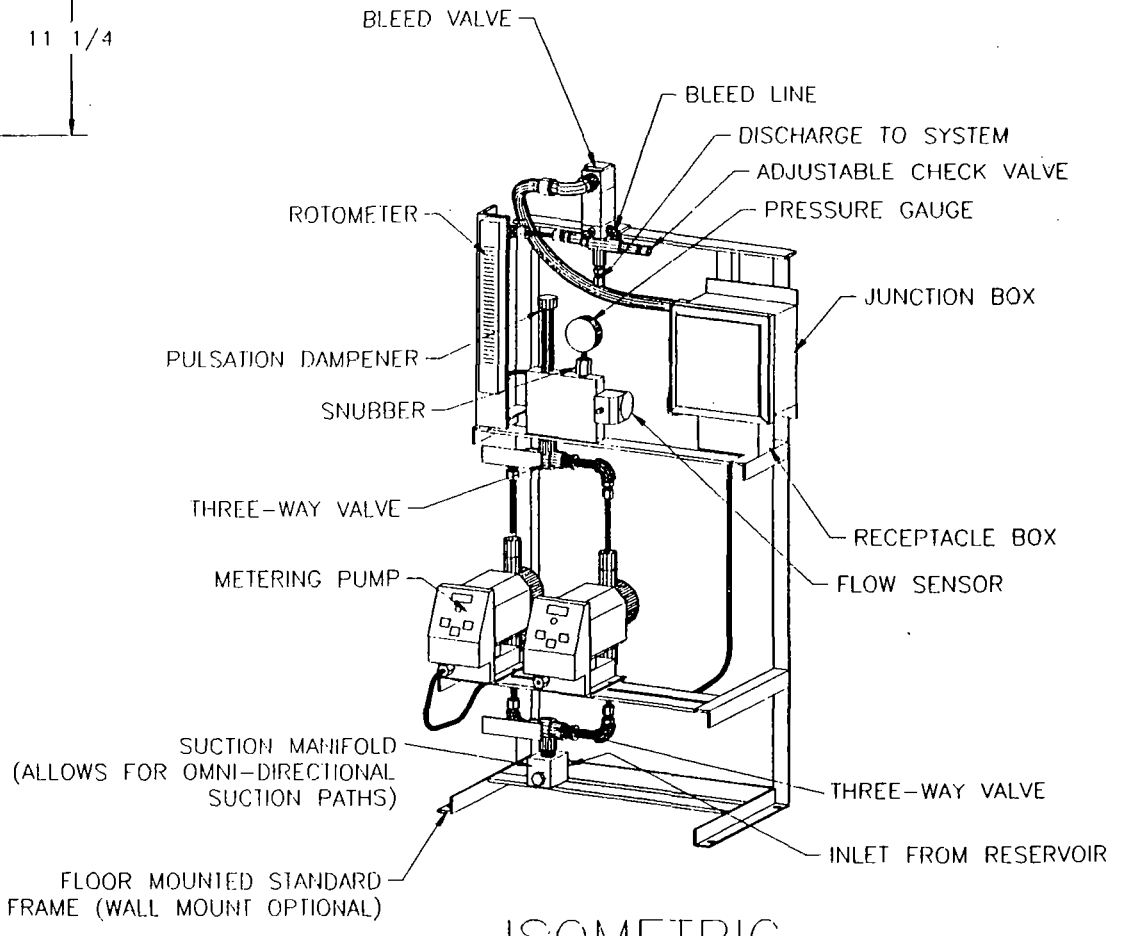
000-RD-000111



PLAN



FRONT ELEVATION



ISOMETRIC

PEROXIDE

THIS DRAWING, ITS SPECIFICATIONS AND DESIGNS, IS THE PROPERTY OF SOLARCHEM ENVIRONMENTAL SYSTEMS AND IS SUBJECT TO RETURN UPON REQUEST. IT IS SUBMITTED ON THE CONDITION THAT IT WILL NOT BE USED OR REPRODUCED IN ANY WAY WITHOUT SOLARCHEM'S WRITTEN APPROVAL.

REVISIONS

REV	DESCRIPTION	DATE	APPVD
A	E.C.O 00584 - S. P.	11 FEB 94	
B			
C			
D			
E			

NOTES

3D - FILE X400013

FINISH

MATERIAL

DIMENSIONS IN INCHES (unless otherwise specified)

TOLERANCES (unless otherwise specified)

ANGULAR	± 0.30°	DECIMAL 2 PLACES	± 0.10
FRACTIONAL	± 1/32	DECIMAL 3 PLACES	± 0.05
DECIMAL 1 PLACE	± 0.15	DECIMAL 4 PLACES	± 0.005

Solarchem
7320 SMOKE RANCH RD
LAS VEGAS, NEVADA
U.S.A. 89128
130 ROYAL CREST CT
MARKHAM, ONTARIO
CANADA L3R 0A1

	NAME	SIGN	DATE
DRAFT	JKMB		17 AUG 93
DESIGN			
CHECK			
APPR			

TITLE: DUAL METERING PUMP FRAME DETAIL

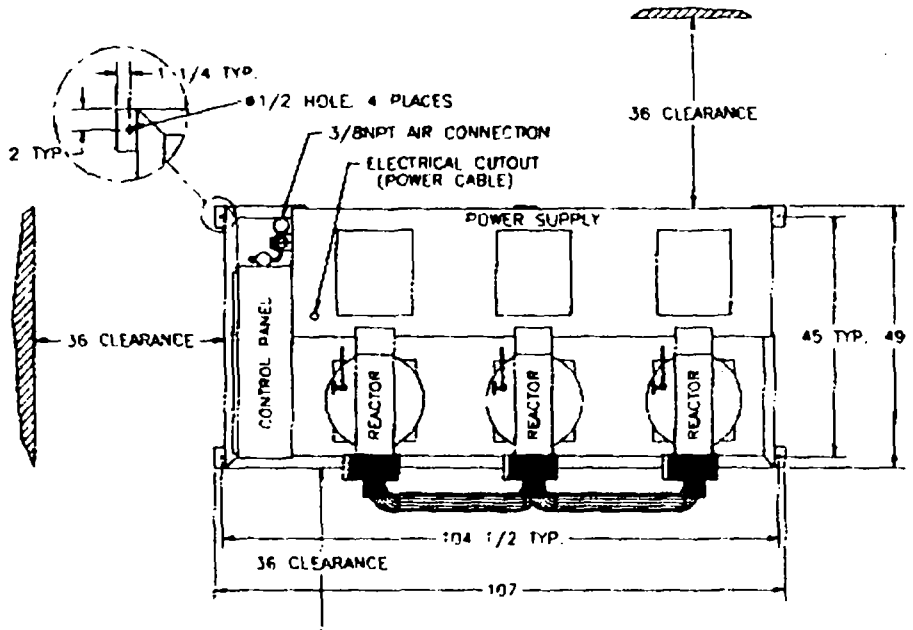
SHEET No. SHEET 1 OF 1

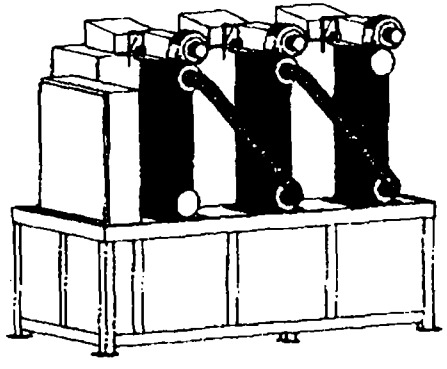
SCALE NONE

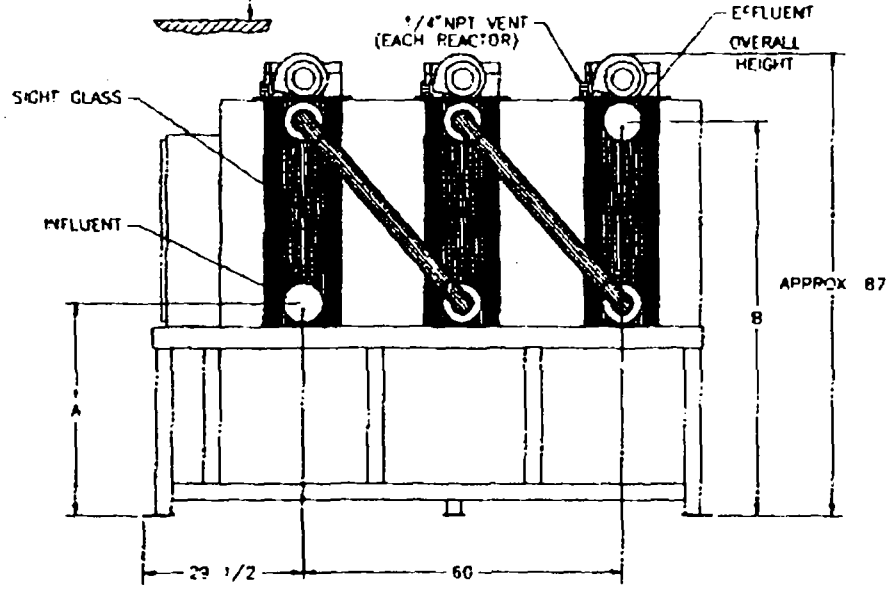
DWG No. 000-RX-400012

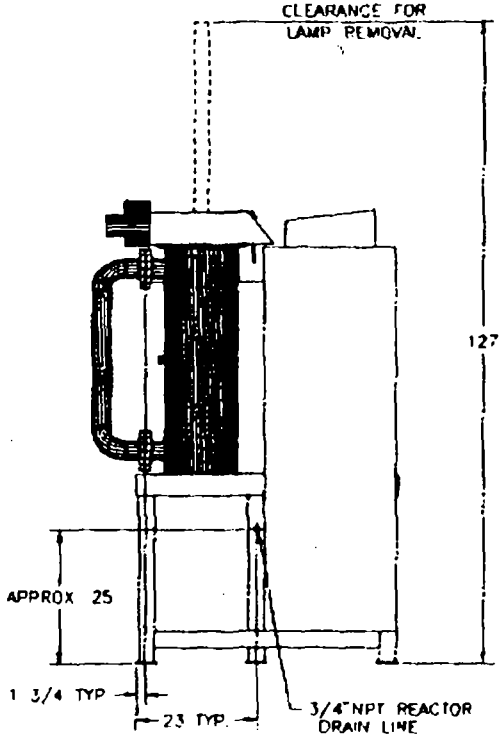
REV A

000-RX-400012









REVISIONS

C	[illegible]	[illegible]	[illegible]
B	[illegible]	[illegible]	[illegible]
A	[illegible]	[illegible]	[illegible]
B	[illegible]	[illegible]	[illegible]
C	[illegible]	[illegible]	[illegible]

NOTES

1. APPROX WEIGHT, 7500 lbs.
2. REFER TO PIPING DRAWING FOR REACTOR NOZZLE ORIENTATION
3. MINIMUM 36" CLEARANCE ACCESS AS SHOWN.
4. UNIT TO BE MOUNTED ON 5" RAISED CONCRETE PAD.
5. REFER TO P & I.D. DRAWING FOR ACTUAL PIPE SIZE

PORT SIZE	APPROX DIMS	
	A	B
1	39	*74-3/4
1-1/2	39-3/4	*74
2	39-3/4	74
3	39-3/4	74
4	40-1/4	73-1/2

* WHERE THERE ARE LOW FLOWS INVOLVED, THE REACTOR EFFLUENT MAY BE OUT OF THE TOP PLATE RATHER THAN OUT THE SIDE

FINISH

MATERIAL

Solarchem

PAYOX 3 x 30HW
REACTOR OUTLINE DETAIL

SHEET 1 OF 1

000-RD-000234

000-RD-000234

BENCH SCALE TREATABILITY STUDIES

ANALYTICAL DATA

Initial Samples
PGCS Water, Source Area Water, Separated Source Area Water

Inorganic Compounds
Volatile Organic Compounds
Semi-Volatile Organic Compounds

August, 1995

MONTGOMERY WATSON
Analytical Testing Services

University Research Park
One Science Court
Madison, Wisconsin 53711
Tel: 608 231 4747 • Fax: 608 231 4777

INORGANIC REPORT

ACS
GRIFFITH IN
Project Number: 4077.0120

Sample #	Description	Test	Result	Reporting Limit	Matrix	Units	Sample Date	Analysis Date
L10988-001	ACS-PGCS1-01	Antimony	< 0.05	0.05	GroundH2O	mg/L	15-JUN-95	29-JUN-95
		Arsenic	0.011	0.001	GroundH2O	mg/L	15-JUN-95	26-JUN-95
		Beryllium	< 0.005	0.005	GroundH2O	mg/L	15-JUN-95	29-JUN-95
		Cadmium	< 0.005	0.005	GroundH2O	mg/L	15-JUN-95	29-JUN-95
		Chromium, Total	0.02	0.01	GroundH2O	mg/L	15-JUN-95	29-JUN-95
		Copper	0.03	0.02	GroundH2O	mg/L	15-JUN-95	29-JUN-95
		Lead	0.0200	0.0015	GroundH2O	mg/L	15-JUN-95	26-JUN-95
		Mercury	< 0.0002	0.0002	GroundH2O	mg/L	15-JUN-95	21-JUN-95
		Nickel	0.03	0.02	GroundH2O	mg/L	15-JUN-95	30-JUN-95
		Selenium	< 0.002	0.002	GroundH2O	mg/L	15-JUN-95	27-JUN-95
		Silver	< 0.01	0.01	GroundH2O	mg/L	15-JUN-95	29-JUN-95
		Thallium	< 0.20	0.20	GroundH2O	mg/L	15-JUN-95	30-JUN-95
		Zinc	0.06	0.01	GroundH2O	mg/L	15-JUN-95	29-JUN-95
		pH	6.00	0.01	GroundH2O	S.U.	15-JUN-95	17-JUN-95
L10988-002	ACS-SBP/OFCA1-01	Antimony	< 0.10	0.05	GroundH2O	mg/L	15-JUN-95	29-JUN-95
		Arsenic	0.046	0.001	GroundH2O	mg/L	15-JUN-95	26-JUN-95
		Beryllium	< 0.005	0.005	GroundH2O	mg/L	15-JUN-95	29-JUN-95
		Cadmium	0.963	0.005	GroundH2O	mg/L	15-JUN-95	29-JUN-95
		Chemical Oxygen Demand	79500	20	GroundH2O	mg/L	15-JUN-95	24-JUN-95
		Chromium, Total	2.28	0.01	GroundH2O	mg/L	15-JUN-95	29-JUN-95
		Copper	5.61	0.02	GroundH2O	mg/L	15-JUN-95	29-JUN-95
		Lead	9.61	0.0015	GroundH2O	mg/L	15-JUN-95	26-JUN-95
		Mercury	0.0280	0.0002	GroundH2O	mg/L	15-JUN-95	21-JUN-95
		Nickel	2.09	0.02	GroundH2O	mg/L	15-JUN-95	30-JUN-95
		Oil and Grease	30200	1	GroundH2O	mg/L	15-JUN-95	22-JUN-95
		Selenium	< 0.004	0.002	GroundH2O	mg/L	15-JUN-95	28-JUN-95
		Silver	< 0.01	0.01	GroundH2O	mg/L	15-JUN-95	29-JUN-95
		Solids, Total Suspended	12400	2	GroundH2O	mg/L	15-JUN-95	21-JUN-95
		Thallium	< 0.40	0.20	GroundH2O	mg/L	15-JUN-95	30-JUN-95
		Zinc	33.1	0.01	GroundH2O	mg/L	15-JUN-95	29-JUN-95
		pH	6.82	0.01	GroundH2O	S.U.	15-JUN-95	17-JUN-95

Chk'd: [signature] App'd: [signature]
Date App'd: 7/5/95

WI Lab Certification ID#: 113138300

MONTGOMERY WATSON
Analytical Testing Services

University Research Park
One Science Court
Madison, Wisconsin 53711
Tel: 608 231 4747 • Fax: 608 231 4777

INORGANIC REPORT
ACS
GRIFFITH IN
Project Number: 4077.0120

Sample #	Description	Test	Result	Reporting Limit	Matrix	Units	Sample Date	Analysis Date
L10988-003	ACS-SBP/OFCA2-01 (SETTLED)	Antimony	< 0.10	0.05	GroundH2O	mg/L	15-JUN-95	29-JUN-95
		Arsenic	0.028	0.001	GroundH2O	mg/L	15-JUN-95	26-JUN-95
		Beryllium	< 0.005	0.005	GroundH2O	mg/L	15-JUN-95	29-JUN-95
		Biochemical Oxygen Demand	14700	1	GroundH2O	mg/L	15-JUN-95	23-JUN-95
		Cadmium	0.543	0.005	GroundH2O	mg/L	15-JUN-95	29-JUN-95
		Chemical Oxygen Demand	26000	20	GroundH2O	mg/L	15-JUN-95	23-JUN-95
		Chromium, Total	0.05	0.01	GroundH2O	mg/L	15-JUN-95	29-JUN-95
		Copper	0.27	0.02	GroundH2O	mg/L	15-JUN-95	29-JUN-95
		Lead	0.105	0.0015	GroundH2O	mg/L	15-JUN-95	26-JUN-95
		Mercury	0.0003	0.0002	GroundH2O	mg/L	15-JUN-95	21-JUN-95
		Nickel	0.78	0.02	GroundH2O	mg/L	15-JUN-95	30-JUN-95
		Oil and Grease	74	1	GroundH2O	mg/L	15-JUN-95	22-JUN-95
		Selenium	< 0.002	0.002	GroundH2O	mg/L	15-JUN-95	27-JUN-95
		Silver	< 0.01	0.01	GroundH2O	mg/L	15-JUN-95	29-JUN-95
		Solids, Total Suspended	391	2	GroundH2O	mg/L	15-JUN-95	21-JUN-95
		Thallium	< 0.40	0.20	GroundH2O	mg/L	15-JUN-95	30-JUN-95
		Zinc	19.0	0.01	GroundH2O	mg/L	15-JUN-95	29-JUN-95
		pH	5.81	0.01	GroundH2O	S.U.	15-JUN-95	17-JUN-95

Footnotes

Sample #	Test	Footnote
L10988-001	pH	A11
L10988-002	Oil and Grease	A4
L10988-002	pH	A11
L10988-002	Antimony	A2
L10988-002	Selenium	A2
L10988-002	Thallium	A2
L10988-003	Biochemical Oxygen Demand	A14
L10988-003	Oil and Grease	A4
L10988-003	pH	A11
L10988-003	Antimony	A2
L10988-003	Thallium	A2

Chk'd: [illegible] App'd: [illegible]
Date App'd: 7/5/95

WI Lab Certification ID#: 113138300

MONTGOMERY WATSON
Analytical Testing Services

University Research Park
One Science Court
Madison, Wisconsin 53711
Tel: 608 231 4747 • Fax: 608 231 4777

ORGANIC REPORT
SEMIVOLATILE
ACS
GRIFFITH IN
Project Number: 4077.0120

Sample ID	Compound	Result	Reporting Limit	Matrix	Units	Footnotes
L10988-001	N-Nitrosodimethylamine	< 130	50	GroundH2O	ug/L	A2
ACS-PGCS1-01	Phenol	< 27	10	GroundH2O	ug/L	A2
	Bis(2-chloroethyl) ether	< 27	10	GroundH2O	ug/L	A2
	2-Chlorophenol	< 27	10	GroundH2O	ug/L	A2
	1,3-Dichlorobenzene	< 27	10	GroundH2O	ug/L	A2
	1,4-Dichlorobenzene	< 27	10	GroundH2O	ug/L	A2
	1,2-Dichlorobenzene	< 27	10	GroundH2O	ug/L	A2
	Bis(2-chloroisopropyl) ether	< 27	10	GroundH2O	ug/L	A2
	N-Nitrosodi-n-propylamine	< 27	10	GroundH2O	ug/L	A2
	Hexachloroethane	< 27	10	GroundH2O	ug/L	A2
	Nitrobenzene	< 27	10	GroundH2O	ug/L	A2
	Isophorone	< 27	10	GroundH2O	ug/L	A2
	2-Nitrophenol	< 27	10	GroundH2O	ug/L	A2
	2,4-Dimethylphenol	< 27	10	GroundH2O	ug/L	A2
	Bis(2-chloroethoxy)methane	< 27	10	GroundH2O	ug/L	A2
	2,4-Dichlorophenol	< 27	10	GroundH2O	ug/L	A2
	1,2,4-Trichlorobenzene	< 27	10	GroundH2O	ug/L	A2
	Naphthalene	< 27	10	GroundH2O	ug/L	A2
	Hexachlorobutadiene	< 27	10	GroundH2O	ug/L	A2
	4-Chloro-3-methylphenol	< 53	20	GroundH2O	ug/L	A2
	Hexachlorocyclopentadiene	< 53	20	GroundH2O	ug/L	A2
	2,4,6-Trichlorophenol	< 27	10	GroundH2O	ug/L	A2
	2-Chloronaphthalene	< 27	10	GroundH2O	ug/L	A2
	Dimethyl phthalate	< 27	10	GroundH2O	ug/L	A2
	2,6-Dinitrotoluene	< 27	10	GroundH2O	ug/L	A2
	Acenaphthylene	< 27	10	GroundH2O	ug/L	A2
	Acenaphthene	< 27	10	GroundH2O	ug/L	A2
	2,4-Dinitrophenol	< 130	50	GroundH2O	ug/L	A2
	4-Nitrophenol	< 130	50	GroundH2O	ug/L	A2
	2,4-Dinitrotoluene	< 27	10	GroundH2O	ug/L	A2
	Diethyl phthalate	< 27	10	GroundH2O	ug/L	A2
	4-Chlorophenyl phenyl ether	< 27	10	GroundH2O	ug/L	A2
	Fluorene	< 27	10	GroundH2O	ug/L	A2
	4,6-Dinitro-2-methylphenol	< 130	50	GroundH2O	ug/L	A2
	1,2-Diphenylhydrazine	< 27	10	GroundH2O	ug/L	A2
	N-Nitrosodiphenylamine	< 27	10	GroundH2O	ug/L	G15,A2
	Hexachlorobenzene	< 27	10	GroundH2O	ug/L	A2
	4-Bromophenyl phenyl ether	< 27	10	GroundH2O	ug/L	A2
	Pentachlorophenol	< 130	50	GroundH2O	ug/L	A2
	Phenanthrene	< 27	10	GroundH2O	ug/L	A2
	Anthracene	< 27	10	GroundH2O	ug/L	A2
	Di-n-butyl phthalate	< 27	10	GroundH2O	ug/L	A2
	Fluoranthene	< 27	10	GroundH2O	ug/L	A2

Chk'd: KCL App'd: [signature]
Date App'd: 2/5/95

WI Lab Certification ID#: 113138300

MONTGOMERY WATSON
Analytical Testing Services

University Research Park
One Science Court
Madison, Wisconsin 53711
Tel: 608 231 4747 • Fax: 608 231 4777

ORGANIC REPORT
SEMIVOLATILE
ACS
GRIFFITH IN
Project Number: 4077.0120

Sample ID	Compound	Result	Reporting Limit	Matrix	Units	Footnotes
L10988-001	Benzidine	< 130	50	GroundH2O	ug/L	A2
ACS-PGCS1-01	Pyrene	< 27	10	GroundH2O	ug/L	A2
	Butyl benzyl phthalate	< 27	10	GroundH2O	ug/L	A2
	3,3'-Dichlorobenzidine	< 53	20	GroundH2O	ug/L	A2
	Chrysene	< 27	10	GroundH2O	ug/L	A2
	Benz(a)anthracene	< 27	10	GroundH2O	ug/L	A2
	Bis(2-ethylhexyl) phthalate	< 27	10	GroundH2O	ug/L	A2
	Di-n-octyl phthalate	< 27	10	GroundH2O	ug/L	A2
	Benzo(b)fluoranthene	< 27	10	GroundH2O	ug/L	A2
	Benzo(k)fluoranthene	< 27	10	GroundH2O	ug/L	A2
	Benzo(a)pyrene	< 27	10	GroundH2O	ug/L	A2
	Indeno(1,2,3-cd)pyrene	< 27	10	GroundH2O	ug/L	A2
	Dibenz(a,h)anthracene	< 27	10	GroundH2O	ug/L	A2
	Benzo(g,h,i)perylene	< 27	10	GroundH2O	ug/L	A2

Sample Date: 15-JUN-95
Extraction Date: 19-JUN-95
Analysis Date: 23-JUN-95

Method Reference : SW846, Method 8270

A2 = Elevated quantitation limit necessary to overcome interference.
G15 = n-Nitrosodiphenylamine decomposes in the GC inlet and cannot be separated from Diphenylamine.

Chk'd: Kate App'd: gfm
Date App'd: 7/5/95

WI Lab Certification ID#: 113138300

MONTGOMERY WATSON
Analytical Testing Services

University Research Park
One Science Court
Madison, Wisconsin 53711
Tel: 608 231 4747 • Fax: 608 231 4777

ORGANIC REPORT
SEMIVOLATILE
ACS
GRIFFITH IN
Project Number: 4077.0120

Sample ID	Compound	Result	Reporting Limit	Matrix	Units	Footnotes
L10988-002	N-Nitrosodimethylamine	< 130000	50	GroundH2O	ug/L	A2
ACS-SBP/OFCA1-01	Phenol	< 25000	10	GroundH2O	ug/L	A2
	Bis(2-chloroethyl) ether	< 25000	10	GroundH2O	ug/L	A2
	2-Chlorophenol	< 25000	10	GroundH2O	ug/L	A2
	1,3-Dichlorobenzene	< 25000	10	GroundH2O	ug/L	A2
	1,4-Dichlorobenzene	< 25000	10	GroundH2O	ug/L	A2
	1,2-Dichlorobenzene	29000	10	GroundH2O	ug/L	
	Bis(2-chloroisopropyl) ether	< 25000	10	GroundH2O	ug/L	A2
	N-Nitrosodi-n-propylamine	< 25000	10	GroundH2O	ug/L	A2
	Hexachloroethane	< 25000	10	GroundH2O	ug/L	A2
	Nitrobenzene	< 25000	10	GroundH2O	ug/L	A2
	Isophorone	77000	10	GroundH2O	ug/L	
	2-Nitrophenol	< 25000	10	GroundH2O	ug/L	A2
	2,4-Dimethylphenol	< 25000	10	GroundH2O	ug/L	A2
	Bis(2-chloroethoxy)methane	< 25000	10	GroundH2O	ug/L	A2
	2,4-Dichlorophenol	< 25000	10	GroundH2O	ug/L	A2
	1,2,4-Trichlorobenzene	< 25000	10	GroundH2O	ug/L	A2
	Naphthalene	210000	10	GroundH2O	ug/L	
	Hexachlorobutadiene	< 25000	10	GroundH2O	ug/L	A2
	4-Chloro-3-methylphenol	< 50000	20	GroundH2O	ug/L	A2
	Hexachlorocyclopentadiene	< 50000	20	GroundH2O	ug/L	A2
	2,4,6-Trichlorophenol	< 25000	10	GroundH2O	ug/L	A2
	2-Chloronaphthalene	< 25000	10	GroundH2O	ug/L	A2
	Dimethyl phthalate	< 25000	10	GroundH2O	ug/L	A2
	2,6-Dinitrotoluene	< 25000	10	GroundH2O	ug/L	A2
	Acenaphthylene	< 25000	10	GroundH2O	ug/L	A2
	Acenaphthene	< 25000	10	GroundH2O	ug/L	A2
	2,4-Dinitrophenol	< 130000	50	GroundH2O	ug/L	A2
	4-Nitrophenol	< 130000	50	GroundH2O	ug/L	A2
	2,4-Dinitrotoluene	< 25000	10	GroundH2O	ug/L	A2
	Diethyl phthalate	< 25000	10	GroundH2O	ug/L	A2
	4-Chlorophenyl phenyl ether	< 25000	10	GroundH2O	ug/L	A2
	Fluorene	< 25000	10	GroundH2O	ug/L	A2
	4,6-Dinitro-2-methylphenol	< 130000	50	GroundH2O	ug/L	A2
	1,2-Diphenylhydrazine	< 25000	10	GroundH2O	ug/L	A2
	N-Nitrosodiphenylamine	< 25000	10	GroundH2O	ug/L	G15,A2
	Hexachlorobenzene	< 25000	10	GroundH2O	ug/L	A2
	4-Bromophenyl phenyl ether	< 25000	10	GroundH2O	ug/L	A2
	Pentachlorophenol	< 130000	50	GroundH2O	ug/L	A2
	Phenanthrene	< 25000	10	GroundH2O	ug/L	A2
	Anthracene	< 25000	10	GroundH2O	ug/L	A2
	Di-n-butyl phthalate	65000	10	GroundH2O	ug/L	
	Fluoranthene	< 25000	10	GroundH2O	ug/L	A2

Chk'd: Kok App'd: [illegible]
Date App'd: 7/5/95

WI Lab Certification ID#: 113138300

MONTGOMERY WATSON
Analytical Testing Services

University Research Park
One Science Court
Madison, Wisconsin 53711
Tel: 608 231 4747 • Fax: 608 231 4777

ORGANIC REPORT
SEMIVOLATILE
ACS
GRIFFITH IN
Project Number: 4077.0120

Sample ID	Compound	Result	Reporting Limit	Matrix	Units	Footnotes
L10988-002	Benzidine	< 130000	50	GroundH2O	ug/L	A2
ACS-SBP/OFCA1-01	Pyrene	< 25000	10	GroundH2O	ug/L	A2
	Butyl benzyl phthalate	27000	10	GroundH2O	ug/L	
	3,3'-Dichlorobenzidine	< 50000	20	GroundH2O	ug/L	A2
	Chrysene	< 25000	10	GroundH2O	ug/L	A2
	Benz(a)anthracene	< 25000	10	GroundH2O	ug/L	A2
	Bis(2-ethylhexyl) phthalate	320000	10	GroundH2O	ug/L	
	Di-n-octyl phthalate	< 25000	10	GroundH2O	ug/L	A2
	Benzo(b)fluoranthene	< 25000	10	GroundH2O	ug/L	A2
	Benzo(k)fluoranthene	< 25000	10	GroundH2O	ug/L	A2
	Benzo(a)pyrene	< 25000	10	GroundH2O	ug/L	A2
	Indeno(1,2,3-cd)pyrene	< 25000	10	GroundH2O	ug/L	A2
	Dibenz(a,h)anthracene	< 25000	10	GroundH2O	ug/L	A2
	Benzo(g,h,i)perylene	< 25000	10	GroundH2O	ug/L	A2

Sample Date: 15-JUN-95
Extraction Date: 19-JUN-95
Analysis Date: 25-JUN-95

Method Reference : SW846, Method 8270

A2 = Elevated quantitation limit necessary to overcome interference.
G15 = n-Nitrosodiphenylamine decomposes in the GC inlet and cannot be separated from Diphenylamine.

WI Lab Certification ID#: 113138300

Chk'd: [illegible] App'd: [illegible]
Date App'd: 7/5/95

MONTGOMERY WATSON
Analytical Testing Services

University Research Park
One Science Court
Madison, Wisconsin 53711
Tel: 608 231 4747 • Fax: 608 231 4777

ORGANIC REPORT
SEMIVOLATILE
ACS
GRIFFITH IN
Project Number: 4077.0120

Sample ID	Compound	Result	Reporting Limit	Matrix	Units	Footnotes
L10988-003	N-Nitrosodimethylamine	< 54	50	GroundH2O	ug/L	A4,A1
ACS-SBP/OFCA2-01	Phenol	< 11	10	GroundH2O	ug/L	A4,A1
(SETTLED)	Bis(2-chloroethyl) ether	< 11	10	GroundH2O	ug/L	A4,A1
	2-Chlorophenol	< 11	10	GroundH2O	ug/L	A4,A1
	1,3-Dichlorobenzene	< 11	10	GroundH2O	ug/L	A4,A1
	1,4-Dichlorobenzene	< 11	10	GroundH2O	ug/L	A4,A1
	1,2-Dichlorobenzene	< 11	10	GroundH2O	ug/L	A4,A1
	Bis(2-chloroisopropyl) ether	< 11	10	GroundH2O	ug/L	A4,A1
	N-Nitrosodi-n-propylamine	< 11	10	GroundH2O	ug/L	A4,A1
	Hexachloroethane	< 11	10	GroundH2O	ug/L	A4,A1
	Nitrobenzene	< 11	10	GroundH2O	ug/L	A4,A1
	Isophorone	< 11	10	GroundH2O	ug/L	A4,A1
	2-Nitrophenol	< 11	10	GroundH2O	ug/L	A4,A1
	2,4-Dimethylphenol	< 11	10	GroundH2O	ug/L	A4,A1
	Bis(2-chloroethoxy)methane	< 11	10	GroundH2O	ug/L	A4,A1
	2,4-Dichlorophenol	< 11	10	GroundH2O	ug/L	A4,A1
	1,2,4-Trichlorobenzene	< 11	10	GroundH2O	ug/L	A4,A1
	Naphthalene	88	10	GroundH2O	ug/L	A4
	Hexachlorobutadiene	< 11	10	GroundH2O	ug/L	A4,A1
	4-Chloro-3-methylphenol	< 22	20	GroundH2O	ug/L	A4,A1
	Hexachlorocyclopentadiene	< 22	20	GroundH2O	ug/L	A4,A1
	2,4,6-Trichlorophenol	< 11	10	GroundH2O	ug/L	A4,A1
	2-Chloronaphthalene	< 11	10	GroundH2O	ug/L	A4,A1
	Dimethyl phthalate	380	10	GroundH2O	ug/L	A4
	2,6-Dinitrotoluene	< 11	10	GroundH2O	ug/L	A4,A1
	Acenaphthylene	< 11	10	GroundH2O	ug/L	A4,A1
	Acenaphthene	< 11	10	GroundH2O	ug/L	A4,A1
	2,4-Dinitrophenol	< 54	50	GroundH2O	ug/L	A4,A1
	4-Nitrophenol	< 54	50	GroundH2O	ug/L	A4,A1
	2,4-Dinitrotoluene	< 11	10	GroundH2O	ug/L	A4,A1
	Diethyl phthalate	40	10	GroundH2O	ug/L	A4
	4-Chlorophenyl phenyl ether	< 11	10	GroundH2O	ug/L	A4,A1
	Fluorene	< 11	10	GroundH2O	ug/L	A4,A1
	4,6-Dinitro-2-methylphenol	< 54	50	GroundH2O	ug/L	A4,A1
	1,2-Diphenylhydrazine	< 11	10	GroundH2O	ug/L	A4,A1
	N-Nitrosodiphenylamine	< 11	10	GroundH2O	ug/L	G15,A4,A1
	Hexachlorobenzene	< 11	10	GroundH2O	ug/L	A4,A1
	4-Bromophenyl phenyl ether	< 11	10	GroundH2O	ug/L	A4,A1
	Pentachlorophenol	< 54	50	GroundH2O	ug/L	A4,A1
	Phenanthrene	< 11	10	GroundH2O	ug/L	A4,A1
	Anthracene	< 11	10	GroundH2O	ug/L	A4,A1
	Di-n-butyl phthalate	< 11	10	GroundH2O	ug/L	A4,A1
	Fluoranthene	< 11	10	GroundH2O	ug/L	A4,A1

Chk'd: [illegible] App'd: [illegible]
Date App'd: 7/5/95

WI Lab Certification ID#: 113138300

MONTGOMERY WATSON
Analytical Testing Services

University Research Park
One Science Court
Madison, Wisconsin 53711
Tel: 608 231 4747 • Fax: 608 231 4777

ORGANIC REPORT
SEMIVOLATILE
ACS
GRIFFITH IN
Project Number: 4077.0120

Sample ID	Compound	Result	Reporting Limit	Matrix	Units	Footnotes
L10988-003	Benzidine	< 54	50	GroundH2O	ug/L	A4,A1
ACS-SBP/OFCA2-01	Pyrene	< 11	10	GroundH2O	ug/L	A4,A1
(SETTLED)	Butyl benzyl phthalate	< 11	10	GroundH2O	ug/L	A4,A1
	3,3'-Dichlorobenzidine	< 22	20	GroundH2O	ug/L	A4,A1
	Chrysene	< 11	10	GroundH2O	ug/L	A4,A1
	Benz(a)anthracene	< 11	10	GroundH2O	ug/L	A4,A1
	Bis(2-ethylhexyl) phthalate	120	10	GroundH2O	ug/L	A4
	Di-n-octyl phthalate	< 11	10	GroundH2O	ug/L	A4,A1
	Benzo(b)fluoranthene	< 11	10	GroundH2O	ug/L	A4,A1
	Benzo(k)fluoranthene	< 11	10	GroundH2O	ug/L	A4,A1
	Benzo(a)pyrene	< 11	10	GroundH2O	ug/L	A4,A1
	Indeno(1,2,3-cd)pyrene	< 11	10	GroundH2O	ug/L	A4,A1
	Dibenz(a,h)anthracene	< 11	10	GroundH2O	ug/L	A4,A1
	Benzo(g,h,i)perylene	< 11	10	GroundH2O	ug/L	A4,A1

Sample Date: 15-JUN-95
Extraction Date: 19-JUN-95
Analysis Date: 24-JUN-95

Method Reference : SW846, Method 8270

A1 = Elevated quantitation limit due to low sample volume.
A4 = Result should be considered estimated due to sample-related problems encountered during analysis.
G15 = n-Nitrosodiphenylamine decomposes in the GC inlet and cannot be separated from Diphenylamine.

WI Lab Certification ID#: 113138300

Chk'd: [illegible] App'd: [illegible]
Date App'd: 7/5/95

MONTGOMERY WATSON
Analytical Testing Services

University Research Park
One Science Court
Madison, Wisconsin 53711
Tel: 608 231 4747 • Fax: 608 231 4777

PCB REPORT
ACS
GRIFFITH IN
Project Number: 4077.0120

Sample #	Description	Compound		Result	Reporting Limit	Matrix	Units	Footnotes
L10988-002	ACS-SBP/OFCA1-01	PCB-1016		< 5.0	0.50	GroundH2O	ug/L	A2
		PCB-1221		< 10	1.0	GroundH2O	ug/L	A2
		PCB-1232		< 10	1.0	GroundH2O	ug/L	A2
		PCB-1242		< 5.0	0.50	GroundH2O	ug/L	A2
		PCB-1248		< 5.0	0.50	GroundH2O	ug/L	A2
		PCB-1254		< 10	1.0	GroundH2O	ug/L	A2
		PCB-1260		< 10	1.0	GroundH2O	ug/L	A2
		Sample Date:	15-JUN-95					
		Extract Date:	20-JUN-95					
		Analysis Date:	21-JUN-95					
L10988-003	ACS-SBP/OFCA2-01 (SETTLED)	PCB-1016		< 5.0	0.50	GroundH2O	ug/L	A2, A4
		PCB-1221		< 10	1.0	GroundH2O	ug/L	A2, A4
		PCB-1232		< 10	1.0	GroundH2O	ug/L	A2, A4
		PCB-1242		< 5.0	0.50	GroundH2O	ug/L	A2, A4
		PCB-1248		< 5.0	0.50	GroundH2O	ug/L	A2, A4
		PCB-1254		< 10	1.0	GroundH2O	ug/L	A2, A4
		PCB-1260		< 10	1.0	GroundH2O	ug/L	A2, A4
		Sample Date:	15-JUN-95					
		Extract Date:	20-JUN-95					
		Analysis Date:	21-JUN-95					

WI Lab Certification ID#: 113138300

Chk'd: [illegible] App'd: [illegible]
Date App'd: 7/5/95

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX. 708/967-6735

LABORATORY REPORT 124774

Montgomery Watson
One Science Court
Madison, WI 53705

Report Date: 6/27/95
Sample Received: 6/21/95
Date Analyzed: 6/26/95

Project No.: 10972-001
Project Name: ACS
Sample Description: Groundwater, ACS-PGC51-01
Sample No.: 22203

Compound	Concentration Found IN Sample (ppb)	Blank (ppb)	Method Detection Limit (MDL) ug/L (ppb)	Practical Quantitation Limit (PQL) ug/L (ppb)
45. 1-Methylpropylbenzene (sec-Butylbenzene)	<0.019	<0.019	0.019	0.079
46. 1,4-Dichlorobenzene	<0.024	<0.024	0.024	0.104
47. 1-Methyl-4(1-methylethyl)benzene (p-Isopropyltoluene)	<0.017	<0.017	0.017	0.067
48. 1,2-Dichlrobenzene	0.949	<0.035	0.035	0.145
49. Trans-1,3-dichloropropene	<0.014	<0.014	0.014	0.054
50. 1,1,2-Trichloroethane	<0.019	<0.019	0.019	0.079
51. 1,3-Dichloropropane	<0.017	<0.017	0.017	0.067
52. Dibromochloromethane	<0.024	<0.024	0.024	0.104
53. n-Butylbenzene	<0.028	<0.028	0.028	0.088
54. 1,2-Dibromo-3-chloropropane	<0.028	<0.028	0.028	0.118
55. 1,2,4-Trichlorobenzene	<0.028	<0.028	0.028	0.118
56. Naphthalene	<0.052	<0.052	0.052	0.222
57. Hexachlorobutadiene	<0.041	<0.041	0.041	0.171
58. 1,2,3-Trichlorobenzene	<0.042	<0.042	0.042	0.172
59. Bromochloromethane	<0.015	<0.015	0.015	0.065
60. Methyl-tert-butyl ether	<0.08	<0.08	0.08	0.17
61. Di-isopropylether	<0.08	<0.08	0.08	0.2
62. Acetone	<10.0	<10.0	10.0	10.0
63. Methyl Ethyl Ketone	<10.0	<10.0	10.0	10.0
64. MIBK	<10.0	<10.0	10.0	10.0

All results expressed as ppb unless otherwise indicated.

Wisconsin Certified Laboratory #999888890.

Analysis performed in accordance with SW-846 method 8260, and Applicable WI-DNR Regulations.

The contents of this report apply to the sample analyzed. No duplication of this report is allowed except in its entirety.

Paul E. Zylka

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT 124774

Montgomery Watson
One Science Court
Madison, WI 53705

Report Date: 6/27/95
Sample Received: 6/21/95
Date Analyzed: 6/26/95

Project No.: 10972-001
Project Name: ACS
Sample Description: Groundwater, ACS-FGC51-01
Sample No.: 22203

Compound	Concentration Found IN Sample (ppb)	Concentration Found IN Blank (ppb)	Method Detection Limit (MDL) ug/L (ppb)	Practical Quantitation Limit (PQL) ug/L (ppb)
25. Tetrachloroethene	0.055	<0.034	0.034	0.144
26. 1,2-Dibromoethane (EDB)	<0.011	<0.011	0.011	0.041
27. Chlorobenzene	<0.025	<0.025	0.025	0.105
28. 1,1,1,2-Tetrachloroethane	<0.028	<0.028	0.028	0.118
29. Ethylbenzene	2.94	<0.011	0.011	0.051
30. m,p-Xylene (1,3-Dimethylbenzene) (1,4-Dimethylbenzene)	0.696	<0.035	0.035	0.145
31. o-Xylene (1,2-Dimethylbenzene)	<0.030	<0.030	0.030	0.130
32. Styrene	<0.035	<0.035	0.035	0.145
33. Bromoform	<0.040	<0.040	0.040	0.170
34. 1,1,2,2-Tetrachloroethane	<0.023	<0.023	0.023	0.093
35. 1-Methylethylbenzene (Isopropylbenzene)	<0.017	<0.017	0.017	0.067
36. 1,2,3-Trichloropropane	<0.038	<0.038	0.038	0.158
37. Bromobenzene	<0.031	<0.031	0.031	0.131
38. 2-Chlorotoluene (1-Methyl-2-chlorobenzene)	<0.023	<0.023	0.023	0.093
39. n-Propylbenzene	<0.038	<0.038	0.038	0.158
40. 4-Chlorotoluene (1-Methyl-4-chlorobenzene)	<0.022	<0.022	0.022	0.092
41. 1,3,5-Trimethylbenzene	<0.014	<0.014	0.014	0.054
42. 1,1-Dimethylethylbenzene (tert-Butylbenzene)	<0.019	<0.019	0.019	0.079
43. 1,2,4-Trimethylbenzene	<0.028	<0.028	0.028	0.118
44. 1,3-Dichlorobenzene	<0.027	<0.027	0.027	0.107

Leah E. Zuhr

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT 124774

Montgomery Watson
One Science Court
Madison, WI 53705

Report Date: 6/27/95
Sample Received: 6/21/95
Date Analyzed: 6/26/95

Project No.: 10972-001
Project Name: ACS
Sample Description: Groundwater, ACS-FGC51-01
Sample No.: 22203

Compound	Concentration Found IN Sample (ppb)	Concentration Found IN Blank (ppb)	Method Detection Limit (MDL) ug/L (ppb)	Practical Quantitation Limit (PQL) ug/L (ppb)
1. Dichlorodifluoromethane	<0.053	<0.053	0.053	0.223
2. Chloromethane	0.209	<0.022	0.022	0.092
3. Vinyl Chloride	0.343	<0.027	0.027	0.117
4. Bromomethane	<0.025	<0.025	0.025	0.105
5. Chloroethane	0.716	<0.021	0.021	0.091
6. Trichlorofluoromethane	<0.027	<0.027	0.027	0.117
7. 1,1-Dichloroethene	<0.018	<0.018	0.018	0.078
8. Dichloromethane	<0.012	<0.012	0.012	0.052
9. Trans-1,2-Dichloroethene	0.398	<0.033	0.033	0.133
10. 1,1-Dichloroethane	0.924	<0.012	0.012	0.052
11. Cis-1,2-Dichloroethene	0.299	<0.030	0.030	0.120
12. 2,2,-Dichloropropane	<0.029	<0.029	0.029	0.119
13. Chloroform	<0.028	<0.028	0.028	0.118
14. 1,1,1-Trichloroethane	<0.013	<0.013	0.013	0.053
15. 1,2-Dichloroethane	<0.022	<0.022	0.022	0.092
16. 1,1-Dichloropropene	<0.013	<0.013	0.013	0.053
17. Benzene	26.0	<0.025	0.025	0.105
18. Carbon Tetrachloride	<0.032	<0.032	0.032	0.132
19. Trichloroethene	<0.019	<0.019	0.019	0.079
20. 1,2-Dichloropropane	<0.017	<0.017	0.017	0.077
21. Dibromomethane	<0.033	<0.033	0.033	0.133
22. Bromodichloromethane	<0.014	<0.014	0.014	0.054
23. Cis-1,3-Dichloropropene	<0.031	<0.031	0.031	0.131
24. Toluene	1.04	<0.022	0.022	0.092

Leah E. Zilmer

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

124776

Montgomery Watson
One Science Court
Madison, WI 53705

Report Date: 6/27/95
Sample Received: 6/21/95
Date Analyzed: 6/26/95

Project No.: 10972-001
Project Name: ACS
Sample Description: Groundwater, ACS-SBP/OFCA-01
Sample No.: 22204

Compound	Concentration Found IN Sample (ppb)	Concentration Found IN Blank (ppb)	Method Detection Limit (MDL) ug/L (ppb)	Practical Quantitation Limit (PQL) ug/L (ppb)
1. Dichlorodifluoromethane	<0.053	<0.053	5000	20000
2. Chloromethane	<0.022	<0.022	5000	20000
3. Vinyl Chloride	25,800	<0.027	5000	20000
4. Bromomethane	<0.025	<0.025	5000	20000
5. Chloroethane	0.716	<0.021	5000	20000
6. Trichlorofluoromethane	128,000	<0.027	5000	20000
7. 1,1-Dichloroethene	168,000	<0.018	5000	20000
8. Dichloromethane	936,000	<0.012	5000	20000
9. Trans-1,2-Dichloroethene	358,000	<0.033	5000	20000
10. 1,1-Dichloroethane	7,130,000	<0.012	5000	20000
11. Cis-1,2-Dichloroethene	359,000	<0.030	5000	20000
12. 2,2,-Dichloropropane	<0.029	<0.029	5000	20000
13. Chloroform	<0.028	<0.028	5000	20000
14. 1,1,1-Trichloroethane	14,600,000	<0.013	5000	20000
15. 1,2-Dichloroethane	<0.022	<0.022	5000	20000
16. 1,1-Dichloropropene	<0.013	<0.013	5000	20000
17. Benzene	9,640,000	<0.025	5000	20000
18. Carbon Tetrachloride	<0.032	<0.032	5000	20000
19. Trichloroethene	7,650,000	<0.019	5000	20000
20. 1,2-Dichloropropane	<0.017	<0.017	5000	20000
21. Dibromomethane	<0.033	<0.033	5000	20000
22. Bromodichloromethane	<0.014	<0.014	5000	20000
23. Cis-1,3-Dichloropropene	<0.031	<0.031	5000	20000
24. Toluene	31,400,000	<0.022	5000	20000

Leah E. Zeher

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-5666
FAX: 708/967-6735

LABORATORY REPORT 124776

Montgomery Watson
One Science Court
Madison, WI 53705

Report Date: 6/27/95
Sample Received: 6/21/95
Date Analyzed: 6/26/95

Project No.: 10972-001
Project Name: ACS
Sample Description: Groundwater, ACS-SEP/OF~~FA~~CA1-01
Sample No.: 22204

Compound	Concentration Found IN Sample (ppb)	Concentration Found IN Blank (ppb)	Method Detection Limit (MDL) ug/L (ppb)	Practical Quantitation Limit (PQL) ug/L (ppb)
25. Tetrachloroethene	35,200.000	<0.034	5000	20000
26. 1,2-Dibromoethane (EDB)	<0.011	<0.011	5000	20000
27. Chlorobenzene	<0.025	<0.025	5000	20000
28. 1,1,1,2-Tetrachloroethane	<0.028	<0.028	5000	20000
29. Ethylbenzene	6,200.000	<0.011	5000	20000
30. m,p-Xylene (1,3-Dimethylbenzene) (1,4-Dimethylbenzene)	<0.035	<0.035	5000	20000
31. o-Xylene (1,2-Dimethylbenzene)	35.000.000	<0.030	5000	20000
32. Styrene	<0.035	<0.035	5000	20000
33. Bromoform	<0.040	<0.040	5000	20000
34. 1,1,2,2-Tetrachloroethane	<0.023	<0.023	5000	20000
35. 1-Methylethylbenzene (Isopropylbenzene)	<0.017	<0.017	5000	20000
36. 1,2,3-Trichloropropane	<0.038	<0.038	5000	20000
37. Bromobenzene	<0.031	<0.031	5000	20000
38. 2-Chlorotoluene (1-Methyl-2-chlorobenzene)	<0.023	<0.023	5000	20000
39. n-Propylbenzene	<0.038	<0.038	5000	20000
40. 4-Chlorotoluene (1-Methyl-4-chlorobenzene)	<0.022	<0.022	5000	20000
41. 1,3,5-Trimethylbenzene	<0.014	<0.014	5000	20000
42. 1,1-Dimethylethylbenzene (tert-Butylbenzene)	<0.019	<0.019	5000	20000
43. 1,2,4-Trimethylbenzene	<0.028	<0.028	5000	20000
44. 1,3-Dichlorobenzene	<0.027	<0.027	5000	20000

Leah E. Zuber

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT 124776

Montgomery Watson
One Science Court
Madison, WI 53705

Report Date: 6/27/95
Sample Received: 6/21/95
Date Analyzed: 6/26/95

Project No.: 10972-001
Project Name: ACS
Sample Description: Groundwater, ACS-SEP/OEE1-01
Sample No.: 22204

Compound	Concentration Found IN Sample (ppb)	Concentration Found IN Blank (ppb)	Method Detection Limit (MDL) ug/L (ppb)	Practical Quantitation Limit (PQL) ug/L (ppb)
45. 1-Methylpropylbenzene (sec-Butylbenzene)	<5000	<0.019	5000	20000
46. 1,4-Dichlorobenzene	<5000	<0.024	5000	20000
47. 1-Methyl-4(1-methylethyl)benzene (p-Isopropyltoluene)	<5000	<0.017	5000	20000
48. 1,2-Dichlrobenzene	569,000	<0.035	5000	20000
49. Trans-1,3-dichloropropene	<0.014	<0.014	5000	20000
50. 1,1,2-Trichloroethane	<0.019	<0.019	5000	20000
51. 1,3-Dichloropropane	<0.017	<0.017	5000	20000
52. Dibromochloromethane	<0.024	<0.024	5000	20000
53. n-Butylbenzene	<0.028	<0.028	5000	20000
54. 1,2-Dibromo-3-chloropropane	<0.028	<0.028	5000	20000
55. 1,2,4-Trichlorobenzene	<0.028	<0.028	5000	20000
56. Naphthalene	2,410,000	<0.052	5000	20000
57. Hexachlorobutadiene	<0.041	<0.041	5000	20000
58. 1,2,3-Trichlorobenzene	<0.042	<0.042	5000	20000
59. Bromochloromethane	<0.015	<0.015	5000	20000
60. Methyl-tert-butyl ether	<0.08	<0.08	5000	20000
61. Di-isopropylether	<0.08	<0.08	5000	20000
62. Acetone	1,710,000	<10.0	5000	20000
63. Methyl Ethyl Ketone	974,000	<10.0	5000	20000
64. MIBK	2,900,000	<10.0	5000	20000

All results expressed as ppb unless otherwise indicated.

Wisconsin Certified Laboratory #999888890.

Analysis performed in accordance with SW-846 method 8260, and Applicable WI-DNR Regulations.

The contents of this report apply to the sample analyzed. No duplication of this report is allowed except in its entirety.

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT 125409

Montgomery Watson
One Science Court
Madison, WI 53705

Report Date: 6/29/95
Project No.: 4077.0120
Sample Received: 6/21/95
Project Name: ACS
Date Analyzed: 6/28/95
Sample Description: Groundwater, ACS-SEP/OFCA2-01
Sample No.: 22202

Compound	Concentration Found IN Sample (ppb)	Concentration Found IN Blank (ppb)	Method Detection Limit (MDL) ug/L (ppb)	Practical Quantitation Limit (PQL) ug/L (ppb)
1. Dichlorodifluoromethane	<0.053	<0.053	0.053	0.223
2. Chloromethane	<0.022	<0.022	0.022	0.092
3. Vinyl Chloride	80.0	<0.027	0.027	0.117
4. Bromomethane	<0.025	<0.025	0.025	0.105
5. Chloroethane	230	<0.021	0.021	0.091
6. Trichlorofluoromethane	34.3	<0.027	0.027	0.117
7. 1,1-Dichloroethene	80.2	<0.018	0.018	0.078
8. Dichloromethane	23000	<0.012	0.012	0.052
9. Trans-1,2-Dichloroethene	20.0	<0.033	0.033	0.133
10. 1,1-Dichloroethane	74200	<0.012	0.012	0.052
11. Cis-1,2-Dichloroethene	451	<0.030	0.030	0.120
12. 2,2,-Dichloropropane	<0.029	<0.029	0.029	0.119
13. Chloroform	1940	<0.028	0.028	0.118
14. 1,1,1-Trichloroethane	16500	<0.013	0.013	0.053
15. 1,2-Dichloroethane	909	<0.022	0.022	0.092
16. 1,1-Dichloropropene	<0.013	<0.013	0.013	0.053
17. Benzene	7190	<0.025	0.025	0.105
18. Carbon Tetrachloride	<0.032	<0.032	0.032	0.132
19. Trichloroethene	3670	<0.019	0.019	0.079
20. 1,2-Dichloropropane	<0.017	<0.017	0.017	0.077
21. Dibromomethane	<0.033	<0.033	0.033	0.133
22. Bromodichloromethane	<0.014	<0.014	0.014	0.054
23. Cis-1,3-Dichloropropene	<0.031	<0.031	0.031	0.131
24. Toluene	22600	<0.022	0.022	0.092

Leah E. Zelus

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT 125409

Montgomery Watson
One Science Court
Madison, WI 53705

Report Date: 6/29/95
Project No.: 4077.0120 Sample Received: 6/21/95
Project Name: ACS Date Analyzed: 6/28/95
Sample Description: Groundwater, ACS-SEP/OFCA2-01
Sample No.: 22202

Compound	Concentration Found IN Sample (ppb)	Concentration Found IN Blank (ppb)	Method Detection Limit (MDL) ug/L (ppb)	Practical Quantitation Limit (PQL) ug/L (ppb)
25. Tetrachloroethene	2450	<0.034	0.034	0.144
26. 1,2-Dibromoethane (EDB)	<0.011	<0.011	0.011	0.041
27. Chlorobenzene	2.68	<0.025	0.025	0.105
28. 1,1,1,2-Tetrachloroethane	<0.028	<0.028	0.028	0.118
29. Ethylbenzene	664	<0.011	0.011	0.051
30. m,p-Xylene (1,3-Dimethylbenzene) (1,4-Dimethylbenzene)	425	<0.035	0.035	0.145
31. o-Xylene (1,2-Dimethylbenzene)	984	<0.030	0.030	0.130
32. Styrene	33.3	<0.035	0.035	0.145
33. Bromoform	<0.040	<0.040	0.040	0.170
34. 1,1,2,2-Tetrachloroethane	3.92	<0.023	0.023	0.093
35. 1-Methylethylbenzene (Isopropylbenzene)	33.8	<0.017	0.017	0.067
36. 1,2,3-Trichloropropane	<0.038	<0.038	0.038	0.158
37. Bromobenzene	0.62	<0.031	0.031	0.131
38. 2-Chlorotoluene (1-Methyl-2-chlorobenzene)	2.69	<0.023	0.023	0.093
39. n-Propylbenzene	34.1	<0.038	0.038	0.158
40. 4-Chlorotoluene (1-Methyl-4-chlorobenzene)	6.23	<0.022	0.022	0.092
41. 1,3,5-Trimethylbenzene	109	<0.014	0.014	0.054
42. 1,1-Dimethylethylbenzene (tert-Butylbenzene)	40.5	<0.019	0.019	0.079
43. 1,2,4-Trimethylbenzene	396	<0.028	0.028	0.118
44. 1,3-Dichlorobenzene	0.27	<0.027	0.027	0.107

Leah E. Zuhn

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT 125409

Montgomery Watson
One Science Court
Madison, WI 53705

Report Date: 6/29/95
Sample Received: 6/21/95
Date Analyzed: 6/28/95

Project No.: 4077.0120
Project Name: ACS
Sample Description: Groundwater, ACS-SBP/OFCA2-01
Sample No.: 22202

Compound	Concentration Found IN Sample (ppb)	Concentration Found IN Blank (ppb)	Method Detection Limit (MDL) ug/L (ppb)	Practical Quantitation Limit (PQL) ug/L (ppb)
45. 1-Methylpropylbenzene (sec-Butylbenzene)	12.8	<0.019	0.019	0.079
46. 1,4-Dichlorobenzene	0.74	<0.024	0.024	0.104
47. 1-Methyl-4(1-methylethyl)benzene (p-Isopropyltoluene)	24.1	<0.017	0.017	0.067
48. 1,2-Dichlorobenzene	10.4	<0.035	0.035	0.145
49. Trans-1,3-dichloropropene	<0.014	<0.014	0.014	0.054
50. 1,1,2-Trichloroethane	<0.019	<0.019	0.019	0.079
51. 1,3-Dichloropropane	<0.017	<0.017	0.017	0.067
52. Dibromochloromethane	<0.024	<0.024	0.024	0.104
53. n-Butylbenzene	51.9	<0.028	0.028	0.088
54. 1,2-Dibromo-3-chloropropane	<0.028	<0.028	0.028	0.118
55. 1,2,4-Trichlorobenzene	<0.028	<0.028	0.028	0.118
56. Naphthalene	37.6	<0.052	0.052	0.222
57. Hexachlorobutadiene	<0.041	<0.041	0.041	0.171
58. 1,2,3-Trichlorobenzene	<0.042	<0.042	0.042	0.172
59. Bromochloromethane	<0.015	<0.015	0.015	0.065
60. Methyl-tert-butyl ether	<0.08	<0.08	0.08	0.17
61. Di-isopropylether	<0.08	<0.08	0.08	0.2
62. Acetone	241,000	<1000	1000	1000
63. Methyl Ethyl Ketone	272,000	<1000	1000	1000
64. MIBK	29,600	<1000	1000	1000

All results expressed as ppb unless otherwise indicated.

Wisconsin Certified Laboratory #999888890.

Analysis performed in accordance with SW-846 method 8260, and Applicable WI-DNR Regulations.

The contents of this report apply to the sample analyzed. No duplication of this report is allowed except its entirety.

Leah E. Zuhn

LABORATORY DIRECTOR

FAX

MONTGOMERY WATSON

2100 Corporate Drive
Addison, Illinois 60101

Tel: (708) 691-5000
Fax: (708) 691-5133

Date: 7/5

To: Ron Schlicher Fax No.: SAME

Company: Reference:

From: Mandy

Subject: ACS BOD Data

COMMENTS

If you do not receive all pages, or if there are any problems with this transmission, please call (708) 691-5000. Operator: No. of pages including cover:

MONTGOMERY WATSON
Analytical Testing Services

University Research Park
One Science Court
Madison, Wisconsin 53711
Tel: 608 231 4747 • Fax: 608 231 4777

INORGANIC REPORT
ACS
GRIFFITH IN
Project Number: 4077.0120

Sample #	Description	Test	Result	Reporting Limit	Matrix	Units	Sample Date	Analysis Date
L10972-002	ACS-SBP/OFCA1-01	Biochemical Oxygen Demand	8370	1	GroundH2O	mg/L	15-JUN-95	17-JUN-95

Chk'd: [illegible] App'd: CRW
Date App'd: 6/29/95

WI Lab Certification ID#: 113138300

MONTGOMERY WATSON

CHAIN OF CUSTODY RECORD

SPECIAL INSTRUCTIONS:
- [ ] PECFA
- [ ] WI LUST
- [ ] ACT 307
- [ ] REPORT DRY WT
- [ ] OTHER:

TURNAROUND
- [ ] 2 WEEKS (standard)
- [ ] 1 WEEK
- [ ] 3 DAYS
- [x] 1 DAY

24 HOUR VOC B

PROJECT NAME: ACS

PROJECT #: 4077.0120

CITY: Griffith Indiana

STATE:

SAMPLER(S): [signature]

COLLECTION DATE	COLLECTION TIME	GRAB/COMP	SAMPLE ID	NO. OF CONTAINERS	VOCS (8240)	BOD							REMARKS	LAB USE ONLY MATRIX	LAB USE ONLY LAB NO.
6-15-95	1300	GRAB	ACS-PGCS1-01	4	X								9.29735,36,37,38		10972-001
6-15-95	1600	Composite	ACS-SBP/OFCA1-01	4	X								9.30369,70,71,72		↓ -002
6-15-95	1600	Composite	ACS-SBP/OFCA1-01	1		X							9.30373		↓ -002

SPECIAL INSTRUCTIONS:

RECEIVED: [x] INTACT [x] ON ICE TEMP _____ °F

PROJ. MGR.: Marty Hamper

* VOCS - Extra Ones Needed
Call Ron Schlicker (Salt Lake City Office) for Details

Cal. seal #s 92-00517, 518

	SIGNATURE	PRINT NAME	COMPANY / TITLE	DATE	TIME
RELINQUISHED BY:	[signature]	David A. Pieczynski	Montgomery Watson / Hydrogeologist	6/15/95	2100
RECEIVED BY:					
RELINQUISHED BY:					
RECEIVED BY:	Glenn Jacobson	Glenn Jacobson	MWATS	6/16/95	11:20am

C-O-C 010405

* NOTE VOCs from ACS-SBP/OFCA1-01 could not be filled Headspace Free!

NAME OF COURIER: Fed Ex

AIRBILL NUMBER: 369.2 7265

MONTGOMERY WATSON
Analytical Testing Services

University Research Park
One Science Court
Madison, Wisconsin 53711
Tel: 608 231 4747 • Fax: 608 231 4777

METHOD REFERENCES

Analytes	Aqueous	Non-Aqueous
Acidity	305.2	-
Alkalinity, Total	310.1 / 310.2	-
Alkalinity, Phenolphthalein	SM2320	-
Alkalinity, Bicarbonate	SM2320	-
Alkalinity, Carbonate	SM2320	-
BOD-5 day	SM5210,4500-O	-
Carbon, Percent Organic	-	29-3.5.3
Carbon, Total Organic (TOC)	415.1	-
Chloride	325.2	-
Chlorine, Residual	330.5*	-
Chromium, Hexavalent	SM3500D	-
COD	410.4	-
Cyanide, Total	335.3	9012
Cyanide, Amenable	335.1	9012
Cyanide, Reactive	SW7.3	SW7.3
Density	SM2710F	SM2710F
Flashpoint, Closed Cup	SW1010	SW1010
Flashpoint, Open Cup	ASTMD4206	ASTMD4206
Fluoride	340.2	-
Hardness, Total	130.1	-
Nitrogen, Ammonia	350.2	350.2
Nitrogen, Nitrate	353.2	-
Nitrogen, Nitrite	353.2	-
Nitrogen, Nitrate + Nitrite	353.2	-
Nitrogen, Total Kjeldahl (TKN)	351.3	351.3
Nitrogen, Total Organic (TON)	350.2 & 351.3	350.2 & 351.3
Oil & grease	413.1	9071
Oil & grease (Polar)	413.1	9071
Oil & grease (Non-polar)	5520F	-
Paint Filter Test	9095	9095
pH	150.1	9045
Phenol, Total	420.2	9066
Phosphorus, Total	365.1	365.1
Phosphorus, Ortho	365.2	-
Solids, Total	160.3	160.3
Solids, Total Dissolved	160.1	-
Solids, Total Suspended	160.2	-
Solids, Total Volatile	160.4	-
Solids, Total Volatile Suspended	160.4	-
Specific Conductance	120.1	-
Specific Weight	SM2710F	SM2710F
Sulfate	375.2	-
Sulfide, Total	376.1	9030
Sulfide, Reactive	SW7.3	SW7.3
Sulfite	377.1	-
Turbidity	180.1	-
TRPH	418.1 & 9073	418.1 & 9073

SW846, "Test Methods for Evaluating Solid Waste", 3rd Ed., December 1987.
EPA-600, "Methods for Chemical Analysis of Water and Wastes", March 1984.
Standard Methods for the Examination of Water and Wastewater", 17th Edition, 1989.
ASTM, Annual Book of American Society for Testing and Materials Standards, 1983, Volume 6.01.
Methods for Soil Analysis, 2nd Ed.

BENCH SCALE TREATABILITY STUDIES

ANALYTICAL DATA

PGCS - Influent and Effluent from Vulcan
1:4 mixture - Influent from Vulcan

Inorganic Compounds
Volatile Organic Compounds
Semi-Volatile Organic Compounds

August, 1995

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXX INHOUSE ONLY: MONTGOMERY WATSON ANALYTICAL TESTING SERVICES XXXXXXXXXXXXXXXXXXXXXXXXXXXXX

LABORATORY TRANSMITTAL
4077.0120
ACS

LOGIN (# OF SAMPLES): 11314 (3)

DATE: 18-AUG-95

SAMPLE DATE: 31-JUL-95

TO: Heck. P

MATRIX: WasteH2O

REPORT: COMPLETE

REISSUE
PARTIAL 8/18/95

OFFICE: MADISON CHICAGO
DETROIT MILWAUKEE
PHILADELPHIA OHIO
CALIFORNIA
Salt Lake City

COMMENTS:

========== IF YOU HAVE ANY QUESTIONS, PLEASE FEEL FREE TO CALL DENNIS LINLEY AT (608)231-4755. ==========

Received Date: 01-AUG-95
Report Due Date: 13-AUG-95
Comments: -><-

TEST RESULTS ENCLOSED OR PREVIOUSLY REPORTED

Subcontract Work: T-TOC-3

Soils:

Organic: PCBSANAL-3 SVPPANAL-3

Wet Chem: ALK-3 BOD-3 CL-3 COD-3 HD-3 O+GSEP-3 PH-3
SO4-3 TDS-3 TSS-3

Metals: AG-3 AS-3 BE-3 CA-3 CD-3 CR-3 CU-3 FE-3 HG-3 MG-3 MN-3 NI-3
PB-3 SB-3 SE-3 TL-3 ZN-3

OUTSTANDING TEST RESULTS

Subcontract Work: A-VOC8240-3

Soils:

Organic:

Wet Chem:

Metals:

MONTGOMERY WATSON
Analytical Testing Services

University Research Park
One Science Court
Madison, Wisconsin 53711
Tel: 608 231 4747 • Fax: 608 231 4777

STANDARD REPORT FOOTNOTES

A1 Elevated quantitation limit due to low sample volume.

A2 Elevated quantitation limit necessary to overcome interference.

A4 Result should be considered estimated due to sample-related problems encountered during analysis.

A11 Sample received past recommended hold time.

A12 Analysis requested past recommended hold time.

A13 Initial analysis performed within hold time; confirmation analysis performed past recommended hold time. Results from repeat analysis are reported.

A14 Initial analysis performed within hold time; necessary dilution performed past recommended hold time. Results from repeat analysis are reported.

A15 Result should be considered estimated; analyte detected in method blank._____@_____

A17 Result should be considered estimated as indicated by method QC.

M3 Total analysis performed due to insufficient solid for TCLP extraction.

G1 Result should be considered estimated, concentration exceeds working calibration range.

G2 Elevated quantitation limit due to the concentration of petroleum hydrocarbons in the sample.

G3 Elevated quantitation limit due to the concentration of non-specific hydrocarbons in the sample.

G4 Analyte coelutes with _____; result calculated from calibration standards in a 1:1 ratio of these two compounds.

G5 Sample required extensive cleanup; Endrin Aldehyde is not recovered from these techniques.

G6 Petroleum-type odor detected from this sample.

G7 Elevated quantitation limit due to the concentration of PCBs in the sample.

G8 Result should be considered estimated due to coelution with an additional hydrocarbon product.

G9 Results are influenced by the presence of extraneous peaks which are not representative of petroleum hydrocarbon products.

G10 Presence of one or more unidentified peaks eluting earlier than the retention time window.

G11 Presence of one or more unidentified peaks eluting later than the retention time window.

G12 Result is estimated. The method used is a screening procedure for this compound.

G13 Measurement performed using test strips.

G15 n-Nitrosodiphenylamine decomposes in the GC inlet and cannot be separated from Diphenylamine.

G16 Measurement upon receipt performed using test strips. Adjusted to pH <2.

G17 Results are influenced by the presence of extraneous peaks which are not representative of petroleum hydrocarbon products. Final results pending GC/MS confirmation.

G18 An LCS/LCS duplicate was performed in lieu of an MS/MSD due to insufficient sample volume available for the MS/MSD analysis.

MONTGOMERY WATSON
Analytical Testing Services

University Research Park
One Science Court
Madison, Wisconsin 53711
Tel: 608 231 4747 • Fax: 608 231 4777

METHOD REFERENCES

Analytes	Aqueous	Non-Aqueous
Acidity	305.2	-
Alkalinity, Total	310.1 / 310.2	-
Alkalinity, Phenolphthalein	SM2320	-
Alkalinity, Bicarbonate	SM2320	-
Alkalinity, Carbonate	SM2320	-
BOD-5 day	SM5210,4500-O	-
Carbon, Percent Organic	-	29-3.5.3
Carbon, Total Organic (TOC)	415.1	-
Chloride	325.2	-
Chlorine, Residual	330.5*	-
Chromium, Hexavalent	SM3500D	-
COD	410.4	-
Cyanide, Total	335.3	9012
Cyanide, Amenable	335.1	9012
Cyanide, Reactive	SW7.3	SW7.3
Density	SM2710F	SM2710F
Flashpoint, Closed Cup	SW1010	SW1010
Flashpoint, Open Cup	ASTMD4206	ASTMD4206
Fluoride	340.2	-
Hardness, Total	130.1	-
Nitrogen, Ammonia	350.2	350.2
Nitrogen, Nitrate	353.2	-
Nitrogen, Nitrite	353.2	-
Nitrogen, Nitrate + Nitrite	353.2	-
Nitrogen, Total Kjeldahl (TKN)	351.3	351.3
Nitrogen, Total Organic (TON)	350.2 & 351.3	350.2 & 351.3
Oil & grease	413.1	9071
Oil & grease (Polar)	413.1	9071
Oil & grease (Non-polar)	5520F	-
Paint Filter Test	9095	9095
pH	150.1	9045
Phenol, Total	420.2	9066
Phosphorus, Total	365.1	365.1
Phosphorus, Ortho	365.2	-
Solids, Total	160.3	160.3
Solids, Total Dissolved	160.1	-
Solids, Total Suspended	160.2	-
Solids, Total Volatile	160.4	-
Solids, Total Volatile Suspended	160.4	-
Specific Conductance	120.1	-
Specific Weight	SM2710F	SM2710F
Sulfate	375.2	-
Sulfide, Total	376.1	9030
Sulfide, Reactive	SW7.3	SW7.3
Sulfite	377.1	-
Turbidity	180.1	-
TRPH	418.1 & 9073	418.1 & 9073

SW846, "Test Methods for Evaluating Solid Waste", 3rd Ed., December 1987.

EPA-600, "Methods for Chemical Analysis of Water and Wastes", March 1984.

Standard Methods for the Examination of Water and Wastewater", 17th Edition, 1989.

ASTM, Annual Book of American Society for Testing and Materials Standards, 1983, Volume 6.01.

Methods for Soil Analysis, 2nd Ed.

* With Modifications

MONTGOMERY WATSON
Analytical Testing Services

University Research Park
One Science Court
Madison, Wisconsin 53711
Tel: 608 231 4747 • Fax: 608 231 4777

METHOD REFERENCES

	Soil/Groundwater				Wastewater			
Analytes	**ICP**	**Flame**	**Furnace**	**CV**	**ICP**	**Flame**	**Furnace**	**CV**
Aluminium	6010	7020	-	-	200.7	202.1	-	-
Antimony	6010	7040	7041	-	200.7	-	204.2	-
Arsenic	6010	-	7060	-	200.7	-	206.2	-
Barium	6010	7080	7081	-	200.7	208.1	208.2	-
Beryllium	6010	7090	7091	-	200.7	210.1	210.2	-
Boron	6010	-	-	-	200.7	-	-	-
Cadmium	6010	7130	7131	-	200.7	213.1	213.2	-
Calcium	6010	7140		-	200.7	215.1	-	-
Chromium, Total	6010	7190	7191	-	200.7	218.1	218.2	-
Cobalt	6010	7200	-	-	200.7	219.1	-	-
Copper	6010	7210	-	-	200.7	220.1	-	-
Iron	6010	7380	-	-	200.7	236.1	-	-
Lead	6010	7420	7421	-	200.7	239.1	239.2	-
Magnesium	6010	7450	-	-	200.7	242.1	-	-
Manganese	6010	7460	-	-	200.7	243.1	-	-
Mercury	-	-	-	7470/7471				245.1
Molybdenum	6010	7480	-	-	200.7	246.1	-	-
Nickel	6010	7520	-	-	200.7	249.1	-	-
Potassium	-	SM3500D	-	-	-	SM3500D	-	-
Selenium	6010	-	7740	-	200.7	-	270.2	-
Silver	6010	7760	7761	-	200.7	272.1	272.2	-
Sodium	6010	SM3500D	-	-	200.7	SM3500D	-	-
Strontium	6010	-	-	-	200.7	-	-	-
Thallium	6010	7840	7841	-	200.7	279.1	279.2	-
Tin	6010	-	-	-	200.7	-	-	-
Titanium	6010	-	-	-	200.7	-	-	-
Vanadium	6010	7910	7911	-	200.7	286.1	286.2	-
Zinc	6010	7950	-	-	200.7	289.1	-	-

SW846, "Test Methods for Evaluating Solid Waste", 3rd Ed., December 1987.

EPA-600, "Methods for Chemical Analysis of Water and Wastes", March 1984.

Standard Methods for the Examination of Water and Wastewater", 17th Edition, 1989.

MONTGOMERY WATSON
Analytical Testing Services

University Research Park
One Science Court
Madison, Wisconsin 53711
Tel: 608 231 4747 • Fax: 608 231 4777

METHOD REFERENCES

Compounds	Soil/Groundwater	Wastewater
Alcohol	8015*	8015*
BEXT	8020***	602
DRO	Modified DRO	Modified DRO
GRO	Modified GRO***	Modified GRO
Fatty Acids	8015*	8015*
Herbicides	8150	8150
Pesticides	8080	608
Pesticide/PCBs	8080	608
PCBs	8080**	608
PCBs	8080****	608
PCP/PHEN	8040****	8040****
PNA (GC/MS)	8270	8270
PNA (HPLC)	8310	8310
PVOCs	8020***	8020
SVOCs	8270	8270
TPH	D-3328-78*	D-3328-78*
TRPH	418.1 & 9073	418.1 & 9073
VOCs	8021	8021
VOCs	8010/8020***	601/602
Solids, Total	160.3	160.3

SW846, "Test Methods for Evaluating Solid Waste", 3rd Ed., December 1987.

EPA-600, "Methods for Organic Chemical Analysis of Water and Wastes", March, 1984.

ASTM, "Annual Book of ASTM Standards", 1990.

Wisconsin DNR Modified 9073 TRPH, PUBL-SW-140, Wisconsin DNR, April 1992.

Wisconsin DNR Modified DRO, PUBL-SW-141, Wisconsin DNR, July 1993.

Wisconsin DNR Modified GRO, PUBL-SW-140, Wisconsin DNR, July 1993.

* With Modifications
** With Modfications for Oil Matrix
*** With Modfications for Soil Gas Matrix
**** With Modifications for Wipe Matrix

MONTGOMERY WATSON
Analytical Testing Services

University Research Park
One Science Court
Madison, Wisconsin 53711
Tel: 608 231 4747 • Fax: 608 231 4777

INORGANIC REPORT
ACS
GRIFFITH IN
Project Number: 4077.0120

Sample #	Description	Test	Result	Reporting Limit	Matrix	Units	Sample Date	Analysis Date
L11314-001	INF BLEND (4:1)	Alkalinity, Total	812	10	WasteH2O	mg/L	31-JUL-95	09-AUG-95
	(LOW:HIGH)	Antimony	< 0.05	0.05	WasteH2O	mg/L	31-JUL-95	17-AUG-95
		Arsenic	0.008	0.001	WasteH2O	mg/L	31-JUL-95	07-AUG-95
		Beryllium	< 0.005	0.005	WasteH2O	mg/L	31-JUL-95	14-AUG-95
		Biochemical Oxygen Demand	1980	1	WasteH2O	mg/L	31-JUL-95	02-AUG-95
		Cadmium	< 0.005	0.005	WasteH2O	mg/L	31-JUL-95	11-AUG-95
		Calcium	166	1.00	WasteH2O	mg/L	31-JUL-95	10-AUG-95
		Chemical Oxygen Demand	6400	20	WasteH2O	mg/L	31-JUL-95	08-AUG-95
		Chloride	411	2	WasteH2O	mg/L	31-JUL-95	03-AUG-95
		Chromium, Total	< 0.01	0.01	WasteH2O	mg/L	31-JUL-95	14-AUG-95
		Copper	0.04	0.02	WasteH2O	mg/L	31-JUL-95	08-AUG-95
		Hardness, Total	600	10	WasteH2O	mg/L	31-JUL-95	07-AUG-95
		Iron	5.58	0.02	WasteH2O	mg/L	31-JUL-95	14-AUG-95
		Lead	0.0023	0.0015	WasteH2O	mg/L	31-JUL-95	11-AUG-95
		Magnesium	33.9	1.00	WasteH2O	mg/L	31-JUL-95	10-AUG-95
		Manganese	0.57	0.01	WasteH2O	mg/L	31-JUL-95	08-AUG-95
		Mercury	< 0.0002	0.0002	WasteH2O	mg/L	31-JUL-95	03-AUG-95
		Nickel	0.13	0.02	WasteH2O	mg/L	31-JUL-95	14-AUG-95
		Oil and Grease	10	1	WasteH2O	mg/L	31-JUL-95	04-AUG-95
		Selenium	< 0.004	0.002	WasteH2O	mg/L	31-JUL-95	07-AUG-95
		Silver	< 0.01	0.01	WasteH2O	mg/L	31-JUL-95	15-AUG-95
		Solids, Total Dissolved	1540	20	WasteH2O	mg/L	31-JUL-95	02-AUG-95
		Solids, Total Suspended	270	2	WasteH2O	mg/L	31-JUL-95	07-AUG-95
		Sulfate	44	10	WasteH2O	mg/L	31-JUL-95	07-AUG-95
		Thallium	0.001	0.001	WasteH2O	mg/L	31-JUL-95	16-AUG-95
		pH	8.25	0.01	WasteH2O	S.U.	31-JUL-95	01-AUG-95

Chk'd: [illegible] App'd: GG
Date App'd: 8/18/95

WI Lab Certification ID#: 113138300

MONTGOMERY WATSON
Analytical Testing Services

University Research Park
One Science Court
Madison, Wisconsin 53711
Tel: 608 231 4747 • Fax: 608 231 4777

INORGANIC REPORT
ACS
GRIFFITH IN
Project Number: 4077.0120

Sample #	Description	Test	Result	Reporting Limit	Matrix	Units	Sample Date	Analysis Date
L11314-002	LOW STRENGTH EFFLUENT	Alkalinity, Total	14	10	WasteH2O	mg/L	31-JUL-95	09-AUG-95
		Antimony	< 0.05	0.05	WasteH2O	mg/L	31-JUL-95	14-AUG-95
		Arsenic	0.002	0.001	WasteH2O	mg/L	31-JUL-95	07-AUG-95
		Beryllium	< 0.005	0.005	WasteH2O	mg/L	31-JUL-95	14-AUG-95
		Biochemical Oxygen Demand	11	1	WasteH2O	mg/L	31-JUL-95	02-AUG-95
		Cadmium	< 0.005	0.005	WasteH2O	mg/L	31-JUL-95	11-AUG-95
		Calcium	154	1.00	WasteH2O	mg/L	31-JUL-95	10-AUG-95
		Chemical Oxygen Demand	44	20	WasteH2O	mg/L	31-JUL-95	08-AUG-95
		Chloride	13	2	WasteH2O	mg/L	31-JUL-95	03-AUG-95
		Chromium, Total	< 0.01	0.01	WasteH2O	mg/L	31-JUL-95	14-AUG-95
		Copper	0.11	0.02	WasteH2O	mg/L	31-JUL-95	08-AUG-95
		Hardness, Total	554	10	WasteH2O	mg/L	31-JUL-95	07-AUG-95
		Iron	5.24	0.02	WasteH2O	mg/L	31-JUL-95	14-AUG-95
		Lead	< 0.0015	0.0015	WasteH2O	mg/L	31-JUL-95	11-AUG-95
		Magnesium	32.6	1.00	WasteH2O	mg/L	31-JUL-95	10-AUG-95
		Manganese	0.69	0.01	WasteH2O	mg/L	31-JUL-95	08-AUG-95
		Mercury	< 0.0002	0.0002	WasteH2O	mg/L	31-JUL-95	03-AUG-95
		Nickel	0.02	0.02	WasteH2O	mg/L	31-JUL-95	14-AUG-95
		Oil and Grease	< 1	1	WasteH2O	mg/L	31-JUL-95	04-AUG-95
		Selenium	< 0.004	0.002	WasteH2O	mg/L	31-JUL-95	07-AUG-95
		Silver	< 0.01	0.01	WasteH2O	mg/L	31-JUL-95	17-AUG-95
		Solids, Total Dissolved	802	20	WasteH2O	mg/L	31-JUL-95	02-AUG-95
		Solids, Total Suspended	4	2	WasteH2O	mg/L	31-JUL-95	02-AUG-95
		Sulfate	535	10	WasteH2O	mg/L	31-JUL-95	07-AUG-95
		Thallium	< 0.001	0.001	WasteH2O	mg/L	31-JUL-95	16-AUG-95
		pH	3.88	0.01	WasteH2O	S.U.	31-JUL-95	01-AUG-95

WI Lab Certification ID#: 113138300

Chk'd: [illegible] App'd: CGG
Date App'd: 8/18/95

MONTGOMERY WATSON
Analytical Testing Services

University Research Park
One Science Court
Madison, Wisconsin 53711
Tel: 608 231 4747 • Fax: 608 231 4777

INORGANIC REPORT
ACS
GRIFFITH IN
Project Number: 4077.0120

Sample #	Description	Test	Result	Reporting Limit	Matrix	Units	Sample Date	Analysis Date
L11314-003	LOW INF 1 THRU	Alkalinity, Total	469	10	WasteH2O	mg/L	31-JUL-95	09-AUG-95
	10	Antimony	< 0.05	0.05	WasteH2O	mg/L	31-JUL-95	14-AUG-95
		Arsenic	0.002	0.001	WasteH2O	mg/L	31-JUL-95	07-AUG-95
		Beryllium	< 0.005	0.005	WasteH2O	mg/L	31-JUL-95	14-AUG-95
		Biochemical Oxygen Demand	11	1	WasteH2O	mg/L	31-JUL-95	02-AUG-95
		Cadmium	< 0.005	0.005	WasteH2O	mg/L	31-JUL-95	11-AUG-95
		Calcium	151	1.00	WasteH2O	mg/L	31-JUL-95	10-AUG-95
		Chemical Oxygen Demand	77	20	WasteH2O	mg/L	31-JUL-95	10-AUG-95
		Chloride	13	2	WasteH2O	mg/L	31-JUL-95	03-AUG-95
		Chromium, Total	< 0.01	0.01	WasteH2O	mg/L	31-JUL-95	14-AUG-95
		Copper	< 0.02	0.02	WasteH2O	mg/L	31-JUL-95	08-AUG-95
		Hardness, Total	542	10	WasteH2O	mg/L	31-JUL-95	07-AUG-95
		Iron	2.09	0.02	WasteH2O	mg/L	31-JUL-95	14-AUG-95
		Lead	< 0.0015	0.0015	WasteH2O	mg/L	31-JUL-95	11-AUG-95
		Magnesium	32.3	1.00	WasteH2O	mg/L	31-JUL-95	10-AUG-95
		Manganese	0.69	0.01	WasteH2O	mg/L	31-JUL-95	08-AUG-95
		Mercury	< 0.0002	0.0002	WasteH2O	mg/L	31-JUL-95	03-AUG-95
		Nickel	< 0.02	0.02	WasteH2O	mg/L	31-JUL-95	14-AUG-95
		Oil and Grease	2	1	WasteH2O	mg/L	31-JUL-95	04-AUG-95
		Selenium	< 0.004	0.002	WasteH2O	mg/L	31-JUL-95	07-AUG-95
		Silver	< 0.01	0.01	WasteH2O	mg/L	31-JUL-95	15-AUG-95
		Solids, Total Dissolved	642	20	WasteH2O	mg/L	31-JUL-95	02-AUG-95
		Solids, Total Suspended	12	2	WasteH2O	mg/L	31-JUL-95	02-AUG-95
		Sulfate	72	10	WasteH2O	mg/L	31-JUL-95	07-AUG-95
		Thallium	< 0.001	0.001	WasteH2O	mg/L	31-JUL-95	16-AUG-95
		pH	7.14	0.01	WasteH2O	S.U.	31-JUL-95	01-AUG-95

Footnotes

Sample #	Test	Footnote
L11314-001	Selenium	A2
L11314-002	Selenium	A2
L11314-003	Selenium	A2

Chk'd: RSK App'd: CGG
Date App'd: 8/18/95

WI Lab Certification ID#: 113138300

MONTGOMERY WATSON
Analytical Testing Services

University Research Park
One Science Court
Madison, Wisconsin 53711
Tel: 608 231 4747 • Fax: 608 231 4777

ORGANIC REPORT
SEMIVOLATILE
ACS
GRIFFITH IN
Project Number: 4077.0120

Sample ID	Compound	Result	Dilution	Reporting Limit	Matrix	Units	Footnotes
L11314-001	N-Nitrosodimethylamine	< 50	1	50	WasteH2O	ug/L	A4
INF BLEND (4:1)	Phenol	< 10	1	10	WasteH2O	ug/L	A4
(LOW:HIGH)	Bis(2-chloroethyl) ether	190	12.5	10	WasteH2O	ug/L	
	2-Chlorophenol	< 10	1	10	WasteH2O	ug/L	A4
	1,3-Dichlorobenzene	< 10	1	10	WasteH2O	ug/L	A4
	1,4-Dichlorobenzene	< 10	1	10	WasteH2O	ug/L	A4
	1,2-Dichlorobenzene	< 10	1	10	WasteH2O	ug/L	A4
	Bis(2-chloroisopropyl) ether	< 10	1	10	WasteH2O	ug/L	A4
	N-Nitrosodi-n-propylamine	< 10	1	10	WasteH2O	ug/L	A4
	Hexachloroethane	< 10	1	10	WasteH2O	ug/L	A4
	Nitrobenzene	< 10	1	10	WasteH2O	ug/L	A4
	Isophorone	2300	12.5	10	WasteH2O	ug/L	
	2-Nitrophenol	< 10	1	10	WasteH2O	ug/L	A4
	2,4-Dimethylphenol	< 10	1	10	WasteH2O	ug/L	A4
	Bis(2-chloroethoxy)methane	< 10	1	10	WasteH2O	ug/L	A4
	2,4-Dichlorophenol	< 10	1	10	WasteH2O	ug/L	A4
	1,2,4-Trichlorobenzene	< 10	1	10	WasteH2O	ug/L	A4
	Naphthalene	11	1	10	WasteH2O	ug/L	A4
	Hexachlorobutadiene	< 10	1	10	WasteH2O	ug/L	A4
	4-Chloro-3-methylphenol	< 20	1	20	WasteH2O	ug/L	A4
	Hexachlorocyclopentadiene	< 20	1	20	WasteH2O	ug/L	A4
	2,4,6-Trichlorophenol	< 10	1	10	WasteH2O	ug/L	A4
	2-Chloronaphthalene	< 10	1	10	WasteH2O	ug/L	A4
	Dimethyl phthalate	170	1	10	WasteH2O	ug/L	A4
	2,6-Dinitrotoluene	< 10	1	10	WasteH2O	ug/L	A4
	Acenaphthylene	< 10	1	10	WasteH2O	ug/L	A4
	Acenaphthene	< 10	1	10	WasteH2O	ug/L	A4
	2,4-Dinitrophenol	< 50	1	50	WasteH2O	ug/L	A4
	4-Nitrophenol	< 50	1	50	WasteH2O	ug/L	A4
	2,4-Dinitrotoluene	< 10	1	10	WasteH2O	ug/L	A4
	Diethyl phthalate	19	1	10	WasteH2O	ug/L	A4
	4-Chlorophenyl phenyl ether	< 10	1	10	WasteH2O	ug/L	A4
	Fluorene	< 10	1	10	WasteH2O	ug/L	A4
	4,6-Dinitro-2-methylphenol	< 50	1	50	WasteH2O	ug/L	A4
	1,2-Diphenylhydrazine	< 10	1	10	WasteH2O	ug/L	A4
	N-Nitrosodiphenylamine	< 10	1	10	WasteH2O	ug/L	G15,A4
	Hexachlorobenzene	< 10	1	10	WasteH2O	ug/L	A4
	4-Bromophenyl phenyl ether	< 10	1	10	WasteH2O	ug/L	A4
	Pentachlorophenol	< 50	1	50	WasteH2O	ug/L	A4
	Phenanthrene	< 10	1	10	WasteH2O	ug/L	A4
	Anthracene	< 10	1	10	WasteH2O	ug/L	A4
	Di-n-butyl phthalate	< 10	1	10	WasteH2O	ug/L	A4

Chk'd: DSK App'd: QG
Date App'd: 8/18/95

WI Lab Certification ID#: 113138300

MONTGOMERY WATSON
Analytical Testing Services

University Research Park
One Science Court
Madison, Wisconsin 53711
Tel: 608 231 4747 • Fax: 608 231 4777

ORGANIC REPORT
SEMIVOLATILE
ACS
GRIFFITH IN
Project Number: 4077.0120

Sample ID	Compound	Result	Dilution	Reporting Limit	Matrix	Units	Footnotes
L11314-001	Fluoranthene	< 10	1	10	WasteH2O	ug/L	A4
INF BLEND (4:1)	Benzidine	< 50	1	50	WasteH2O	ug/L	A4
(LOW:HIGH)	Pyrene	< 10	1	10	WasteH2O	ug/L	A4
	Butyl benzyl phthalate	< 10	1	10	WasteH2O	ug/L	A4
	3,3'-Dichlorobenzidine	< 20	1	20	WasteH2O	ug/L	A4
	Chrysene	< 10	1	10	WasteH2O	ug/L	A4
	Benz(a)anthracene	< 10	1	10	WasteH2O	ug/L	A4
	Bis(2-ethylhexyl) phthalate	11	1	10	WasteH2O	ug/L	A4
	Di-n-octyl phthalate	< 10	1	10	WasteH2O	ug/L	A4
	Benzo(b)fluoranthene	< 10	1	10	WasteH2O	ug/L	A4
	Benzo(k)fluoranthene	< 10	1	10	WasteH2O	ug/L	A4
	Benzo(a)pyrene	< 10	1	10	WasteH2O	ug/L	A4
	Indeno(1,2,3-cd)pyrene	< 10	1	10	WasteH2O	ug/L	A4
	Dibenz(a,h)anthracene	< 10	1	10	WasteH2O	ug/L	A4
	Benzo(g,h,i)perylene	< 10	1	10	WasteH2O	ug/L	A4

Sample Date : 31-JUL-95
Extraction Date : 04-AUG-95
Analysis Date : 07-AUG-95
Analyst : Lisa Hill

Method Reference : EPA 600, Method 625

Footnote codes :

A4 = Result should be considered estimated due to sample-related problems encountered during analysis.
G15 = n-Nitrosodiphenylamine decomposes in the GC inlet and cannot be separated from Diphenylamine.

Chk'd: RSK App'd: GG
Date App'd: 8/16/95

WI Lab Certification ID#: 113138300

MONTGOMERY WATSON
Analytical Testing Services

University Research Park
One Science Court
Madison, Wisconsin 53711
Tel: 608 231 4747 • Fax: 608 231 4777

ORGANIC REPORT
SEMIVOLATILE
ACS
GRIFFITH IN
Project Number: 4077.0120

Sample ID	Compound	Result	Dilution	Reporting Limit	Matrix	Units	Footnotes
L11314-002	N-Nitrosodimethylamine	< 50	1	50	WasteH2O	ug/L	
LOW STRENGTH	Phenol	< 10	1	10	WasteH2O	ug/L	
EFFLUENT	Bis(2-chloroethyl) ether	< 10	1	10	WasteH2O	ug/L	
	2-Chlorophenol	< 10	1	10	WasteH2O	ug/L	
	1,3-Dichlorobenzene	< 10	1	10	WasteH2O	ug/L	
	1,4-Dichlorobenzene	< 10	1	10	WasteH2O	ug/L	
	1,2-Dichlorobenzene	< 10	1	10	WasteH2O	ug/L	
	Bis(2-chloroisopropyl) ether	< 10	1	10	WasteH2O	ug/L	
	N-Nitrosodi-n-propylamine	< 10	1	10	WasteH2O	ug/L	
	Hexachloroethane	< 10	1	10	WasteH2O	ug/L	
	Nitrobenzene	< 10	1	10	WasteH2O	ug/L	
	Isophorone	< 10	1	10	WasteH2O	ug/L	
	2-Nitrophenol	< 10	1	10	WasteH2O	ug/L	
	2,4-Dimethylphenol	< 10	1	10	WasteH2O	ug/L	
	Bis(2-chloroethoxy)methane	< 10	1	10	WasteH2O	ug/L	
	2,4-Dichlorophenol	< 10	1	10	WasteH2O	ug/L	
	1,2,4-Trichlorobenzene	< 10	1	10	WasteH2O	ug/L	
	Naphthalene	< 10	1	10	WasteH2O	ug/L	
	Hexachlorobutadiene	< 10	1	10	WasteH2O	ug/L	
	4-Chloro-3-methylphenol	< 20	1	20	WasteH2O	ug/L	
	Hexachlorocyclopentadiene	< 20	1	20	WasteH2O	ug/L	
	2,4,6-Trichlorophenol	< 10	1	10	WasteH2O	ug/L	
	2-Chloronaphthalene	< 10	1	10	WasteH2O	ug/L	
	Dimethyl phthalate	< 10	1	10	WasteH2O	ug/L	
	2,6-Dinitrotoluene	< 10	1	10	WasteH2O	ug/L	
	Acenaphthylene	< 10	1	10	WasteH2O	ug/L	
	Acenaphthene	< 10	1	10	WasteH2O	ug/L	
	2,4-Dinitrophenol	< 50	1	50	WasteH2O	ug/L	
	4-Nitrophenol	< 50	1	50	WasteH2O	ug/L	
	2,4-Dinitrotoluene	< 10	1	10	WasteH2O	ug/L	
	Diethyl phthalate	< 10	1	10	WasteH2O	ug/L	
	4-Chlorophenyl phenyl ether	< 10	1	10	WasteH2O	ug/L	
	Fluorene	< 10	1	10	WasteH2O	ug/L	
	4,6-Dinitro-2-methylphenol	< 50	1	50	WasteH2O	ug/L	
	1,2-Diphenylhydrazine	< 10	1	10	WasteH2O	ug/L	
	N-Nitrosodiphenylamine	< 10	1	10	WasteH2O	ug/L	G15
	Hexachlorobenzene	< 10	1	10	WasteH2O	ug/L	
	4-Bromophenyl phenyl ether	< 10	1	10	WasteH2O	ug/L	
	Pentachlorophenol	< 50	1	50	WasteH2O	ug/L	
	Phenanthrene	< 10	1	10	WasteH2O	ug/L	
	Anthracene	< 10	1	10	WasteH2O	ug/L	
	Di-n-butyl phthalate	< 10	1	10	WasteH2O	ug/L	

Chk'd: [illegible] App'd: GG
Date App'd: 8/18/95

WI Lab Certification ID#: 113138300

MONTGOMERY WATSON
Analytical Testing Services

University Research Park
One Science Court
Madison, Wisconsin 53711
Tel: 608 231 4747 • Fax: 608 231 4777

ORGANIC REPORT
SEMIVOLATILE
ACS
GRIFFITH IN
Project Number: 4077.0120

Sample ID	Compound	Result	Dilution	Reporting Limit	Matrix	Units	Footnotes
L11314-002	Fluoranthene	< 10	1	10	WasteH2O	ug/L	
LOW STRENGTH	Benzidine	< 50	1	50	WasteH2O	ug/L	
EFFLUENT	Pyrene	< 10	1	10	WasteH2O	ug/L	
	Butyl benzyl phthalate	< 10	1	10	WasteH2O	ug/L	
	3,3'-Dichlorobenzidine	< 20	1	20	WasteH2O	ug/L	
	Chrysene	< 10	1	10	WasteH2O	ug/L	
	Benz(a)anthracene	< 10	1	10	WasteH2O	ug/L	
	Bis(2-ethylhexyl) phthalate	17	1	10	WasteH2O	ug/L	
	Di-n-octyl phthalate	< 10	1	10	WasteH2O	ug/L	
	Benzo(b)fluoranthene	< 10	1	10	WasteH2O	ug/L	
	Benzo(k)fluoranthene	< 10	1	10	WasteH2O	ug/L	
	Benzo(a)pyrene	< 10	1	10	WasteH2O	ug/L	
	Indeno(1,2,3-cd)pyrene	< 10	1	10	WasteH2O	ug/L	
	Dibenz(a,h)anthracene	< 10	1	10	WasteH2O	ug/L	
	Benzo(g,h,i)perylene	< 10	1	10	WasteH2O	ug/L	

Sample Date : 31-JUL-95
Extraction Date : 04-AUG-95
Analysis Date : 07-AUG-95
Analyst : Lisa Hill

Method Reference : EPA 600, Method 625

Footnote codes :

G15 = n-Nitrosodiphenylamine decomposes in the GC inlet and cannot be separated from Diphenylamine.

Chk'd: [illegible] App'd: GG
Date App'd: 8/18/95

WI Lab Certification ID#: 113138300

MONTGOMERY WATSON
Analytical Testing Services

University Research Park
One Science Court
Madison, Wisconsin 53711
Tel: 608 231 4747 • Fax: 608 231 4777

ORGANIC REPORT
SEMIVOLATILE
ACS
GRIFFITH IN
Project Number: 4077.0120

Sample ID	Compound	Result	Dilution	Reporting Limit	Matrix	Units	Footnotes
L11314-003	N-Nitrosodimethylamine	< 50	1	50	WasteH2O	ug/L	
LOW INF 1 THRU	Phenol	200	1	10	WasteH2O	ug/L	
10	Bis(2-chloroethyl) ether	< 10	1	10	WasteH2O	ug/L	
	2-Chlorophenol	< 10	1	10	WasteH2O	ug/L	
	1,3-Dichlorobenzene	< 10	1	10	WasteH2O	ug/L	
	1,4-Dichlorobenzene	< 10	1	10	WasteH2O	ug/L	
	1,2-Dichlorobenzene	< 10	1	10	WasteH2O	ug/L	
	Bis(2-chloroisopropyl) ether	< 10	1	10	WasteH2O	ug/L	
	N-Nitrosodi-n-propylamine	< 10	1	10	WasteH2O	ug/L	
	Hexachloroethane	< 10	1	10	WasteH2O	ug/L	
	Nitrobenzene	< 10	1	10	WasteH2O	ug/L	
	Isophorone	< 10	1	10	WasteH2O	ug/L	
	2-Nitrophenol	< 10	1	10	WasteH2O	ug/L	
	2,4-Dimethylphenol	< 10	1	10	WasteH2O	ug/L	
	Bis(2-chloroethoxy)methane	< 10	1	10	WasteH2O	ug/L	
	2,4-Dichlorophenol	< 10	1	10	WasteH2O	ug/L	
	1,2,4-Trichlorobenzene	< 10	1	10	WasteH2O	ug/L	
	Naphthalene	< 10	1	10	WasteH2O	ug/L	
	Hexachlorobutadiene	< 10	1	10	WasteH2O	ug/L	
	4-Chloro-3-methylphenol	< 20	1	20	WasteH2O	ug/L	
	Hexachlorocyclopentadiene	< 20	1	20	WasteH2O	ug/L	
	2,4,6-Trichlorophenol	< 10	1	10	WasteH2O	ug/L	
	2-Chloronaphthalene	< 10	1	10	WasteH2O	ug/L	
	Dimethyl phthalate	< 10	1	10	WasteH2O	ug/L	
	2,6-Dinitrotoluene	< 10	1	10	WasteH2O	ug/L	
	Acenaphthylene	< 10	1	10	WasteH2O	ug/L	
	Acenaphthene	< 10	1	10	WasteH2O	ug/L	
	2,4-Dinitrophenol	< 50	1	50	WasteH2O	ug/L	
	4-Nitrophenol	< 50	1	50	WasteH2O	ug/L	
	2,4-Dinitrotoluene	< 10	1	10	WasteH2O	ug/L	
	Diethyl phthalate	< 10	1	10	WasteH2O	ug/L	
	4-Chlorophenyl phenyl ether	< 10	1	10	WasteH2O	ug/L	
	Fluorene	< 10	1	10	WasteH2O	ug/L	
	4,6-Dinitro-2-methylphenol	< 50	1	50	WasteH2O	ug/L	
	1,2-Diphenylhydrazine	< 10	1	10	WasteH2O	ug/L	
	N-Nitrosodiphenylamine	< 10	1	10	WasteH2O	ug/L	G15
	Hexachlorobenzene	< 10	1	10	WasteH2O	ug/L	
	4-Bromophenyl phenyl ether	< 10	1	10	WasteH2O	ug/L	
	Pentachlorophenol	< 50	1	50	WasteH2O	ug/L	
	Phenanthrene	< 10	1	10	WasteH2O	ug/L	
	Anthracene	< 10	1	10	WasteH2O	ug/L	
	Di-n-butyl phthalate	< 10	1	10	WasteH2O	ug/L	

Chk'd: [illegible] App'd: [illegible]
Date App'd: 8/18/95

WI Lab Certification ID#: 113138300

MONTGOMERY WATSON
Analytical Testing Services

University Research Park
One Science Court
Madison, Wisconsin 53711
Tel: 608 231 4747 • Fax: 608 231 4777

ORGANIC REPORT
SEMIVOLATILE
ACS
GRIFFITH IN
Project Number: 4077.0120

Sample ID	Compound	Result	Dilution	Reporting Limit	Matrix	Units	Footnotes
L11314-003	Fluoranthene	< 10	1	10	WasteH2O	ug/L	
LOW INF 1 THRU	Benzidine	< 50	1	50	WasteH2O	ug/L	
10	Pyrene	< 10	1	10	WasteH2O	ug/L	
	Butyl benzyl phthalate	< 10	1	10	WasteH2O	ug/L	
	3,3'-Dichlorobenzidine	< 20	1	20	WasteH2O	ug/L	
	Chrysene	< 10	1	10	WasteH2O	ug/L	
	Benz(a)anthracene	< 10	1	10	WasteH2O	ug/L	
	Bis(2-ethylhexyl) phthalate	12	1	10	WasteH2O	ug/L	
	Di-n-octyl phthalate	< 10	1	10	WasteH2O	ug/L	
	Benzo(b)fluoranthene	< 10	1	10	WasteH2O	ug/L	
	Benzo(k)fluoranthene	< 10	1	10	WasteH2O	ug/L	
	Benzo(a)pyrene	< 10	1	10	WasteH2O	ug/L	
	Indeno(1,2,3-cd)pyrene	< 10	1	10	WasteH2O	ug/L	
	Dibenz(a,h)anthracene	< 10	1	10	WasteH2O	ug/L	
	Benzo(g,h,i)perylene	< 10	1	10	WasteH2O	ug/L	

Sample Date : 31-JUL-95
Extraction Date : 04-AUG-95
Analysis Date : 07-AUG-95
Analyst : Lisa Hill

Method Reference : EPA 600, Method 625

Footnote codes :

G15 = n-Nitrosodiphenylamine decomposes in the GC inlet and cannot be separated from Diphenylamine.

Chk'd: [illegible] App'd: GG
Date App'd: 8/18/95

WI Lab Certification ID#: 113138300

MONTGOMERY WATSON
Analytical Testing Services

University Research Park
One Science Court
Madison, Wisconsin 53711
Tel: 608 231 4747 • Fax: 608 231 4777

PCB REPORT
ACS
GRIFFITH IN
Project Number: 4077.0120

Sample #	Description	Compound		Result	Reporting Limit	Matrix	Units	Footnotes
L11314-001	INF BLEND (4:1) (LOW:HIGH)	PCB-1016		< 0.50	0.50	WasteH2O	ug/L	
		PCB-1221		< 1.0	1.0	WasteH2O	ug/L	
		PCB-1232		< 1.0	1.0	WasteH2O	ug/L	
		PCB-1242		< 0.50	0.50	WasteH2O	ug/L	
		PCB-1248		< 0.50	0.50	WasteH2O	ug/L	
		PCB-1254		< 1.0	1.0	WasteH2O	ug/L	
		PCB-1260		< 1.0	1.0	WasteH2O	ug/L	
		Sample Date:	31-JUL-95					
		Extract Date:	03-AUG-95					
		Analysis Date:	03-AUG-95					
L11314-002	LOW STRENGTH EFFLUENT	PCB-1016		< 0.50	0.50	WasteH2O	ug/L	
		PCB-1221		< 1.0	1.0	WasteH2O	ug/L	
		PCB-1232		< 1.0	1.0	WasteH2O	ug/L	
		PCB-1242		< 0.50	0.50	WasteH2O	ug/L	
		PCB-1248		< 0.50	0.50	WasteH2O	ug/L	
		PCB-1254		< 1.0	1.0	WasteH2O	ug/L	
		PCB-1260		< 1.0	1.0	WasteH2O	ug/L	
		Sample Date:	31-JUL-95					
		Extract Date:	03-AUG-95					
		Analysis Date:	03-AUG-95					
L11314-003	LOW INF 1 THRU 10	PCB-1016		< 0.50	0.50	WasteH2O	ug/L	
		PCB-1221		< 1.0	1.0	WasteH2O	ug/L	
		PCB-1232		< 1.0	1.0	WasteH2O	ug/L	
		PCB-1242		< 0.50	0.50	WasteH2O	ug/L	
		PCB-1248		< 0.50	0.50	WasteH2O	ug/L	
		PCB-1254		< 1.0	1.0	WasteH2O	ug/L	
		PCB-1260		< 1.0	1.0	WasteH2O	ug/L	
		Sample Date:	31-JUL-95					
		Extract Date:	03-AUG-95					
		Analysis Date:	03-AUG-95					

Chk'd: Kak App'd: GG
Date App'd: 8/18/95

WI Lab Certification ID#: 113138300

RMT LABORATORIES 744 HEARTLAND TRAIL MADISON, WI 53717-1934 P.O. BOX 8923 MADISON, WI 53708-8923 608/831-4444 608/831-7530 FAX

PROJECT NAME: MONTGOMERY WATSON
PROJECT NO: 91054.00
WORK ORDER NO: 7696

REPORT DATE:08/08/95
PAGE NO: 1

SAMPLE NO.	STATION ID	COLL. DATE	SAMPLE NO.	STATION ID	COLL. DATE
7696-001	11314-001	07/31/95			
7696-002	11314-002	07/31/95			
7696-003	11314-003	07/31/95			

I certify that the data contained in this Final Report has been generated and reviewed in accordance with approved methods and RMT Laboratory Standard Operating Procedure. Exceptions, if any, are discussed in the accompanying sample narrative. Release of this Final Report is authorized by RMT Laboratory management, as is verified by the following signature.

Approval Signature

8.8.95
Date

Lab Cert. #: WI DNR 113138520, MN DNR 055-999-107, SC DHEC 83001, TN DOH 02916

RMT LABORATORIES 744 HEARTLAND TRAIL MADISON, WI 53717-1934 P.O. BOX 8923 MADISON, WI 53708-8923 608/831-4444 608/831-7530 FAX

PROJECT NAME: MONTGOMERY WATSON
PROJECT NUMBER: 91054.00
LAB SAMPLE NUMBER: 7696-001
STATION ID: 11314-001
WI DNR LAB ID: 113138520

REPORT DATE: 08/08/95
COLLECTION DATE: 07/31/95
MATRIX TYPE: WW

1:4 Blend

INORGANIC ANALYSIS REPORT

COMPOUND	RESULT	EQL	CODE	UNITS
Total organic carbon as NPOC	2300	0.25		mg/L

RMT LABORATORIES 744 HEARTLAND TRAIL MADISON, WI 53717-1934 P.O. BOX 8923 MADISON, WI 53708-8923 608/831-4444 608/831-7530 FAX

PROJECT NAME: MONTGOMERY WATSON
PROJECT NUMBER: 91054.00
LAB SAMPLE NUMBER: 7696-002
STATION ID: 11314-002
WI DNR LAB ID: 113138520

REPORT DATE: 08/08/95
COLLECTION DATE: 07/31/95
MATRIX TYPE: WW

Low strength after UV ox

INORGANIC ANALYSIS REPORT

COMPOUND	RESULT	EQL	CODE	UNITS
Total organic carbon as NPOC	18	0.25		mg/L

RMT LABORATORIES 744 HEARTLAND TRAIL MADISON, WI 53717-1934 P.O. BOX 8923 MADISON, WI 53708-8923 608/831-4444 608/831-7530 FAX

PROJECT NAME: MONTGOMERY WATSON
PROJECT NUMBER: 91054.00
LAB SAMPLE NUMBER: 7696-003
STATION ID: 11314-003
WI DNR LAB ID: 113138520

REPORT DATE: 08/08/95
COLLECTION DATE: 07/31/95
MATRIX TYPE: WW

Low strength
Before UV ox

INORGANIC ANALYSIS REPORT

COMPOUND	RESULT	EQL	CODE	UNITS
Total organic carbon as NPOC	33	0.25		mg/L

MONTGOMERY WATSON

CHAIN OF CUSTODY RECORD

SPECIAL INSTRUCTIONS:
- [ ] PECFA
- [ ] WI LUST
- [ ] ACT 307
- [ ] REPORT DRY WT
- [ ] OTHER:

TURNAROUND
- [ ] 2 WEEKS (standard)
- [ ] 1 WEEK
- [ ] 3 DAYS
- [ ] 1 DAY

PROJECT NAME: ACS

PROJECT #: 4077.0120

CITY:

STATE:

SAMPLER(S): Peter Reko

COLLECTION DATE	COLLECTION TIME	GRAB / COMP	SAMPLE ID	NO. OF CONTAINERS	VOC-8260	SVOC (PP list)	PP Metals	Fe, Ca, Mg, Mn	Cl, SO4, Alk	TOC, COD, BOD, Ld	TSS, TDS, PCBs	Oil + Grease, pH	REMARKS	LAB USE ONLY MATRIX	LAB USE ONLY LAB NO.
7/31/95		INF	Blend (4:1) (Low: High)	3-	1L		plastic						#1,2,3	NW	11314-001
				3-	1L		glass						#4,5,6		
				1-	1L		glass						#7		
				1-	500ml		plastic						#8		
				2-	40ml		VOA						#9,10		

SPECIAL INSTRUCTIONS:

PROJ. MGR.: Phil Heck

TAMPER EVIDENT SEAL INTACT? ____YES ____NO ____NOT PRESENT

SEAL NO.: _____

SAMPLES RECEIVED ON ICE? ✓ YES ____NO TEMP: _____ °C

	SIGNATURE	DATE	TIME		SIGNATURE	DATE	TIME
RELINQUISHED BY:	Peter Reko 7/31/95			RECEIVED BY:			
RELINQUISHED BY				RECEIVED BY:			
RELINQUISHED BY:				RECEIVED BY:			
RELINQUISHED BY				RECEIVED FOR LABORATORY BY:	L. Collins	8/01/95	2:30pm

C-O-C No. 014529

NAME OF COURIER: _____

AIRBILL NUMBER: _____

Samples: 1,2,3, 8,9,10,15,16, [illegible]
Samples: 4,5,6,7,11,12,13,14 in another cooler

MONTGOMERY WATSON

CHAIN OF CUSTODY RECORD

SPECIAL INSTRUCTIONS:
- [ ] PECFA
- [ ] WI LUST
- [ ] ACT 307
- [ ] REPORT DRY WT
- [ ] OTHER:

TURNAROUND
- [ ] 2 WEEKS (standard)
- [ ] 1 WEEK
- [ ] 3 DAYS
- [ ] 1 DAY

PROJECT NAME: ACS
PROJECT #: 4077.0120
CITY: Tucson, Az
STATE:
SAMPLER(S): Peter Reko

COLLECTION DATE	COLLECTION TIME	GRAB / COMP	SAMPLE ID	NO. OF CONTAINERS	VOC-8260	SVOC (PP list)	PP Metals	Fe, Ca, Mg, Mn, Cl, SO4, Alk	TOC, COD, BOD, Hd, TSS, TDS, PCBs	Oil + Grease, pH	REMARKS	LAB USE ONLY MATRIX	LAB USE ONLY LAB NO.
7/31/95			Low Strength Effluent	20	- TOTAL							WW	11314-002
~~7/31/95~~			↓										
7/31/95			↓	6-	1L	PLASTIC		NM	→ # 4,5,6,7,8,9				
7/31/95			↓	6-	1L	glass		NM	→ # 1,2,3,10,11,12				
↓			↓	2-	1L	glass		WM	→ # 13,14				
↓			↓	2-	.5L	plastic		→ # 15,16					
↓			↓	4-	40 mL	glass		VOA	→ # 18,19,20,21				

SPECIAL INSTRUCTIONS:

PROJ. MGR.: Phil Heck

TAMPER EVIDENT SEAL INTACT? ___ YES ___ NO ___ NOT PRESENT
SEAL NO.: ___
SAMPLES RECEIVED ON ICE? ✓ YES ___ NO TEMP: ___ °C

SIGNATURE	DATE	TIME	SIGNATURE	DATE	TIME
RELINQUISHED BY: Peter Reko	7/31/95		RECEIVED BY:		
RELINQUISHED BY			RECEIVED BY:		
RELINQUISHED BY:			RECEIVED BY:		
RELINQUISHED BY			RECEIVED FOR LABORATORY BY: L. Collins	8/01	2:30 pm

C-O-C No. 014531

NAME OF COURIER: ___
AIRBILL NUMBER: ___

MONTGOMERY WATSON

CHAIN OF CUSTODY RECORD

SPECIAL INSTRUCTIONS:
- [ ] PECFA
- [ ] WI LUST
- [ ] ACT 307
- [ ] REPORT DRY WT
- [ ] OTHER:

TURNAROUND
- [ ] 2 WEEKS (standard)
- [ ] 1 WEEK
- [ ] 3 DAYS
- [ ] 1 DAY

PROJECT NAME: ACS

PROJECT #: 4077.0120

CITY: Tucson, AZ

STATE:

SAMPLER(S): Peter Reko

COLLECTION DATE	COLLECTION TIME	GRAB / COMP	SAMPLE ID	NO. OF CONTAINERS	VOC 8260 ~~8240~~	SVOC (PP)	PP Metals	Fe, Ca, Mg, Mn	Cl, SO4, Alk	TOC, COD, BOD, H2O	TSS, TDS, PCBs	Oil + Grease, pH	REMARKS	LAB USE ONLY MATRIX	LAB USE ONLY LAB NO.
7/31/95		LOW	INF 1, 2, 3	3 - 1L glass						NM				WW	11314-003
			LOW INF 4, 5, 6	3 - 1L plastic											
			LOW INF 7	1 1L - glass						WM					
			LOW INF 8	1 - 500 ml - plastic											
			LOW INF 9, 10	2 - 40 ml VOA											

SPECIAL INSTRUCTIONS:

PROJ. MGR.: Phil Heck

TAMPER EVIDENT SEAL INTACT? ___YES ___NO ___NOT PRESENT

SEAL NO.: _____

SAMPLES RECEIVED ON ICE? ✓ YES ___NO TEMP: _____ °C

	SIGNATURE	DATE	TIME		SIGNATURE	DATE	TIME
RELINQUISHED BY:	Peter Reko 7/31/95			RECEIVED BY:			
RELINQUISHED BY				RECEIVED BY:			
RELINQUISHED BY:				RECEIVED BY:			
RELINQUISHED BY				RECEIVED FOR LABORATORY BY:	L. Collins	8/01/95	2:30 pm

C-O-C No. 014530

NAME OF COURIER: _____

AIRBILL NUMBER: _____

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX INHOUSE ONLY: MONTGOMERY WATSON ANALYTICAL TESTING SERVICES XXXXXXXXXXXXXXXXXXXXXXXXXXXXX

LABORATORY TRANSMITTAL
4077.0120
ACS

LOGIN (# OF SAMPLES): 11314 (3)

DATE: 29-AUG-95

SAMPLE DATE: 31-JUL-95

TO: P. Heck

MATRIX: WasteH2O

REPORT: COMPLETE

REISSUE

PARTIAL 8/18/95

RECEIVED
AUG 31 1995
MONTGOMERY WATSON

OFFICE: MADISON CHICAGO
DETROIT MILWAUKEE
PHILADELPHIA OHIO
CALIFORNIA Salt Lake City

COMMENTS:

========== IF YOU HAVE ANY QUESTIONS, PLEASE FEEL FREE TO CALL DENNIS LINLEY AT (608)231-4755. ==========

Received Date: 01-AUG-95
Report Due Date: 13-AUG-95
Comments: ->>-

TEST RESULTS ENCLOSED OR PREVIOUSLY REPORTED

Subcontract Work: A-VOC8240-3 T-TOC-3

Soils:

Organic: PCBSANAL-3 SVPPANAL-3

Wet Chem: ALK-3 BOD-3 CL-3 COD-3 HD-3 O+GSEP-3 PH-3
SO4-3 TDS-3 TSS-3

Metals: AG-3 AS-3 BE-3 CA-3 CD-3 CR-3 CU-3 FE-3 HG-3 MG-3 MN-3 NI-3
PB-3 SB-3 SE-3 TL-3 ZN-3

OUTSTANDING TEST RESULTS

Subcontract Work:

Soils:

Organic:

Wet Chem:

Metals:

IEA
An Aquarion Company

Definitions of Data Qualifiers and Terminology

There are a number of data qualifiers that are widely used within the environmental testing industry which may be utilized in our data reports. The following definitions of these qualifiers are included as a service to our clientele. The majority of the qualifiers have evolved from the EPA contract laboratory program (CLP) therefore, they may or may not be appropriate for the particular testing that you have requested. If your work did not involve CLP type analyses, only a few of these items may apply to your particular report.

A - This flag is utilized to indicate that a tentatively identified compound (TIC) is a suspected aldol-condensation product formed during sample processing and caution should be applied in interpreting these results.

B - This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination and warns the data user to use caution when applying the results of this analyte.

BQL - Below quantitation limit indicates the compound was not detected in the sample above the practial quantitation limit.

C - Indicates that a pesticide identification has been confirmed utilizing GC/MS techniques.

D - Indicates the sample extract was diluted by the factor listed due to the sample matrix and/or concentration levels. All method detection limits or practical quantitation limits for the particular sample are therefore increased by this dilution factor.

E - Indicates that the concentration of the specific compound exceeded the calibration range of the instrument for that particular analysis.

J - Indicates an estimated value. It indicates that the compound was analyzed for and determined to be present in the sample. 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 compound that meet the identification criteria but the result is less than the sample quantitation limit but greater than zero.

MDL - The method detection limit (MDL) is defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero.

ND - Indicates the compound or analyte was not detected in the sample above the method detection limit or the practical quantitation limit for the particular analysis.

PQL - The practical quantitation limit is the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine operating conditions.

U - Indicates the compound was analyzed for but not detected in the sample above the applicable quantitation limit.

printed on recycled paper

IEA
An Aquarion Company

CLIENT NAME: Montgomery Watson
IEA PROJECT ID: CH951361
CLIENT PROJECT ID: 4077.0120

PROJECT NARRATIVE

Volatile Analysis

Samples Inf-Blend and Low Influent were determined to be unpreserved by a post-analysis check of the pH. Samples were initially analyzed within the 7 day holdtime for unpreserved samples. However, the analysis of Inf-Blend (DL2) and Low Influent (DL1 & DL2) was performed outside the 7 day holdtime.

printed on recycled paper

IEA
An Aquarion Company

Client: Montgomery Watson
IEA Job#: CH951361
Project #: 4077.0120
Matrix: Water
Method: 8260

EPA Target Compound List (TCL)
Volatile Organic Compounds
(µg/L)

Analyte / Lab ID						PQL
Dilution Factor (DF)	1	50	1000	1	5	
Method Blank	VN080495	VN080795	VN080895	VN080995	VN080895	
Client ID	Inf-Blend	Inf-Blend DL1	Inf-Blend DL2	Low Effluent	Low Effluent DL	
Lab ID	951361001	951361001 DL1	951361001 DL2	951361002	951361002 DL	
Chloromethane	U	UD	UD	U	UD	10
Bromomethane	U	UD	UD	U	UD	10
Vinyl Chloride	U	UD	UD	U	UD	10
Chloroethane	30	UD	UD	U	UD	10
Methylene Chloride	2100E	2600	UD	U	UD	5
Acetone	8300E	72000E	90000	230E	260	10
Carbon Disulfide	U	UD	UD	U	UD	5
1,1-Dichloroethene	U	UD	UD	U	UD	5
1,1-Dichloroethane	3200E	8900	8000	U	UD	5
total-1,2-Dichloroethene	370E	370	UD	U	UD	5
Chloroform	200	UD	UD	U	UD	5
1,2-Dichloroethane	U	UD	UD	U	UD	5
2-Butanone	28000E	120000E	130000	U	UD	10
1,1, 1-Trichloroethane	890E	830	UD	U	UD	5
Carbon Tetrachloride	U	UD	UD	U	UD	5
Vinyl Acetate	U	UD	UD	U	UD	10
Bromodichloromethane	U	UD	UD	U	UD	5
1,2-Dichloropropane	U	UD	UD	U	UD	5
Trans-1,3-dichloropropene	U	UD	UD	U	UD	5
Trichloroethylene	150	UD	UD	U	UD	5
Dibromochloromethane	U	UD	UD	U	UD	5
1,1,2-Trichloroethane	22	UD	UD	U	UD	5
Benzene	1700E	4200	UD	U	UD	5
cis-1,3-Dichloropropene	U	UD	UD	U	UD	5
2-Chloroethylvinylether	U	UD	UD	U	UD	5
Bromoform	U	UD	UD	U	UD	5
4-Methyl-2-Pentanone	5800E	15000E	10000	U	UD	10
2-Hexanone	36	UD	UD	U	UD	10
Tetrachloroethylene	44	UD	UD	U	UD	5
1,1,2,2-Tetrachloroethane	U	UD	UD	U	UD	5
Toluene	650E	710	UD	U	UD	5
Chlorobenzene	U	UD	UD	U	UD	5
Ethylbenzene	24	UD	UD	U	UD	5
Styrene	U	UD	UD	U	UD	5
Total Xylenes	120	UD	UD	U	UD	5
Date Sampled	7/31/95	7/31/95	7/31/95	7/31/95	7/31/95	
Date Analyzed	8/4/95	8/7/95	8/8/95	8/9/95	8/8/95	

printed on recycled paper

PQL = Practical Quantitation Limit
To obtain sample-specific quantitation limit, multiply the PQL by the Dilution Factor.

IEA
An Aquarion Company

Client: Montgomery Watson
IEA Job#: CH951361
Project #: 4077.0120
Matrix: Water
Method: 8260

EPA Target Compound List (TCL)
Volatile Organic Compounds
(µg/L)

Analyte / Lab ID						PQL
Dilution Factor (DF)	1	20	100	1	1	
Method Blank	VN080495	VN080895	VN080995	VN080495	VN080795	
Client ID	Low Influent	Low InfluentDL	Low InfluentDL	Method Blank	Method Blank	
Lab ID	951361003	951361003 DL1	951361003 DL2	VN080495	VN080795	
Chloromethane	U	UD	UD	U	U	10
Bromomethane	U	UD	UD	U	U	10
Vinyl Chloride	U	UD	UD	U	U	10
Chloroethane	U	UD	UD	U	U	10
Methylene Chloride	U	UD	UD	U	U	5
Acetone	82	UD	UD	U	U	10
Carbon Disulfide	U	UD	UD	U	U	5
1,1-Dichloroethene	U	UD	UD	U	U	5
1,1-Dichloroethane	U	UD	UD	U	U	5
total-1,2-Dichloroethene	U	UD	UD	U	U	5
Chloroform	U	UD	UD	U	U	5
1,2-Dichloroethane	U	UD	UD	U	U	5
2-Butanone	30	UD	UD	U	U	10
1,1, 1-Trichlorethane	U	UD	UD	U	U	5
Carbon Tetrachloride	U	UD	UD	U	U	5
Vinyl Acetate	U	UD	UD	U	U	10
Bromodichloromethane	U	UD	UD	U	U	5
1,2-Dichloropropane	U	UD	UD	U	U	5
Trans-1,3-dichloropropene	U	UD	UD	U	U	5
Trichloroethylene	U	UD	UD	U	U	5
Dibromochloromethane	U	UD	UD	U	U	5
1,1,2-Trichloroethane	U	UD	UD	U	U	5
Benzene	2100E	8000E	4500	U	U	5
cis-1,3-Dichloropropene	U	UD	UD	U	U	5
2-Chloroethylvinylether	U	UD	UD	U	U	5
Bromoform	U	UD	UD	U	U	5
4-Methyl-2-Pentanone	U	UD	UD	U	U	10
2-Hexanone	U	UD	UD	U	U	10
Tetrachloroethylene	U	UD	UD	U	U	5
1,1,2,2-Tetrachloroethane	U	UD	UD	U	U	5
Toluene	U	UD	UD	U	U	5
Chlorobenzene	U	UD	UD	U	U	5
Ethylbenzene	U	UD	UD	U	U	5
Styrene	U	UD	UD	U	U	5
Total Xylenes	U	UD	UD	U	U	5
Date Sampled	7/31/95	7/31/95	7/31/95	---	---	
Date Analyzed	8/4/95	8/8/95	8/8/95	8/4/95	8/7/95	

PQL = Practical Quantitation Limit
To obtain sample-specific quantitation limit, multiply the PQL by the Dilution Factor.

printed on recycled paper

IEA
An Aquarion Company

Client: Montgomery Watson
IEA Job#: CH951361
Project #: 4077.0120
Matrix: Water
Method: 8260

EPA Target Compound List (TCL)
Volatile Organic Compounds
(µg/L)

Analyte / Lab ID	Dilution Factor (DF)	1	1				PQL
	Method Blank	VN080895	VN080995				
	Client ID	Method Blank	Method Blank				
	Lab ID	VN080895	VN080995				
Chloromethane		U	U				10
Bromomethane		U	U				10
Vinyl Chloride		U	U				10
Chloroethane		U	U				10
Methylene Chloride		U	U				5
Acetone		U	U				10
Carbon Disulfide		U	U				5
1,1-Dichloroethene		U	U				5
1,1-Dichloroethane		U	U				5
total-1,2-Dichloroethene		U	U				5
Chloroform		U	U				5
1,2-Dichloroethane		U	U				5
2-Butanone		U	U				10
1,1, 1-Trichlorethane		U	U				5
Carbon Tetrachloride		U	U				5
Vinyl Acetate		U	U				10
Bromodichloromethane		U	U				5
1,2-Dichloropropane		U	U				5
Trans-1,3-dichloropropene		U	U				5
Trichloroethylene		U	U				5
Dibromochloromethane		U	U				5
1,1,2-Trichloroethane		U	U				5
Benzene		U	U				5
cis-1,3-Dichloropropene		U	U				5
2-Chloroethylvinylether		U	U				5
Bromoform		U	U				5
4-Methyl-2-Pentanone		U	U				10
2-Hexanone		U	U				10
Tetrachloroethylene		U	U				5
1,1,2,2-Tetrachloroethane		U	U				5
Toluene		U	U				5
Chlorobenzene		U	U				5
Ethylbenzene		U	U				5
Styrene		U	U				5
Total Xylenes		U	U				5
Date Sampled		---	---				
Date Analyzed		8/8/95	8/9/95				

PQL = Practical Quantitation Limit
To obtain sample-specific quantitation limit, multiply the PQL by the Dilution Factor.

printed on recycled paper

MONTGOMERY WATSON

CHAIN OF CUSTODY RECORD

SPECIAL INSTRUCTIONS:
- [ ] PECFA
- [ ] WI LUST
- [ ] ACT 307
- [ ] REPORT DRY WT
- [ ] OTHER:

TURNAROUND
- [ ] 2 WEEKS (standard)
- [ ] 1 WEEK
- [ ] 3 DAYS
- [ ] 1 DAY

PROJECT NAME: ACS

PROJECT #: 4077.0120

CITY:

STATE:

SAMPLER(S): Peter Reko

COLLECTION DATE	COLLECTION TIME	GRAB / COMP	SAMPLE ID	NO. OF CONTAINERS	VOC-8260	SVOC (PP list)	PP Metals	Fe, Ca, Mg, Mn	Cl, SO4, Alk	TOC, COD, BOD, Hd,	TSS, TDS, PCBs,	Oil + Grease, pH	REMARKS	LAB USE ONLY MATRIX	LAB USE ONLY LAB NO.
7/31/95	INF		Blend (4:1) (Low: High)	3-	1L		plastic						#1,2,3	WW	11314-001
				3-	1L		glass		wm				#4,5,6		
				1-	1L		glass		wm				#7		
				1-	500ml		plastic						#8		
				2-	40ml		VOA						#9,10		

SPECIAL INSTRUCTIONS:

TAMPER EVIDENT SEAL INTACT? ___YES ___NO ___NOT PRESENT

SEAL NO.: _____

SAMPLES RECEIVED ON ICE? ✓ YES ___NO TEMP: _____ °C

PROJ. MGR.: Phil Heck

	SIGNATURE	DATE	TIME		SIGNATURE	DATE	TIME
RELINQUISHED BY:	Peter Reko 7/31/95			RECEIVED BY:			
RELINQUISHED BY				RECEIVED BY:			
RELINQUISHED BY:				RECEIVED BY:			
RELINQUISHED BY				RECEIVED FOR LABORATORY BY:	L. Collins	8/01/95	2:30pm

C-O-C No. 014529

NAME OF COURIER: _____

AIRBILL NUMBER: _____

Samples: 1,2,3, 8,9,10,15,16,18,19,20,21 in one cooler
Samples: 4,5,6,7,11,12,13,14 in another cooler

MONTGOMERY WATSON

CHAIN OF CUSTODY RECORD

SPECIAL INSTRUCTIONS:
- [ ] PECFA
- [ ] WI LUST
- [ ] ACT 307
- [ ] REPORT DRY WT
- [ ] OTHER:

TURNAROUND
- [ ] 2 WEEKS (standard)
- [ ] 1 WEEK
- [ ] 3 DAYS
- [ ] 1 DAY

PROJECT NAME: ACS
PROJECT #: 4077.0120
CITY: Tucson, Az
STATE:
SAMPLER(S): Peter Reko

COLLECTION DATE	COLLECTION TIME	GRAB / COMP	SAMPLE ID	NO. OF CONTAINERS	VOC-8260	SVOC (PP list)	PP Metals	Fe, Ca, Mg, Mn	Cl, SO4, Alk	TOC, COD, BOD, Hd	TSS, TDS, PCBs	Oil + Grease, pH	REMARKS	LAB USE ONLY MATRIX	LAB NO.
7/31/95			Low Strength Effluent	20	- TOTAL									WW	11314-002
~~7/31/95~~			↓												
7/31/95			↓	6-	1L	PLASTIC							NM → # 4,5,6,7,8,9		
7/31/95			↓	6-	1L	glass							NM → # 1,2,3,10,11,12		
↓			↓	2-	1L	glass							WM → # 13,14		
↓			↓	2-	.5L	plastic							→ # 15,16		
↓			↓	4-	40 mL	glass							VOA → # 18,19,20,21		

SPECIAL INSTRUCTIONS:

TAMPER EVIDENT SEAL INTACT? ___ YES ___ NO ___ NOT PRESENT
SEAL NO.: _____
SAMPLES RECEIVED ON ICE? ✓ YES ___ NO TEMP: _____ °C

PROJ. MGR.: Phil Heck

	SIGNATURE	DATE	TIME		SIGNATURE	DATE	TIME
RELINQUISHED BY:	Peter Reko	7/31/95		RECEIVED BY:			
RELINQUISHED BY				RECEIVED BY:			
RELINQUISHED BY:				RECEIVED BY:			
RELINQUISHED BY				RECEIVED FOR LABORATORY BY:	L. Collins	8/01	2:30pm

C-O-C No. 014531

NAME OF COURIER: _____
AIRBILL NUMBER: _____

MONTGOMERY WATSON

CHAIN OF CUSTODY RECORD

SPECIAL INSTRUCTIONS:
- ☐ PECFA
- ☐ WI LUST
- ☐ ACT 307
- ☐ REPORT DRY WT
- ☐ OTHER:

TURNAROUND
- ☐ 2 WEEKS (standard)
- ☐ 1 WEEK
- ☐ 3 DAYS
- ☐ 1 DAY

PROJECT NAME: ACS
PROJECT #: 4077.0120
CITY: Tucson, AZ
STATE:
SAMPLER(S): Peter Reko

COLLECTION DATE	COLLECTION TIME	GRAB / COMP	SAMPLE ID	NO. OF CONTAINERS	8260 VOC	SVOC (PP)	PP Metals	Fe, Ca, Mg, Na	O&G	TOC, COD, BOD, H2O	TSS, TDS	PCBs	Oil + Grease, pH	REMARKS	LAB USE ONLY MATRIX	LAB USE ONLY LAB NO.
7/31/95		Low	INF 1,2,3	3-1L glass	NM										WW	113140003
			Low INF 4,5,6	3-1L plastic												
			Low INF 7	1 1L-glass	WM											
			Low INF 8	1-500ml-plastic												
			Low INF 9,10	2-40 ml VOA												

SPECIAL INSTRUCTIONS:

PROJ. MGR.: Phil Heek

TAMPER EVIDENT SEAL INTACT? ___YES ___NO ___NOT PRESENT
SEAL NO.: _____
SAMPLES RECEIVED ON ICE? ✓ YES ___NO TEMP: _____ °C

	SIGNATURE	DATE	TIME		SIGNATURE	DATE	TIME
RELINQUISHED BY:	Peter Reko 7/31/95			RECEIVED BY:			
RELINQUISHED BY				RECEIVED BY:			
RELINQUISHED BY:				RECEIVED BY:			
RELINQUISHED BY				RECEIVED FOR LABORATORY BY:	L. Collins	8/01/95	2:30 pm

C-O-C No. 014530

NAME OF COURIER: _____
AIRBILL NUMBER: _____

Preparation and Extraction of Semi-Volatiles on PUF (polyUrethane Foam)/XAD-2 Resin Samples

(TO-13)

UNCONTROLLED COPY

Quanterra Environmental Services

Controlled Copy
Copy No._____

SOP No. SAC-OP-0006
Revision No. 1
Revision Date: 3/11/96
Page: 1 of 18

OPERATION-SPECIFIC STANDARD OPERATING PROCEDURE

TITLE: Preparation and Extraction of Semi-Volatiles on PUF(PolyUrethane Foam)/XAD-2 Resin Samples For GC/MS Analysis

(SUPERSEDES: LM-CAL-7013)

Prepared by: Brian Thompson and Steve Valmores

Reviewed by: _____
Technical Specialist, Patrick Rainey

Approved by: _____
Quality Assurance Manager, Gail Cho Celaschi

Approved by: _____
Environmental Health and Safety Coordinator, Cheryl Ann Stith

Approved by: _____
Laboratory Director, Bruce Warden

Proprietary Information Statement:

This document has been prepared by and remains the sole property of Quanterra Incorporated. It is submitted to a client or government agency solely for its use in evaluating Quanterra's qualifications in connection with the particular project, certification, or approval for which it was prepared and is to be held propriety to Quanterra.

The user agrees by its acceptance or use of this document to return it upon Quanterra's request and not to reproduce, copy, lend, or otherwise disclose or dispose of the contents, directly or indirectly, and not to use it for any propose other than that for which it was specifically furnished. The user also agrees that where consultants or others outside of the user's organization are involved in the evaluation process, access to these documents shall not be given to those parties unless those parties also specifically agree to these conditions.

1. SCOPE AND APPLICATION

1.1. This document describes the pre-cleaning and preparation procedure for the determination of base/neutral and acids involving a combination quartz filter/adsorbent cartridge with subsequent analysis by GC/MS. A list of analytes and their CAS registration numbers are listed in Appendix I.

2. SUMMARY OF METHOD

2.1. Filters and adsorbent cartridges are cleaned in solvent, dried, assembled and shipped to the field. During sampling, the amount of air sampled through the filter is recorded and the filter and cartridge are sent to the laboratory for analysis. The filter and adsorbent cartridge is extracted using soxhlet extraction techniques. The extract is then concentrated by Kuderna-Danish and adjusted to the final volume of extract for analysis by GC/MS.

3. DEFINITIONS

3.1. Refer to the Glossary of the Quanterra QAMP.

3.2. Batch: A QC batch is a set of up to 20 field samples of similar matrix that behave similarly and are processed using the same procedures, reagents, and standards within the same time period.

3.2.1. For method TO-13, the QC batch is defined at the preparation stage.

3.3. PUF Cartridge: Air sampling cartridge consisting of a glass cylinder in which a cylindrical polyurethane foam adsorbent filter is inserted. These are typically used in high volume samplers.

3.4. XAD-2 resin: A porous polymeric adsorbent resin typically used for semivolatile air sampling. The resin is placed in a cartridge and used in a high volume air sampler.

4. INTERFERENCES

4.1. Method interferences may be caused by contaminants in solvents, reagents, glassware, and other sample processing hardware.

Quanterra Environmental Services

PROPRIETARY

4.2. Matrix interferences can be caused by contaminants that are coextracted from the sample.

4.3. Heat, ozone, NO_2 and ultraviolet light may cause sample degradation.

5. SAFETY

5.1. Procedures shall be carried out in a manner that protects the health and safety of all Quanterra associates.

5.2. Eye protection that satisfied ANSI Z87.1 (as per the Chemical Hygiene Plan), laboratory coat, and chemically resistant gloves must be worn while samples, standards, solvents, and reagents are being handled. Disposable gloves that have been contaminated will be removed and discarded; other gloves will be cleaned immediately.

5.2.1. Neoprene, natural rubber, and butyl gloves provide varying degrees of protection against those chemicals listed. Refer to permeation/degradation charts for the actual data.

5.3. The health and safety hazards of many of the chemicals used in this procedure have not been fully defined. Additional health and safety information can be obtained from the Material Safety Data Sheets (MSDS) maintained in the laboratory.

5.3.1. Chemicals that have been classified as carcinogens, or potential carcinogens, under OSHA include: methylene chloride

5.3.2. Chemicals that have been classified as flammable, under OSHA include: acetone and hexane

5.4. Exposure to chemicals must be maintained as low as reasonably achievable, therefore, unless they are known to be non-hazardous, all samples must be opened, transferred and prepared in a fume hood, or under other means of mechanical ventilation. Solvent and waste containers will be kept closed unless transfers are being made.

5.5. The preparation of standards, reagents and glassware cleaning procedures that involved organic solvents such as methylene chloride will be conducted in a fume hood with the sash closed as far as the operation will permit.

Quanterra
Environmental Services

PROPRIETARY

5.6. All work must be stopped in the event of a known or potential compromise to the health and safety of a Quanterra associate. The situation must be reported immediately to a laboratory supervisor.

6. EQUIPMENT AND SUPPLIES

6.1. Soxhlet apparatus

6.2. Filtering funnels - 100 mm top diameter

6.3. Disposable 1 mL pipettes

6.4. Concentrator tubes, Kuderna-Danish - 10 mL graduated

6.5. Evaporative flasks, Kuderna-Danish - 1000 mL. Attach to concentrator tube with clamp

6.6. Vials - 2 mL capacity with Teflon-lined screw cap

6.7. Quartz Fiber filter (10.16 cm, round)

6.8. Boiling chips - methylene chloride rinsed

6.9. Glass sampling cartridge with Nickel or Stainless Steel screen (Mesh 200/200)

6.10. PolyUrethane Foam (PUF) plugs, (Density 0.0225g/ cm^3)

6.11. XAD-2 resin (20/60 mesh)

6.12. Cotton gloves

6.13. Water bath - heated with a concentric ring cover capable of temperature control

6.14. Top loading balance capable of weighing accurately to 0.01 g

6.15. Nitrogen evaporation device

6.16. Aluminum foil, methylene chloride rinsed.

Quanterra Environmental Services

PROPRIETARY

6.17. Pyrex dish

6.18. Chemically resistant gloves

7. REAGENTS AND STANDARDS

7.1. Methylene chloride - pesticide grade or equivalent

7.2. Hexane - pesticide grade or equivalent.

7.3. Acetone - pesticide grade or equivalent

7.4. Sodium sulfate (ACS), anhydrous, granular

7.5. Surrogate spiking solution. See Attached Appendix II.

7.6. Duplicate Control Sample (DCS) spiking solution . See Attached Appendix II.

7.7. Pre-spike solution (by client request).

8. SAMPLE COLLECTION, PRESERVATION AND STORAGE

8.1. The samples should be returned to the laboratory, packed in blue ice to ensure that the assembled cartridge and filter are chilled to 4 ± 2°C. The samples should be received by the laboratory within two days of sample collection.

8.2. The samples are logged in the laboratory logbook or appropriate data tracking system according to sample location and filter/adsorbent cartridge number identification.

8.3. The samples must be kept refrigerated at 4 ± 2°C, exposure of samples to fluorescent light must be minimized.

8.4. Sample extracts must be stored in sealed air-tight vials.

8.5. Samples, sample extracts, and standards must be stored separately.

8.6. The extraction shall be started within 7 days from sample collection. Extracts must be analyzed within 30 days following the start of the extraction.

Quanterra
Environmental Services

PROPRIETARY

9. QUALITY CONTROL

9.1 One method blank must be extracted with every process batch of similar matrix, not to exceed twenty (20) samples. The method blank is a PUF/XAD-2 cartridge and quartz fiber filter processed in the same manner and at the same time as the associated samples. Corrective actions must be documented on a Nonconformance Memo, then implemented when target analytes are detected in the method blank above the reporting limit or when surrogate recoveries are outside control limits. See Quanterra Inc. QA Policy 003 for specific acceptance criteria.

9.2 A pair of Duplicate Control Samples (DCS) must be extracted with every process batch of similar matrix, not to exceed twenty (20) samples. The DCS is a media-free solvent aliquot spiked with surrogate solution and DCS spike solution. See Appendix II for spike levels. The DCS pair must be processed in the same manner and at the same time as the associated samples. Corrective actions must be documented on a Nonconformance Memo, then implemented when recoveries of any spiked analyte is outside control limits provided on the LIMS or by the client. See Quanterra Inc. QA Policy 003 for specific acceptance criteria.

9.3 All samples in the process batch, including the Method Blank and the DCS are spiked with appropriate surrogate solution. See Appendix II for spike levels.

9.4 In the event that the PUF/XAD-2 cartridges were pre-spiked with surrogate prior to shipment to the field, by client request only, the method blank is also spiked with the pre-spike solution. See Appendix II.

10. CALIBRATION AND STANDARDIZATION

10.1. The analytical balance used must be calibrated and documented in a logbook for each day of use.

10.2. Standard and equipment calibration must be performed according to the frequency and procedures described in the SW846 8270 SOP "GCMS Analysis of Semi-volatile Organics", LM-CAL-3004, revision 4.0, SOP "GCMS Analysis Based on Method 8270B, SW846", CORP-MS-0001, revision 1.0, and the Quanterra Incorporated Quality Assurance Management Plan.

11. PROCEDURE

PROPRIETARY

Quanterra Environmental Services

11.1. One time procedural variations are allowed only if deemed necessary in the professional judgment of supervision to accommodate variation in sample matrix, radioactivity, chemistry, sample size, or other parameters. Any variation in procedure shall be completely documented using a Nonconformance Memo and is approved by a Technical Specialist and QA Manager. If contractually required, the client shall be notified. The Nonconformance Memo shall be filed in the project file.

11.2. Any unauthorized deviations from this procedure must also be documents as a nonconformance, with a cause and corrective action described. The Nonconformance Memo shall be filed in the project file.

11.3. Preparation of Sample Filter and Adsorbent Cartridge

11.3.1. The sampling device consists of a glass cartridge fitted with a nickel or stainless steel screen to retain the PUF /XAD-2 resin. A quartz fiber filter (10.16 cm, round) accompanies the PUF/XAD-2 cartridge to the field.

11.3.2. Quartz Fiber Filter Preparation

11.3.2.1. For clean-up of the quartz fiber filter, a batch of quartz fiber filters is placed in a soxhlet apparatus and extracted at least once with methylene chloride for a minimum of 16 hours at an extraction rate of approximately 4 cycles per hour.

11.3.2.2. At the end of the soxhlet extraction, the quartz fiber filter is removed from the soxhlet apparatus, placed in a fume hood to dry for a minimum of six hours before use.

11.3.3. PUF Adsorbent Preparation

11.3.3.1. The PUF adsorbent is composed of 1 inch and 2 inch inserts cut from sheet stock and should fit with slight compression in the glass cartridge, supported by wire screen.

11.3.3.2. For initial clean-up of the PUF adsorbent, a batch of PUF plugs is placed in a soxhlet apparatus and extracted with methylene chloride for a minimum of 4 hours at an extraction rate of approximately 4 cycles per hour.

Quanterra Environmental Services

PROPRIETARY

11.3.3.3. At the end of the initial soxhlet extraction, the spent methylene chloride is discarded per Attachment C of the Chemical Hygiene Plan, Section WS002, Table 1, and replaced with fresh methylene chloride. The PUF adsorbent is extracted at least twice for a minimum of 16 hours each at an extraction rate of approximately 4 cycles per hour.

11.3.3.4. The extracted PUF plugs are placed in solvent rinsed Pyrex dishes and dried in a fume hood for a minimum of 4 hours.

11.3.4. XAD-2 Resin Preparation

11.3.4.1. For initial clean-up of the XAD-2 resin, a batch of XAD-2 is placed in a soxhlet apparatus and extracted with methylene chloride for a minimum of 4 hours at an extraction rate of approximately 4 cycles per hour.

11.3.4.2. At the end of the initial soxhlet extraction, the spent methylene chloride is discarded per Attachment C of the Chemical Hygiene Plan, Section WS002, Table 1, and replaced with fresh methylene chloride. The XAD-2 resin is extracted at least once for a minimum of 16 hours at an extraction rate of approximately 4 cycles per hour.

11.3.4.3. The XAD-2 resin is removed from the soxhlet apparatus, placed in a solvent rinsed Pyrex dish and dried at room temperature for a minimum of 16 hours.

11.3.5. PUF/XAD-2 Sampling Cartridge Preparation

11.3.5.1. Cotton gloves must be worn while handling glass cartridges to prevent contamination. Chemically resistant gloves must be worn to prevent exposure to samples or chemicals.

11.3.5.2. Prior to assembly of the PUF/XAD-2 sampling cartridges, the glass cartridges containing nickel or stainless steel screen are rinsed with acetone, hexane, and methylene chloride and allowed to dry for a minimum of 1 hour. A soxhlet-extracted, dried 1 inch PUF is placed on top of the screen in the glass sampling cartridge.

11.3.5.3. Approximately 15 grams of 20/60 mesh XAD-2 resin is placed into the sampling cartridge on top of the PUF.

11.3.5.4. The 2 inch PUF adsorbent is placed on top of the XAD-2 resin bed.

11.3.5.5. The glass module containing the PUF/XAD-2 adsorbent is wrapped with methylene chloride-rinsed aluminum foil, labeled, placed in a ziplock bag , then placed in a bubble wrap plastic bag and tightly sealed with tape for shipment.

11.4. Certification

11.4.1. At least one PUF/XAD-2 sample and filter from each batch must be analyzed as a media blank before the batch is considered for field use. A batch is considered a group of up to 20 assembled PUF/XAD-2 sample cartridges with quartz fiber filters

11.4.2. Each batch of cleaned and certified cartridges including QC samples should be shipped to the field, and sampled within the same delivery group (SDG) to the extent possible.

11.4.3. An assembled cartridge consists of the PUF/XAD-2 and filter. All these components may be extracted and analyzed together. No target compounds should be present above the reporting limit in an acceptable "pre-cleaned" blank. Surrogate compound recoveries should be within acceptable limits. If target compounds are present, the associated batch of media will be rinsed again and re-analyzed.

11.5. Pre-spike samples (optional, upon client request).

11.5.1. Prior to field deployment, a surrogate compound ($^{13}C_6$-Hexachlorobenzene or any other suitable isotopically labeled surrogate) may be added to the PUF/XAD-2 cartridge. The surrogate compound should be added to each cartridge. See Appendix II.

11.6. Storage of Spike Certified Adsorbent Cartridge

11.6.1. The PUF/XAD-2 sample cartridges must be stored in air-tight glass or metal containers, protected from light and refrigerated at 4 $\pm$2 °C from the time of

Quanterra Environmental Services

PROPRIETARY

preparation. The cartridges must be wrapped in aluminum foil for protection from sunlight and external contamination.

11.6.2. The PUF/XAD-2 sample cartridges should not be stored for more than thirty days prior to sampling. The expiration date must be included on the cartridge label.

11.6.3. Label each lot as (date prepared; client; series #). Log into the PUF preparation tracking log.

11.7. Extraction Procedure

11.7.1. Soxhlet Extraction Procedure

11.7.1.1. Assemble the soxhlet apparatus. The soxhlet apparatus consists of a triple solvent rinsed 1 liter round bottom flask containing 2 to 3 methylene chloride-rinsed boiling chips, with a solvent rinsed large extractor body attached.

11.7.1.2. Add 800 mL of methylene chloride to the soxhlet apparatus..

11.7.1.3. Using cotton gloves, transfer the PUF/XAD-2 sample cartridge and filter to the soxhlet apparatus. The PUF/XAD-2 sample cartridge and filter are analyzed together.

11.7.1.4. Add a certified clean PUF/XAD-2 sample cartridge to be used as a Method Blank.

11.7.1.5. Add the surrogate solution to all samples, including the Method Blank and DCS. (See Appendix II for spike level.) Add spike solution to the DCS. (See Appendix II for spike level.) *Note: Add the pre-spike solution to the method blank if samples were spiked prior to field deployment.*

11.7.1.6. Reflux the sample for a minimum of 16 hours at an extraction rate of approximately 4 cycles per hour.

11.7.1.7. The heating elements are turned off, and the samples are allowed to cool approximately one hour.

Quanterra Environmental Services

PROPRIETARY

11.7.1.8. Remove the condenser and rinse the extractor with 10-20 mLs of methylene chloride. The soxhlet apparatus is tilted to allow the solvent to drain into the round bottom flask. The extractor body is removed and the lower joint is rinsed with 2-3 mLs methylene chloride into the round bottom flask. The PUF/XAD-2 cartridge is carefully removed and the extractor body is rinsed twice with 5-10 mLs of methylene chloride into the round bottom flask. The extracts are now ready for concentration by K-D.

11.7.2. Concentration Procedure

11.7.2.1. Assemble a Kuderna-Danish concentrator by attaching a 10 mL concentrator tube to a 1000 mL evaporative flask. Add 2 -3 methylene chloride-rinsed boiling chips.

11.7.2.2. Transfer the extract by pouring the extract through funnel and collect the extract in the K-D concentrator. Rinse the round bottom flask 2-3 times with 5-10 mLs methylene chloride to complete the quantitative transfer.

Note: If one or more of the sample extracts appears to have water present, ALL the extracts (including the Method Blank and DCS) must be poured through a drying funnel containing methylene chloride-rinsed anhydrous, granular sodium sulfate, plugged with methylene chloride-rinsed glass wool.

11.7.2.3. Pour the sample through the funnel, rinse the round bottom flask 3 times with methylene chloride and pour the rinse through the funnel. If sodium sulfate was used in the funnel, rinse the sodium sulfate two (2) times with methylene chloride.

11.7.2.4. Attach a three-ball Snyder column to the evaporative flask. Pre-wet the Snyder column by adding about 1 mL of the extraction solvent to the top of the column. Place the K-D apparatus in a hot water bath (80°C to 85°C) so that the concentrator tube is partially immersed in the hot water, and the entire lower rounded surface of the flask is bathed with hot vapor. Adjust the vertical position of the apparatus and the water temperature as required to complete the concentration in one hour. At the proper rate of distillation, the balls of the column will

actively chatter but the chambers will not flood with condensed solvent. When the apparent volume of liquid reaches 6 mL, remove the K-D apparatus from the water bath, dry the bottom of the evaporative flask, K-D tube and joint with 5-10 mLs acetone. Add 1-2 mLs of methylene chloride to the Snyder column to rinse the inside of the flask into the K-D tube. Allow to drain and cool. Remove the Snyder column. Remove the K-D tube and rinse the joint of the flask with 0.5-1.0 mLs of methylene chloride into the K-D tube.

11.7.2.5. Quantitatively transfer the extracts from the K-D tubes to 16 mL culture tubes using a disposable pipette. Rinse the sides and bottom of the K-D tube 2-3 times with ~ 0.5 mL methylene chloride to complete the transfer.

11.7.2.5.1. Nitrogen Blowdown - evaporate the solvent volume of the extracts under a gentle stream of nitrogen. Concentrate to approximately 3 mLs, cap with Teflon lined screw caps, and gently invert the extract several times to rinse the sides of the culture tube.

11.8. Remove the caps and continue to blow down the extract to slightly below 1 mL. Do not allow the extract to go to dryness. Carefully transfer the extracts to a Teflon-sealed 2 mL screw cap autovial. Complete the quantitative transfer by rinsing the bottom and sides of the internal wall of the culture tube with small amounts of methylene chloride. Adjust the final volume to 1.0 mL. Extracts are now ready for analysis by GC/MS.

12. METHOD PERFORMANCE

12.1. The group/team leader has the responsibility to ensure that this procedure is performed by an associate who has been properly trained in its use and has the required expertise.

13. POLLUTION PREVENTION

Quanterra Environmental Services

PROPRIETARY

13.1. No solvents of any kind or in any amount are to be disposed of in the sinks or evaporated in the hoods.

14. WASTE MANAGEMENT

14.1. Waste management in the procedure must be segregated and disposed according to the facility hazardous waste procedures. The Environmental Health and Safety Coordinator or Hazardous Materials Technician should be contacted if additional information is required.

14.2. All waste must be disposed of according to the facility hazardous waste management procedures, Attachment C of the Chemical Hygiene Plan, Section WS002, Table 1.

14.3. Samples and other solutions containing high concentrations of toxic materials must be disposed of according to the facility hazardous waste management procedures, Attachment C of the Chemical Hygience Plan, Section WS003, Disposal of Samples After Analysis.

15. REFERENCES

15.1. Compendium Method TO-13 - The Determination of Benzo(a)pyrene and other Polynuclear Aromatic Hydrocarbons in Ambient Air Using Gas Chromatographic and High Performance Liquid Chromatographic Analysis.

15.2. Method 8270, SW846, Third Edition, USEPA Office of Solid Waste and Emergency Response, Washington D.C., 20460, September 1986.

15.3. SW846, Test Methods for Evaluating Solid Waste, Third Edition, Update II, October 1994, Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS): Capillary Column Technique, Method 8270B.

15.4. USEPA Contract Laboratory Program, Statement Of Work for Organic Analysis, OLM0X.X.

15.5. "GCMS Analysis of Semi-volatile Organics", LM-CAL-3004, revision 4.0.

15.6. "GCMS Analysis Based on Method 8270B, SW846", CORP-MS-0001, revision 1.0.

16. MISCELLANEOUS

16.1. Deviations from reference method.

16.1.1. TO-13 was published for the analysis of PAH's only, other semivolatiles can be analyzed at reporting limits similar to the PAH's reporting limits.

16.1.2. The quartz filter, XAD-2 resin and PUF adsorbent are cleaned separately in batches, assembled as a sample cartridge, extracted, and analyzed for contaminants of interest. TO-13 lists the individual extraction, clean-up and analysis of the PUF adsorbent, XAD-2 resin, and quartz fiber filter.

16.1.3. TO-13 states glass fiber filters are used for sampling. This SOP references the option to use quartz fiber filters for sampling.

16.1.4. TO-13 states drying XAD-2 resin in a vacuum oven with ultra-pure nitrogen gas stream at room temperature for 2-4 hours. This SOP references XAD-2 resin to be dried in a fume hood for a minimum of 16 hours before use.

16.1.5. TO-13 uses hexane-rinsed aluminum foil. This SOP uses methylene chloride-rinsed aluminum foil.

16.1.6. Section 11.4 is not referenced in TO-13.

16.1.7. Section 11.5 is not referenced in TO-13 and is optional, upon client request.

16.1.8. Section 11.7.1 soxhlet procedure does not include a pre-cleaning extraction of 800 mL methylene chloride of the soxhlet apparatus. The extraction solvent is methylene chloride instead of the 10% ether/hexane extraction solvent referenced in TO-13.

16.1.9. TO-13 lists a concentration step which involves a solvent exchange to cyclohexane and to a final extract volume of 1 mL in cyclohexane. This SOP extraction and concentration steps are processed with methylene chloride. The final sample extract is at 1.0 mL in methylene chloride.

16.2. List of other SOPs cross-referenced in SOP.

16.2.1. SAC-QA-0041 Calibration and Calibration Check of Balances, Rev. 1.1.

16.2.2. LP-CAL-0001 Laboratory Documentation Practices, Rev. 3.0.

Quanterra
Environmental Services

PROPRIETARY

16.2.3. QA Policy 003 Quanterra Quality Control Program, Rev. 0.

16.2.4. QA Policy 008 Data Recording Requirements, Rev. 0.

16.2.5. LP-CAL-0004 Sample Receipt and Login, Rev. 4.0.

16.2.6. LM-CAL-3004, "GCMS Analysis of Semi-volatile Organics", Rev. 4.0.

16.2.7. CORP-MS-0001, "GCMS Analysis Based on Method 8270B, SW846", Rev. 1.0.

16.2.8. Chemical Hygiene Plan, Attachment C, Hazardous Waste Management Procedures, Revision 0.

APPENDIX I

Method Analytes and CAS Registry Numbers

Analyte	CAS #	Analyte	CAS #
Phenol	108-95-2	Acenaphthene	83-32-9
bis-(2-Chloroethyl)ether	111-44-4	2,4-Dinitrophenol	51-28-5
2-Chlorophenol	95-57-8	4-Nitrophenol	100-02-7
1,3-Dichlorobenzene	541-73-1	Dibenzofuran	132-64-9
1,4-Dichlorobenzene	106-46-7	2,4-Dinitrotoluene	121-14-2
Benzyl alcohol	100-51-6	2,6-Dinitrotoluene	606-20-2
1,2-Dichlorobenzene	95-50-1	Diethyl phthalate	84-66-2
2-Methylphenol	95-48-7	4-Chlorophenyl phenyl ether	7005-72-3
bis(2-Chloroisopropyl) ether	108-60-1	Fluorene	86-73-7
4-Methylphenol	106-44-5	4-Nitroaniline	100-01-6
n-Nitroso-di-n-propylamine	621-64-7	4,6-Dinitro-2-methylphenol	534-52-1
Hexachloroethane	67-72-1	N-Nitrosodiphenylamine	86-30-6
Nitrobenzene	98-95-3	4-Bromophenyl phenyl ether	101-55-3
Isophorone	78-59-1	Hexachlorobenzene	118-74-1
2-Nitrophenol	88-75-5	Pentachlorophenol	87-86-5
2,4-Dimethylphenol	105-67-9	Phenanthrene	85-01-8
Benzoic acid	65-85-0	Anthracene	120-12-7
bis(2-Chloroethoxy)methane	111-91-1	Di-n-butyl phthalate	84-74-2
2,4-Dichlorophenol	120-83-2	Fluoranthene	206-44-0
1,2,4-Trichlorobenzene	120-82-1	Pyrene	129-00-0
Naphthalene	91-20-3	Butyl benzyl phthalate	85-68-7
4-Chloroaniline	106-47-8	3,3'-Dichlorobenzidine	91-94-1
Hexachlorobutadiene	87-68-3	Benzo(a)anthracene	56-55-3
4-Chloro-3-methylphenol	59-50-7	bis(2-Ethylhexyl)phthalate	117-81-7
2-Methylnaphthalene	91-57-6	Chrysene	218-01-9
Hexachlorocyclopentadiene	77-47-4	Di-n-octyl phthalate	117-84-0
2,4,6-Trichlorophenol	88-06-2	Benzo(b)fluoranthene	205-99-2
2,4,5-Trichlorophenol	95-95-4	Benzo(k)fluoranthene	207-08-9
2-Chloronaphthalene	91-58-7	Benzo(a)pyrene	50-32-8
2-Nitroaniline	88-74-4	Indeno(1,2,3-c,d)pyrene	193-39-5
Dimethyl phthalate	99-65-0	Dibenzo(a,h)anthracene	53-70-3
Acenaphthylene	208-96-8	Benzo(g,h,i)perylene	191-24-2
3-Nitroaniline	99-09-2		

Quanterra Environmental Services

PROPRIETARY

APPENDIX II

SURROGATE AND DUPLICATE CONTROL SAMPLE SPIKES

SURROGATE SPIKING

Surrogates are added to all the samples, including the MB (which is also the SCS), and the DCS. Add 0.5 mL of the ABN surrogate solution to each sample regardless of size, to yield spike levels shown below.

Analyte	SW846 (ug/sample)	CLP SOW 3/90 (ug/sample)
2-Fluorophenol	100	75
Phenol-d5	100	75
2,4,6-Tribromophenol	100	75
2-Fluorobiphenyl	50	50
Terphenyl-d14	50	50
Nitrobenzene-d5	50	50
2-Chlorophenol	NA	75
1,2-Dichlorobenzene-d4	NA	50

NA= Not Applicable

Pre-Spike Surrogate (by client request only)

Analyte	Amount (ug/sample)
$^{13}C_6$ Hexachlorobenzene*	50

* or any other suitable isotopically labeled surrogate

Quanterra
Environmental Services

PROPRIETARY

DCS SPIKING

Spike the DCS with 0.5 mL of the ABN DCS spiking solution to yield the spike levels shown below.

Analyte	SW846 (ug/sample)	CLP SOW 3/90 (ug/sample)
Pentachlorophenol	100	75
Phenol	100	75
2-Chlorophenol	100	75
4-Chloro-3-methylphenol	100	75
4-Nitrophenol	100	75
1,2,4-Trichlorobenzene	50	50
Acenaphthene	50	50
2,4-Dinitrotoluene	50	50
Pyrene	50	50
n-Nitroso-di-n-propylamine	50	50
1,4-Dichlorobenzene	50	50

Determination of Volatile Organics (VOCs) in Ambient Air by GC/MS - Scan Mode Using EPA Method TO-14

(TO-14)

Quanterra
Environmental Services

Controlled Copy
Copy No. UNCONTROLLED COPY

SOP No. COI-MS-0003
Revision No. 0
Revision Date: 04/09/96
Page: 1 of 22

OPERATION-SPECIFIC STANDARD OPERATING PROCEDURE

TITLE: DETERMINATION OF VOLATILE ORGANICS (VOCS) IN AMBIENT AIR BY GC/MS - SCAN MODE USING EPA METHOD TO-14

(SUPERSEDES: LM-ATL-7001)

Prepared by: Mark Johnson

Reviewed by: MJ
GC/MS Chemist, Mark Johnson

Approved by: Sevdâ K. Aleckson
Quality Assurance Manager, Sevdâ Aleckson

Approved by:
Environmental Health and Safety Coordinator, Manny Velazquez

Approved by:
Laboratory Manager, Val Mallari

Proprietary Information Statement:

This document has been prepared by and remains the sole property of Quanterra Incorporated. It is submitted to a client or government agency solely for its use in evaluating Quanterra's qualifications in connection with the particular project, certification, or approval for which it was prepared and is to be held propriety to Quanterra.

The user agrees by its acceptance or use of this document to return it upon Quanterra's request and not to reproduce, copy, lend, or otherwise disclose or dispose of the contents, directly or indirectly, and not to use it for any purpose other than that for which it was specifically furnished. The user also agrees that where consultants or others outside of the user's organization are involved in the evaluation process, access to these documents shall not be given to those parties unless those parties also specifically agree to these conditions.

1. SCOPE AND APPLICATION

1.1. Analytes: VOCs with molecular weights in the general range of 40-200 g/mol suitable for GC/MS analysis. Target analytes are listed in Table 1.

1.2. Method detection limits (see current MDL study).

1.3. Reporting limits: in the general range of 2-20 ppbv (See Table 1).

1.4. Applicable matrices - air, vapor

1.5. Dynamic range (See Table 1)

PROPRIETARY

1.6. Approximate analytical time

1 min. - cool down of cryotrap
1 min. - flush of inlet system with internal standard
1 min. - collection of 100 ml internal standard on trap
1 min. - flush of inlet system on trap
5 min. - collection of 500 ml of sample/standard on trap
1 min. - flush of trap with HP Helium and GC oven cool down
24 min. - GC run time

When running multiple samples, steps can be overlapped to reduce run time to approximately 25 min.

2. SUMMARY OF METHOD

2.1. An air sample is metered through a mass flow controller and concentrated onto a cryogenically cooled trap. After 100 ml of internal standard and 500 ml (nominal) of the sample has been trapped, a valve is switched and the trap is heated to purge the trap's contents onto the gas chromatography column. The target compounds are analyzed with a mass spectrometer operated in the scan mode.

3. DEFINITIONS

3.1. Standard pressure is defined as 1.0 atmosphere, 14.6 psia, 0" Hg, and 0 psig, assuming Quanterra Air Toxics Lab, City of Industry elevation and average barometric pressure.

3.2. Standard molar volume is defined as 24.5 l/mol at room temperature.

PROPRIETARY

4. INTERFERENCES

4.1. Gas regulators are cleaned by the manufacturer using Freon 113, which is one of the target compounds. Before using ultra high purity (UHP) Nitrogen (N_2), Hydrocarbon (HC) free air, Internal Standard (I.S.), or a target compound standard mix, each regulator should be purged a minimum of three times with the appropriate gas.

4.2. Contamination may occur in sample or standard results if canisters are not properly cleaned prior to use. Canisters should not be used for the collection of samples until a batch blank analysis indicates that no target compounds are present above 0.2 ppbv, or a level previously agreed upon by Quanterra and Client. All other sampling equipment including pumps, flow controllers and filters must be thoroughly cleaned to ensure that the filling apparatus will not contaminate samples.

4.3. High levels of CO_2 and/or moisture may limit the amount of sample that can be concentrated due to plugging of the trap. High levels of CO_2 may also over-pressurize the instrument's vacuum system requiring delay of scan start time or the reduction of amount of sample trapped. High levels of CO_2 have been shown to shift the retention time of the first several target compounds earlier.

5. SAFETY

5.1. Procedures shall be carried out in a manner that protects the health and safety of all Quanterra associates.

5.2. Eye protection that satisfied ANSI Z87.1 (as per the Chemical Hygiene Plan), laboratory coat, and appropriate gloves should be worn while samples, standards, solvents, and reagents are being handled. Disposable gloves that have been contaminated will be removed and discarded; other gloves will be cleaned immediately.

5.3. The health and safety hazards of many of the chemicals used in this procedure have not been fully defined. Additional health and safety information can be obtained from the Material Safety Data Sheets (MSDS) maintained in the laboratory.

5.4. Exposure to chemicals must be maintained **as low as reasonably achievable**, therefore, unless they are known to be non-hazardous, all samples must be opened, transferred and prepared in a fume hood, or under other means of mechanical ventilation. Solvent and waste containers will be kept closed unless transfers are being made.

5.5. The preparation of standards and reagents will be conducted in a fume hood with the sash closed as far as the operation will permit.

5.6. At no time should SUMMA canisters be pressurized over 40 psig.

5.7. All work must be stopped in the event of a known or potential compromise to the health and safety of a Quanterra associate. The situation must be reported **immediately** to a laboratory supervisor.

6. EQUIPMENT AND SUPPLIES

6.1. Gas chromatograph - capable of subambient temperature programming for the oven and with the jet separator option (Hewlett Packard 5890).

6.2. Mass-selective detector - equipped with computer and appropriate software (Hewlett Packard 5970B with HP-1000 RTE-A data system).

6.3. Cryogenic trap with temperature control assembly (Nutech 8533 and 3538). See Figure 1.

6.4. Electronic mass flow controller - for maintaining constant sample flow through Nutech concentrators (Unit Instruments)

6.5. Chromatographic grade stainless steel or nickel tubing and stainless steel plumbing fittings.

6.6. Chromatographic column - DB-624 0.53 ID, 30 meter length (J&W Scientific).

6.7. Stainless steel vacuum/pressure gauge capable of measuring from 30" of mercury (Hg) to 40 psig (Span Instruments) or equivalent.

6.8. High precision vacuum gauge - for making daily standards. (Wallace & Tiernan Pennwalt)

6.9. Pressure regulators for carrier gas and standards - 2 stage, stainless steel diaphragm (single stage acceptable for standards).

6.10. SUMMA passivated canisters 6 L or 15 L (Scientific Instrumentation Specialists, Anderson Instruments) or equivalent.

6.11. 7 micron filters (Nupro), or equivalent.

6.12. Vacuum flow regulators capable of flow settings to give required time sample flows (Valin or equivalent).

6.13. Diaphragm type vacuum pump to draw sample through mass flow controller.

7. REAGENTS AND STANDARDS

7.1. 4-Bromofluorobenzene, 25 ng/uL in methanol (for tuning of mass spectrometer)

7.2. High purity air and helium for making dilutions and for carrier gas.

7.3. Pressurized air source for valve actuation.

7.4. Gas calibration stock standards are at a nominal concentration of 1 ppmv (CS_2 is not as stable and so the concentration is 5 ppmv). Standards are prepared in a balance gas of nitrogen and are analytically certified by the supplier (Scott-Marrin, Scott Specialty, or equivalent). To facilitate certification by vendor, the standards were divided into several cylinders. (See current stock cylinder standard certifications)

7.5. Internal standard mix of Bromochloromethane, 1,4-Difluorobenzene, and Chlorobenzene-d5 at 250 ppbv each in a balance gas of nitrogen (Scott-Marrin or equivalent).

8. SAMPLE COLLECTION, PRESERVATION AND STORAGE

8.1. Samples should be collected in precleaned and batch analyzed SUMMA passivated canisters. A 7 micron filter should be placed on the inlet of the can to protect the valve from particulates. Canisters should never be pressurized over 40 psig.

8.2. The absolute pressure of the canister should be recorded before and after sample collection. See Section 11.1 Sample preparation.

8.3. Samples must be kept within the temperature range of 20 to 30 °C.

8.4. Tedlar bag samples should be protected from sunlight.

8.5. Canisters samples should be analyzed within 14 days of collection.

8.6. Tedlar Bag samples should be analyzed within 3 days of collection.

9. QUALITY CONTROL

9.1. For every 12 hour shift the mass spectrometer must meet the tuning criteria described in Section 11.2.

9.2. After tuning, a single point check standard must be analyzed. Ninety percent of the target compound response factors must be within ± 30 percent difference of the initial multipoint calibration curve average response factors. If the check standard fails to meet this criterion, the system and standard conditions should be evaluated and the standard reanalyzed. If the reanalysis fails to meet linearity criteria a new five point calibration curve must be run.

9.3. A laboratory control sample (LCS) must be analyzed daily or every 20 samples, whichever is more frequent. This sample will consist of target VOCs prepared in a separate canister from a second source. Five compounds will be used to assess control for the LCS: methylene chloride, 1,1-dichloroethene, trichloroethene, toluene and 1,1-2,2-tetrachloroethane. The percent recovery for the five control compounds must be within a window of 80-115% or a window established using historical lab data. QC sample limits may change once established using historical lab data.

9.4. For each lot of 20 samples analyzed, a duplicate control sample (DCS) must be analyzed. The DCS sample is identical to the LCS in composition and source. The same LCS percent recovery criterion must be met. In addition, the relative percent difference (RPD) for the LCS and DCS must be ≤ 10%. If either of the control samples fail the criteria the system should be checked and the LCS that failed reanalyzed. Samples will not be considered reportable until the DCS criteria are met.

9.5. A method blank must be analyzed every 12 hour shift before samples. The blank results must indicate that there are no target compounds present above the reporting limits (RL). The method blank is prepared by adding zero grade air to a SUMMA canister. Internal standards are added to the trap and the blank is processed exactly as a sample or standard.

9.6. If any of the above criteria are not met, corrective actions must be implemented before analyses can proceed.

9.7. Internal Standards and their associated key ions are noted in Table 2. The internal standard areas are monitored for each 12 hour shift by comparing the areas of the internal standards in each sample with the areas of the internal standards in the daily continuing calibration standard. Sample areas are considered acceptable if they fall between 50% and 150% of the daily standard areas. Any sample outside this criteria should be reanalyzed. Samples failing upon repeat analysis should be documented on the analysis benchsheet and in the report narrative. The internal standard area of Bromochloromethane should always be greater than 50,000 area counts to reliably achieve standard reporting limits

10. CALIBRATION AND STANDARDIZATION

10.1. A low level static dilution of the stock standard gas mixtures is made in a 6 or 15 liter SUMMA canister. The high precision vacuum gauge is flushed with HC free air and attached to the top valve of the clean, evacuated canister. After recording the absolute pressure, 2.00 psi of each of the 4 standard mixtures and 1.00 psi of CS2 are added to the canister (each regulator and the transfer line should be flushed several times before transfer of standard to the canister). Close the canister valves and replace the high precision gauge with a vacuum/pressure gauge of known accuracy. Pressurize the can with HC free air to 30 psig. This will yield a standard with a nominal concentration of 45 ppbv for most compounds. Actual concentrations of each compound as certified should be used in all calculations.

10.2. A high level static dilution of the stock standard gas mixtures is made in a 6 or 15 liter SUMMA canister. The high precision vacuum gauge is flushed with HC free air and attached to the top valve of the clean, evacuated canister. After recording the absolute pressure, 8.00 psi of each of the 4 standard mixtures and 2.00 psi of CS2 are added to the canister (each regulator and the transfer line should be flushed several times before transfer of standard to the canister). Close the canister valves and replace the high precision gauge with a vacuum/pressure gauge of known accuracy. Pressurize the can with HC free air to 30 psig. This will yield a standard with a nominal concentration of 179 ppbv for most compounds. Actual concentrations of each compound as certified should be used in all calculations.

10.3. An initial, minimum 5 point, curve is run in the linear working range of the system for each compound. The nominal concentration of the standards are 2.2, 4.5, 11, 45, 144, 287, and 448 ppbv. More than 5 levels are run in order to maximize each compound's linear working range and to verify reporting limits. These concentrations are achieved by varying the amount of standard trapped on the instrument and/or the concentration of the standard being analyzed. A percent relative standard deviation (%RSD) is calculated for each target analyte in that analytes dynamic range as indicated in Table 1 using the calculation in section 14.4. 90% of the target compounds must be less than 30% RSD to accept the curve for analysis. Refer to section 11 for RSD calculation. All compounds should have a response factor greater than 0.05.

10.4. During every 12 hours of operation, after tuning criteria is verified, a one point midrange standard (500 mL of 44 ppbv) is run to verify linearity with the initial calibration. A percent difference is calculated between the response factors (RFs) from the continuing calibration standard and the average RFs from the initial curve for each target analyte using the calculation in section 11. 90% of the target compound response factors must be within 30% difference of the initial multipoint curve average

Response Factor, or a new initial calibration must be run. All compounds should have a response factor greater than 0.05.

10.5. The daily, one point check standard response factors (RFs) are used to quantitate the results of the samples for the 12 hour shift.

11. PROCEDURE

11.1. Sample Preparation

11.1.1. The initial pressure of the sample canister is checked and recorded by attaching a vacuum/pressure gauge to the canister. The gauge should be rinsed before use with zero grade nitrogen by physically holding against the air outlet and flushing for a few seconds. If the pressure is less than approximately 6 psig, pressurize the canister to 10 psig with zero grade nitrogen and record the final pressure. Pressures should be recorded in the sample pressurizing log and on the individual canister field sheets.

11.1.2. If the canister pressure is increased, a dilution factor (DF) is calculated and applied to results:

$$DF = \frac{Y_a}{X_a}$$

Where:

X_a = *absolute canister pressure before dilution (initial pressure)*
Y_a = *absolute canister pressure after dilution (final pressure)*

11.2. Initial/Daily GC/MS Tuning

11.2.1. After a successful autotune as per manufacture recommendations each instrument is manually tuned using PFTBA so that m/z 69 is 100%, m/z 131 is approximately 34%, and m/z 213 is approximately 36%. The width and axis parameters are set using the routines in the software. This initial tune should remain stable for extended periods of time, and retuning with PFTBA should not be necessary every day.

11.2.2. At the beginning of each 12 hour shift, prior to any analytical runs, the GC/MS system must be verified that acceptable tune performance criteria are achieved. If any of the key ions fail the abundance criteria listed in Section 11.2.4, the system is considered out of tune and any subsequent sample/standard analysis should be considered unacceptable.

11.2.3. For shift tune verification the cryotrap is not used and should be left at 150C. Alternatively the trap can be cold or cooling down but should be out of line with the column. The GC program (see Table 2) is initiated by using the BAMON commands. The GC programs are named "GCBFB1" and "GCBFB2" for systems A and B respectively. Tune files are typically "MTBFB1" and "MTBFB2." Once the data system has initiated the run and GC oven has stabilized, the remote start light will turn on and the system is ready for injection.

2 uL of a 25 ng/uL 4-Bromofluorobenzene (BFB) standard is injected into the injection port of the concentrator unit and the remote start button is activated.

11.2.4. Once the tuning run is complete (~ 6 minutes), run the program TUNVOA, data file." This is a program that will evaluate the tuning analysis and print out the required information automatically. If the BFB tuning criteria cannot be met on the first injection, retuning the instrument with PFTBA and or system maintenance may be required prior to re-injection of BFB.

Mass	Ion Abundance Criteria
50	15 to 40% of mass 95
75	30 to 60% of mass 95
95	Base Peak, 100% Relative Abundance
96	5 to 9% of mass 95
173	<2% of mass 174
174	>50% of mass 95
175	5 to 9% of mass 174
176	>95% but <101% of mass 174
177	5 to 9% of mass 176

11.3. One time procedural variations are allowed only if deemed necessary and appropriate by the supervisor to accommodate variation in sample matrix, radioactivity, chemistry, sample size, or other parameters. Any variation in procedure shall be completely documented using a Nonconformance Memo including approval by a Technical Specialist and QA Manager. If it is determined that the quality of the sample data is significantly affected and/or if contractually required, the client shall be notified. The Nonconformance Memo shall be filed in the project file.

11.4. Any unauthorized deviations from this procedure must also be documented as a nonconformance, with a cause and corrective action described.

12. ANALYSIS

12.1. The continuing standard and the QA/QC samples are analyzed the same as samples. After the one-point continuing calibration standard is analyzed an evaluated (section 9.2), duplicate laboratory control samples (DCS) are analyzed and evaluated (See sections 9.3 and 9.4).

12.2. Before sample analysis a zero grade nitrogen method blank is analyzed and evaluated (see section 9.5), The method blank consists of a SUMMA canister that is filled with zero grade nitrogen.

12.3. At the beginning of a sample or standard run the sample valve is in the purge position and the trap valve is in the column position. The trap is cooled to <150C. The internal standard canister attached and approximately 100 ml is flushed through (this can be concurrent with the trap cool down). After flushing the trap valve is placed in the sample position and the trap temperature is checked to be at -150C or less.

Trapping is started by switching the sample valve to sample position and activating a timer. When 100 ml has been trapped (1 minutes at 100 ml/min) the sample valve is switched to purge and the internal standard canister is closed and removed.

12.4. The sample/standard canister is then attached and approximately 100 ml is flushed through. Trapping is again started by switching the sample valve to sample and starting a timer. After the appropriate amount of time (5 minutes for 500 ml at 100 ml/min) the sample valve is switched back to purge, the canister is closed and the data system is set up.

12.5. Typically, the "Name" field in the data system set up screen contains the Quanterra sample number and the name of the client. The "Misc." section contains the volume of the sample that was trapped, the client sample ID, the canister number (or a note of "Tedlar bag"), and the canister or Tedlar bag dilution factor (final/initial pressure, if applicable).

12.6. The GC system methods are "GCNEW1: and "GCNEW2" (see Table 3). When the GC reaches ready at the programmed start temperature, and after waiting at least 30 seconds after trapping, the trap valve is switched to column, and then the cryotrap is switched to heat and the run is started simultaneously.

12.7. A canister filled with zero grade air is attached to the sample line in between samples. The line is allowed to flush until it is time for the next sample.

12.8. Trapped sample volumes are adjusted for pressurization to give an undiluted volume of 500 ml.

13. DATA INTERPRETATION

13.1. Qualitative Analyses

13.1.1. Two criteria must be satisfied to verify positive identification. (1) elution of sample component at the same GC relative or absolute retention time as those of the standard component; and (2) correspondence of the sample component and the standard component mass spectra.

13.1.1.1. The sample component relative retention time (RRT) must compare within ± 0.06 RRT units of the RRT of the standard component. As an option, RT must compare within 0.5 minutes of the standard component absolute retention time (RT). For reference, the RT standard must be run within the same 12 hour shift as the sample.

13.1.1.2. (1) All ions present in the standard mass spectra at a relative intensity greater than 10% (most abundant ion in the spectrum equals 100%) must be present in the sample spectrum. (2) The relative intensities of ions specified in (1) must agree within plus or minus 20% between the standard reference and sample spectra. (Example: For an ion with an abundance of 50% in the reference spectra, the corresponding sample abundance must be between 30 and 70 percent. Standard reference mass spectra must be obtained on each individual system.

13.1.1.3. If a compound cannot be verified by all of the criteria in the above paragraphs but in the technical judgment of the analytical chemist the identification is correct, then the compound may be reported.

13.1.2. For samples containing components not associated with the calibration standards, a library search may be made for the purpose of tentative identification. The necessity to perform this type of identification will be determined by the type of analysis being conducted. normally, compounds will be given general names consisting of major functional groups and number of carbon atoms unless a retention time reference is available. Guidelines for making tentative identification are:

13.1.2.1. Relative intensities of major ions in the reference spectrum (ions > 10% of the most abundant ion) should be present in the sample spectrum.

13.1.2.2. The relative intensities of the major ions should agree within ± 20%. (Example: For an ion with an abundance of 50% in the standard spectrum, the corresponding sample ion abundance must be between 30 and 70%).

13.1.2.3. Molecular ions present in the reference spectrum should be present in the sample spectrum.

13.1.2.4. Ions present in the sample spectrum but not in the reference spectrum should be reviewed for possible background contamination or presence of coeluting compounds.

13.1.2.5. Ions present in the reference spectrum but not in the sample spectrum should be reviewed for possible subtraction from the sample spectrum because of background contamination or coeluting peaks. Data system library reduction programs can sometimes create these discrepancies.

13.1.2.6. Only peaks having a total ion current greater than 10% of the nearest eluting Internal Standard total ion current will be evaluated for reporting.

13.1.2.7. Semiquantitative results will be calculated for tentatively identified compounds using total ion current areas and assuming a relative response factor of 1.0 of the nearest internal standard.

Computer generated library search routines should not use normalization routines that would misrepresent the library or unknown spectra when compared to each other. Only after visual comparison of sample with the nearest library searches will the mass spectral interpretation specialist assign a tentative identification.

13.2. Quantitative Analysis:

13.2.1. When a compound has been identified, the quantification of that compound will be based on the integrated abundance from the EICP of the primary characteristic ion. Quantification will take place using the internal standard technique. A summary table of primary and secondary ions for target compounds and internal standards is listed in Table 4. The calculation for quantitation of sample is found in section 14.

14. DATA ANALYSIS AND CALCULATIONS

14.1. The HP data system is set up to automatically quantitate the sample results based on a 500 ml sample size. The default result units are in ppbv.

14.2. If a sample size other than 500 ml was used and/or a canister sample was pressurized, the result must be adjusted as shown below:

$$Final\ result\ ppbv = raw\ result\ ppbv\ X \frac{500\,mL}{sample\ volume\ injected}\ X \frac{final\ psia}{initial\ psia}$$

14.3. Calculation for Relative Response Factor (RRF):

$$RRF = \frac{Area\ cpd\ in\ Std.}{Area\ I.S.}\ X \frac{Conc.\ I.S.}{Conc.\ cpd\ in\ Std.}$$

The area of the primary quantitation ion is used in the calculation.
I.S.: Internal Standard

14.4. Calculation for Percent Relative Standard Deviation (%RSD):

$$\%RSD = \frac{Std.\ Dev.\ of\ RRFs}{Mean\ of\ RRFs}\ X\ 100$$

14.5. Calculation for Percent Difference (%D):

$$\%D = \frac{Average\ RRF\ from\ initial\ curve\ RRF\ cpd.}{Average\ RRF\ from\ initial\ curve}\ X\ 100$$

14.6. Calculation for Determining Concentration of Compounds:

$$Conc.\ Cpd(ppbv) = \frac{Area\ cpd\ in\ sample}{Area\ I.S.\ in\ sample}\ X \frac{Conc.\ I.S.}{RRF\ daily\ Std.}\ X\ Dil.\ Factor\ (See\ 14.2)$$

The area of the primary quantitation ion is used in the calculation.
I.S.: Internal Standard

14.7. Calculation for Percent Recovery (%Rec):

$$\%\ Rec = \frac{Amount\ cpd.\ recovered}{Amount\ cpd.\ spiked}\ X\ 100\%$$

14.8. Calculation for Relative Percent Difference (RPD):

$$RPD = \frac{Value\ A - Value\ B}{Average\ of\ Values}\ X\ 100$$

15. REPORTING

15.1. Standard reporting units are ppbv. If results are to be reported in ng/L or ug/m^3 use the following equation:

$$result\ ppbv\ X \frac{Molecular\ weight\ of\ compound}{24.5} = results\ ng/L\ or\ ug/m^3$$

Note: 24.5 is the molar volume of ideal gas at 25° Centigrade and 1 atm.

15.2. Reporting limits

15.2.1. See Table 1. All reporting limits and MDLs must be derived on GC/MS systems at the Quanterra Air Toxics laboratory and are periodically updated.

15.2.2. "J" values (results below the normal reporting limit but above the MDL) are issued on request only.

15.3. Significant figures

15.3.1. All results should be reported to two significant figures.

15.4. No conversion of the analytical results to standard conditions is made.

16. METHOD PERFORMANCE

17. POLLUTION PREVENTION

18. WASTE MANAGEMENT

19. REFERENCES

19.1. Method Source

19.1.1. "EPA Compendium Method TO-14. The Determination of Volatile Organic Compounds (VOCs) in Ambient Air using SUMMA Passivated Canisters Sampling and Gas Chromatographic Analysis."

19.2. Deviations from Method

19.2.1. Nitrogen is used for dilution/pressurization purposes.

19.2.2. TO-14 recommends the use of a 0.32 mm column coupled directly to the MSD. With the HP system, the MSD can only handle flow of 1 ml/min or less. The 0.32 mm column provides ~ 3 ml/min. Quanterra uses a 0.53 mm column through a jet separator.

19.2.3. TO-14 describes an inlet system that uses a vacuum to pull the sample through the trap. Quanterra optionally uses the pressure of the sample canister to drive the sample through the trap.

19.2.4. TO-14 describes the use of a Nafion dryer to remove excess moisture from air matrices. Quanterra does not use a Nafion dryer since polar compounds may be lost during this removal step.

19.2.5. TO-14 describes the use of SUMMA passivated steel canisters for sampling and analysis. No mention is made of Tedlar sampling bags. Quanterra analyzes samples in Tedlar bags for VOCs using the same procedures described herein. A modification to the method is noted on the final report.

20. MISCELLANEOUS (TABLES, APPENDICES, ETC.)

Table 1 VOC Target Compounds

Compound	R.T. (approx.)	Report Limits (ppbv)	Dynamic Range (ppbv)
Dichlorodifluoromethane (Freon 12)	2.05	2.0	2-450
Chloromethane	2.62	4.0	4-450
1,2-Dichloro-1,1,2,2-tetrafluoroethane (Freon 114)	2.66	2.0	2-450
Vinyl Chloride	2.89	2.0	2-450
Bromomethane	3.34	2.0	2-450
Chloroethane	3.52	4.0	4-450
Trichlorofluoromethane (11)	3.85	2.0	2-450
1,1-Dichloroethene	4.44	2.0	2-450
Carbon Disulfide	4.54	10.0	10-360
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	4.52	2.0	2-450

Compound	R.T. (approx.)	Report Limits (ppbv)	Dynamic Range (ppbv)
Hexachlorobutadiene	21.52	2.0	4-450

PROPRIETARY

Compound	R.T. (approx.)	Report Limits (ppbv)	Dynamic Range (ppbv)
Acetone	4.62	10.0	10-450
Methylene Chloride	5.07	2.0	2-450
trans-1,2-Dichloroethene	5.38	2.0	2-450
1,1-Dichloroethane	5.91	2.0	2-450
Vinyl Acetate	6.13	10.0	10-450
cis-1,2-Dichloroethene	6.70	2.0	2-450
2-Butanone	6.84	10.0	10-450
Chloroform	7.23	2.0	2-450
1,1,1-Trichloroethane	7.33	2.0	2-450
Carbon Tetrachloride	7.56	2.0	2-450
Benzene	7.88	2.0	2-450
1,2-Dichloroethane	7.97	2.0	2-450
Trichloroethene	8.95	2.0	2-450
1,2-Dichloropropane	9.31	2.0	2-450
Bromodichloromethane	9.88	2.0	2-450
cis-1,3-Dichloropropene	10.70	2.0	2-450
4-Methyl-2-pentanone	11.11	10.0	10-450
Toluene	11.21	2.0	2-450
trans-1,3-Dichloropropene	11.82	2.0	2-450
1,1,2-Trichloroethane	12.12	2.0	2-450
Tetrachloroethene	12.19	2.0	2-450
2-Hexanone	12.78	30.0	30-450
Dibromochloromethane	12.80	2.0	2-450
1,2-Dibromoethane	12.90	2.0	2-450
Chlorobenzene	13.98	2.0	2-450
Ethylbenzene	14.33	2.0	2-450
1,4-and 1,3-(p,m)Xylene	14.61	2.0	2-900
1,2-(ortho)Xylene	15.43	2.0	2-450
Styrene	15.49	2.0	2-450
Bromoform	15.78	2.0	2-450
1,1,2,2-Tetrachloroethane	17.18	2.0	2-450
Benzyl Chloride	17.30	10.0	10-450
4-Ethyltoluene	17.55	2.0	2-450
1,3,5-Trimethylbenzene	17.73	2.0	2-450
1,2,4-Trimethylbenzene	18.55	2.0	2-450
1,3-Dichlorobenzene	19.02	2.0	2-450
1,4-Dichlorobenzene	19.26	2.0	2-450
1,2-Dichlorobenzene	19.83	2.0	2-450
1,2,4-Trichlorobenzene	21.32	20.0	20-450

PROPRIETARY

TABLE 2 BFB GC Method

Method file: GCBFB1(2)

METHOD FILE LIST

Method file:	GCBFB1 GCBFB2	GC Type: 5890 Column: Cap	Run type: SCAN,GC,E1 Splitless: Yes

Temperature:	Inj.P	Intfc	Source
	90.0	250.0	0.0

GC/DIP		LEVEL A	LEVEL B	POST RUN
Temp 1	30.0	100.0	0.0	0.0
Time 1	1.0	3.0	0.0	0.0
Rate	35.0	0.0	0.0	
Temp 2	100.0	0.0	0.0	
Time	15.0	0.0	0.0	

Oven equilibration Time. 0.10 min

Run time: 6.00
Scan Start time 2.50

Scan Parameters:			
	Mass Range:	34 to 260	
	Multiplier voltage:	varies	Number of A/D samples: 8
	GC Peak threshold:	20000 counts	
	Threshold:	100 counts	

Compound	R.T. (approx.)	Report Limits (ppbv)	Dynamic Range (ppbv)
Hexachlorobutadiene	21.52	2.0	4–450

TABLE 2 BFB GC Method

Method file: GCBFB1(2)

METHOD FILE LIST

Method file:	GCBFB1 GCBFB2	GC Type: 5890 Column: Cap	Run type: SCAN,GC,E1 Splitless: Yes

Temperature:	Inj.P	Intfc	Source
	90.0	250.0	0.0

GC/DIP		LEVEL A	LEVEL B	POST RUN
Temp 1	30.0	100.0	0.0	0.0
Time 1	1.0	3.0	0.0	0.0
Rate	35.0	0.0	0.0	
Temp 2	100.0	0.0	0.0	
Time	15.0	0.0	0.0	

Oven equilibration Time. 0.10 min

Run time: 6.00
Scan Start time 2.50

Scan Parameters:			
	Mass Range:	34 to 260	
	Multiplier voltage:	varies	Number of A/D samples: 8
	GC Peak threshold:	20000 counts	
	Threshold:	100 counts	

PROPRIETARY

TABLE 3 GC Analytical Method

Method file: GCNEW1(2)

METHOD FILE LIST

Method file:	GCSYS1 GCSYS2	GC Type: 5890 Column: Cap	Run type: SCAN,GC,E1 Splitless: Yes

Temperature:	Inj.P	Intfc	Source
	90.0	250.0	0.0

GC/DIP		LEVEL A	LEVEL B	POST RUN
Temp 1	-50.0	10.0	100.0	0.0
Time 1	1.5	0.0	0.0	0.0
Rate	50.0	5.5	40.0	
Temp 2	10.0	100.0	160.0	
Time	0.0	0.0	3.4	

Oven equilibration Time. 0.10 min

Run time: 24.00
Scan Start time 1.60

Scan Parameters:			
	Mass Range:	34 to 260	
	Multiplier voltage:	varies	Number of A/D samples: 8
	GC Peak threshold:	20000 counts	
	Threshold:	10 counts	

PROPRIETARY

TABLE 4 VOC Key Ions

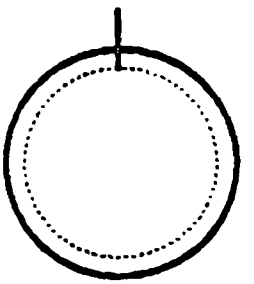
Compound	Primary	Secondary		
Bromochloromethane I.S. #1	49	130	128	
Dichlorodifluoromethane (Freon 12)	85	87,	50	
Chloromethane	50	52		
1,2-Dichloro-1,1,2,2-tetrafluoroethane (Freon 114)	85	135	87	
Vinyl Chloride	62	64		
Bromomethane	94	96,	79	
Chloroethane	64	66,	49	
Trichlorofluoromethane (11)	101	103	66	
1,1-Dichloroethene	61	96,	63,	98
Carbon Disulfide	76	78,	44	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	151	101	103	85
Acetone	43	58		
Methylene Chloride	84	49,	86	
trans-1,2-Dichloroethene	96	61,	98,	6
1,1-Dichloroethane	63	65,	83	
Vinyl Acetate	43	44,	86,	42
cis-1,2-Dichloroethene	96	61,	98,	63
2-Butanone	72	57,	43	
Chloroform	83	85,	47	
1,1,1-Trichloroethane	97	99,	61	
Carbon Tetrachloride	117	119	121	82
1,4-Difluorobenzene I.S. #2	114	63,	88	
Benzene	78	50,	52,	77
1,2-Dichloroethane	62	64,	49,	98
Trichloroethene	130	95,	132	97
1,2-Dichloropropane	63	62,	41,	39
Bromodichloromethane	83	85,	129	
cis-1,3-Dichloropropene	75	77,	39	
4-Methyl-2-pentanone	43	58,	57,	85
Toluene	91	65,	92	
Chlorobenzene-d5 I.S. #3	117	52,	54,	82
trans-1,3-Dichloropropene	75	77,	39	
1,1,2-Trichloroethane	97	83,	85,	61
Tetrachloroethene	164	129	131	166
2-Hexanone	58	43	57	
Dibromochloromethane	129	127	208	13
1,2-Dibromoethane	107	109	188	
Chlorobenzene	112	77,	114	

PROPRIETARY

TABLE 4 VOC Key Ions

Compound	Primary	Secondary		
Ethylbenzene	91	106		
1,4-and 1,3-(p,m)Xylene	91	106	105	
1,2-(ortho)Xylene	91	106	105	
Styrene	104	78	103	51
Bromoform	173	171	175	93
1,1,2,2-Tetrachloroethane	83	85,	133	131
Benzyl Chloride	91	126	63	
4-Ethyltoluene	105	120	77	
1,3,5-Trimethylbenzene	105	120	77	
1,2,4-Trimethylbenzene	105	120	77	
1,3-Dichlorobenzene	146	148	111	75
1,4-Dichlorobenzene	146	148	111	75
1,2-Dichlorobenzene	146	148	111	75
1,2,4-Trichlorobenzene	180	182	109	145
Hexachlorobutadiene	225	227	223	

FIGURE 1. Nutech 8533 Flow Diagram



GC/MS Analysis of Semi-Volatile Organics

(SW 8270)

Quanterra
Environmental Services

QUANTERRA - SANTA ANA
SOP CHANGE FORM

SOP NUMBER: SANA-MS-0002
SOP TITLE: GC/MS Analysis of Semivolatile Organics (Method 8270A)
SOP SECTION(S) AFFECTED BY CHANGE Title Page, 6.2.3, and Table C-2 Daily / Continuing Calibration, 6.2.1
REASON FOR ADDITION OR CHANGE: To make compliant with Update II
CHANGE EFFECTIVE FROM: (Date) 7-17-95
CHANGE OR ADDITION (SPECIFY SECTION; USE ADDITIONAL SHEETS IF NECESSARY) **Title Page**: Remove 8270A and Replace with 8270B **Section 6.2.3 and Table C-2**: Change from 30% D to 20% D for continuing calibrations. **Section 6.2.1**: Add Section 6.2.1.6 " The GC/MS tuning solution should contain 4,4'-DDT, pentachlorophenol, and benzidine at approximately 50 ng/mL. Degradation of DDT to DDD and DDE should not exceed 20%. Benzidine and pentachlorophenol should have normal responses with minimal peak tailing.
SUBMITTED BY/DATE: Manny Vallejo
*APPROVED BY:

Technical Review Signature	Date 7-5-95
Environmental Health and Safety Signature	Date 7-10-95
QA Signature	Date 7-5-95
Management Signature	Date 7/10/95

*Must be same signature authorities of SOP being revised.

Control Copy Number _____

SOPCHNG.DOC
4/11/95 SCH

Quanterra
Environmental Services

Controlled Copy
Copy No._____

SOP No. SANA-MS-0002
Revision No. 0
Revision Date: 3/30/95
Page: 1 of 57

OPERATION-SPECIFIC STANDARD OPERATING PROCEDURE

TITLE: GC/MS ANALYSIS OF SEMIVOLATILE ORGANICS (METHOD 8270A)

(SUPERSEDES: CS-MS-0090, LM-CRL-3002)

Prepared by: Robert Sundberg

Reviewed by: _____
Technical Specialist,

Approved by: _____
Quality Assurance Manager,

Approved by: Sylvia Ward
Environmental Health and Safety Coordinator,

Approved by: _____
Laboratory Director,

Proprietary Information Statement:

This document has been prepared by and remains the sole property of Quanterra Incorporated. It is submitted to a client or government agency solely for its use in evaluating Quanterra's qualifications in connection with the particular project, certification, or approval for which it was prepared and is to be held propriety to Quanterra.

The user agrees by its acceptance or use of this document to return it upon Quanterra's request and not to reproduce, copy, lend, or otherwise disclose or dispose of the contents, directly or indirectly, and not to use it for any purpose other than that for which it was specifically furnished. The user also agrees that where consultants or others outside of the user's organization are involved in the evaluation process, access to these documents shall not be give to those parties unless those parties also specifically agree to these conditions.

1. SUMMARY OF METHOD

1.1 Aqueous samples are extracted with dichloromethane into base/neutral and acid fractions. Sample extracts are combined for quantitative and/or qualitative GC/MS analysis using an internal standard method.

1.2 Solid samples are extracted with an appropriate solvent and the extract is analyzed by GC/MS for quantitative and/or qualitative identification using the same internal standard method.

2. SCOPE AND APPLICATION

2.1 Note: This procedure may be used in conjunction with any project specific requirements, as requested by the end user. When such requirements are defined in writing, e.g. in a QAPjP, their application shall take precedence.

2.2 Analytes: Quantitative analysis is performed for the compounds listed in Appendix A. Qualitative analysis by mass spectral identification can be performed on other extractable, chromatographable compounds.

2.3 Reporting Limits: See Appendix A.

2.4 Applicable matrices: Water, soil, solids, sludge, and waste.

2.5 Dynamic range: Analytes can typically be quantitated between 5ug/mL and 160 ug/mL. Samples which exceed this concentration range for any analyte in Appendix A, Table 1 should be diluted to be within the dynamic range of the method. Sample extracts should also be diluted when any other semivolatile component of the sample exceeds this range. Reporting limits will be adjusted to reflect the dilution performed.

2.6 Analysis time: Approximate analytical time is 45 minutes per GC/MS run. The time required for data reduction will be dependent upon the complexity of the sample.

2.7 Comments

2.7.1 All deviations made from this SOP MUST be approved by the supervisor /manager and QA director.

2.7.2 All reusable glassware should be solvent rinsed prior to use.

2.7.3 Care should be taken not to introduce contamination into the samples. Particular attention should be paid to selecting a protective glove that does not contribute contamination during sample preparation.

2.7.4 pH adjustments required for the preparation of aqueous samples are critical. Analyte recoveries can be adversely affected if the pH of the sample is not sufficiently basic or acidic.

3. SAFETY ISSUES

3.1 Safe Work Practices

All laboratory personnel must have a working knowledge of the pertinent safe work practices and procedures outlined in the Quanterra Health and Safety Manual. Employees must receive Hazard Communication and Chemical Hygiene training prior to working with chemicals used in this SOP.

3.2 Personal Protective Equipment

Lab coats and gloves are required whenever samples and or reagents are being handled. Employees should familiarize themselves with the glove compatibility chart for proper choice of gloves. Other specialized safety equipment may be required depending on procedure, reagents used and known hazards of samples.

3.3 Chemical Exposure Potential

The toxicity/carcinogenicity or other inherent hazards of each chemical used in this procedure may not be precisely defined. Therefore, each chemical compound should be treated as a potential health hazard. Exposure to these chemicals should be reduced to the lowest possible level by engineering controls and Personal Protective Equipment. A Material Safety Data Sheet (MSDS) is available for each laboratory standard and reagent chemical. Employees must review all MSDS's for all chemicals listed in the procedure prior to initial use.

3.4 Hazardous Waste

Laboratory personnel assigned to perform hazardous waste disposalprocedures must have a working knowledge of the established proceduresand practices outlined in the Quanterra Health and Safety Manual. Theseemployees must have training on the hazardous waste disposal practicesinitially upon assignment of these tasks, followed by an annualrefresher training.

4. SAMPLE COLLECTION, PRESERVATION, CONTAINERS, AND HOLDING TIMES

4.1 Grab samples must be collected in glass containers. Conventionalsampling practices should be followed, except that the bottle must not be pre-rinsed with sample before collection. Automatic sampling equipment must be as free as possible of Tygon tubing and other potential sources of contamination. Solid samples should be collected in wide mouth glass jars.

4.2 All samples must be iced or refrigerated at 4 + 2°C from the time of collection until extraction.

4.3 All aqueous samples must be extracted within 7 days of collection and completely analyzed within 40 days of extraction. Soil/waste samples must be extracted within 14 days of collection and completely analyzed within 40 days of extraction.

5. APPARATUS

5.1 Capillary column: Use one of the following or an approved substitute:

J&W 30 m DB-5, 0.25 mm id, 0.25 um film thickness
Restek Rtx-5, 0.25 mm id, o.25 um film thickness

5.2 Syringes: 10 uL, 25 uL, 50 uL, 100 uL, 500 uL, and 1 mL, as appropriate for making injections, adding internal standard, and preparing sample dilutions.

5.3 Gas Chromatograph/Mass Spectrometer

5.3.1 Gas chromatograph: An analytical system that includes a temperature-programmable gas chromatograph suitable for splitless injection including all required accessories such as syringes, columns, and gases.

5.3.2 Mass spectrometer: Capable of scanning from 35 to 500 amu every 1 sec or less, using 70 volts (nominal) electron energy in the electron impact ionization mode.

5.3.3 GC/MS interface: An interface that allows direct coupling of the capillary column and adequate analyte response.

5.3.4 Data system: A computer system is interfaced to the mass spectrometer which allows the continuous acquisition and storage on machine-readable media of all mass spectra obtained throughout the analytical run. The software is capable of producing extracted ion profiles and integrating these abundances. The EPA/NIH Mass Spectral Library is available on the system.

6. PROCEDURE

6.1 Instrument Set-Up for the GC/MS

6.1.1 Chromatographic Conditions

6.1.1.1 Temperature Program:

Initial Temperature:	45°C
Initial hold time:	2 min
Temperature ramp:	8°C/min

Final temperature:	295°C
*Final hold time:	15 min
Oven equilib. time:	0.2 min
Splitless valve time:	0.8 minutes

*The final hold time should be adjusted according to the retention time of the final compound in the standard.

6.1.1.2 These parameters are verified and/or changed using the DATAC procedure for the Hewlett Packard 5970 instrument.

6.1.2 Mass spectrometer parameters:

o Mass range:	35-450 amu
o Scanning rate:	1 s/scan
o Number of A/D samples:	2
o Zone temperatures:	
Injection port:	295°C
Transfer line:	295°C
Ion Source temperature:	200°C

6.1.3 Acquisition Parameters:

o Scan start time:	1-4 min
o *Run time:	48-50 min
o Threshold:	10-50
o GC peak threshold:	20000 counts

*Run time could be shorter as long as the last compound has eluted two minutes before the run ends.

6.2 Instrument calibration

6.2.1 DFTPP

6.2.1.1 Each GC/MS MUST be hardware tuned to meet the EPA ion abundance criteria for DFTPP. The instrument tune MUST be verified at the start of every 12 hours of operation. Ion abundance criteria are listed in Appendix C, Table C-1.

6.2.1.2 Inject 50 ng of DFTPP under the following chromatographic conditions:

Initial temperature:	150°C
Initial hold:	1 min
Rate:	30°C/min
Final temperature:	295°C

6.2.1.3 Evaluate the spectrum of DFTPP. Ion abundance criteria given in Appendix C, Table C-1 must be met. Averaging scans across the peak and reasonable background subtraction is acceptable. Manipulations which will distort the spectrum, such as excessive background subtraction, are not acceptable. Daily evaluation of DFTPP criteria is performed by a Hewlett Packard software routine called "TUNBNA". This program finds the scan or scans under the peak that best fits the criteria outlined in Appendix C, Table C-1.

6.2.1.4 If the ion abundance criteria are not met, retune the instrument and reinject DFTPP.

6.2.1.5 If the ion abundance criteria are met, generate a hardcopy of the spectrum, mass abundance table, and ion abundance summary.

6.2.2 Initial calibration. An initial calibration must be performed before analysis of sample extracts can begin. This consists of a five point calibration curve for all of the analytes of interest. Standard solutions are prepared at concentrations of 20, 50, 80, 120, and 160 ug/mL. All standards and their dilutions must be made under the fume hood.

Six compounds are chosen as internal standards. The characteristic ions of those internal standards are used for quantitation (see Appendix E). Each analyte will be assigned a corresponding internal standard and its primary ion will be used to calculate response factor RF:

$$RF = (Ax\ Cis)/(Ais\ Cx)$$

Where:
- Ax = area of the characteristic ion for the compound being measured.
- Ais = area of the characteristic ion for the specific internal standard.
- Cx = concentration of the compound being measured.
- Cis = concentration of the specific internal std.

Certain compounds have been selected to monitor instrument performance. These compounds are identified as System Performance Check Compounds (SPCC) and Calibration Check Compounds (CCC).

The average response factor for each System Performance Check Compound (SPCC) MUST be greater than 0.05.

The percent relative standard deviation (%RSD) for each Calibration

Check Compound (CCC) MUST be less than 30%. The %RSD for all compounds should also be reviewed. Any values greater than 50% should be evaluated before analyses are continued.

If samples are NOT being analyzed for these specific compounds, the criteria for these compounds need not be met. The fact that these compounds are not in the analyte set should be documented.

See Appendix C, Table C-2 for a summary of CCC and SPCC criteria.

6.2.2.1 The five standard solutions are: 20, 50, 80, 120, and 160 ug/mL.

6.2.2.2 The analyst should complete the data reduction of the 50 ug/mL standard while the next standard is running.

6.2.2.3 The SPCC limits MUST be verified. If a SPCC RF is < 0.05 corrective action will be taken. Corrective action may include replacement of injection port liner, breaking off the column, or replacing the column. Document corrective action taken or decision to proceed. This documentation will be kept with the output for the initial calibration. If necessary, reinject the 50 ug/mL standard.

6.2.2.4 The concentration of surrogate compounds is 50 ug/mL. The concentration of internal standard compounds is 40 ug/mL.

6.2.2.5 Review the quantitation list to ensure that the internal standards are correctly identified and that the analytes are properly quantitated. ALWAYS check the following compounds for proper integration:

Benzyl Alcohol
Benzoic Acid
4-Nitrophenol
4-Nitroaniline
Benzo(b &/or k)fluoranthene
Indeno(1,2,3-cd)pyrene
Dibenzo(a,h)anthracene
Benzo(g,h,i)perylene

These compounds do not chromatograph well, particularly as the column deteriorates.

6.2.2.6 Check for the correct peak assignment for the pairs of structural isomers which are in the standard.

Identification is based on elution order, as they appear in the library. These pairs are:

2,4,6-/2,4,5-Trichlorophenol
Anthracene/Phenanthrene
Chrysene/Benzo(a)anthracene
Fluorathene/Pyrene

6.2.2.7 Each of the other standards analyzed should be evaluated in the same manner as the 50 ug/mL standard, with particular attention focused on the "troublesome" compounds with the following exceptions:

a.) 20 ug/mL standard: five compounds may not appear in this standard due to low response. They are benzoic acid, 2,4-nitrophenol, 4-nitrophenol, 4,6-dinitro-2-methylphenol, and pentachlorophenol.

b.) 160 ug/mL standard: Certain compounds (especially naphthalene and other polynuclear aromatic compounds) may saturate. When this occurs, the point for the saturated compound will be deleted resulting in a 4-point calibration for that particular compound.

Verify that the CCC and SPCC criteria have been met. Review average response factors of all the other analytes. Investigate the individual components for an average response factor that is greater than 50%

6.2.2.8 If corrections are necessary, make adjustment and verify the standard again. If compounds are still outside acceptable limits, consult a supervisor.

All SPCC and CCC criteria must be met. If these criteria are not met and the decision is made to continue analysis, the rationale must be documented by the individual making that decision. This documentation must be kept on file with the initial calibration record.

6.2.3 Continuing calibration. The 50 ug/mL standard is used as the continuing calibration standard. It MUST be analyzed for each 12 hour period immediately following a successful DFTPP analysis.

The response factor of each CCC compound should be compared to the initial calibration. The percent difference for each CCC compound should be less than 30%. Response factors for all analytes should be reviewed. Any significant deviations from the initial calibration should be evaluated before analyses are continued (e.g. deviations of greater than 50%). Exceptions may be made in special cases where data quality objectives allow for deviation and are approved by the

end data user. Results can be released as preliminary and re-analyzed later.

All SPCC criteria MUST meet RF > 0.05 criteria.

6.2.3.1 Inject 1 uL of the 50 ug/mL standard.The concentration of surrogate compounds is 50 ug/mL. The concentration of internal standard compounds is 40 ug/mL.

Process the data file using the QT program.

6.2.3.2 Review the quantitation list to ensure that the internal standards are correctly identified and that the analytes are properly quantitated. ALWAYS check the following compounds for proper integration:

Benzyl Alcohol
Benzoic Acid
4-Nitrophenol
4-Nitroaniline
Benzo(b &/or k)fluoranthene
Indeno(1,2,3-cd)pyrene
Dibenzo(a,h)anthracene
Benzo(g,h,i)perylene

These compounds do not chromatograph well, particularly as the column deteriorates.

6.2.3.3 Check for the correct peak assignment for the pairs of structural isomers which are in the standard. Identification is based on elution order, as they appear in the library. These pairs are:

2,4,6-/2,4,5-Trichlorophenol
Anthracene/Phenanthrene
Chrysene/Benzo(a)anthracene
Fluorathene/Pyrene

6.2.3.4 Compare the continuing calibration standard to the initial calibration. Evaluate the CCC and SPCC compounds as outlined in Appendix C, Table C-2 Review the RF and percent deviations from the initial calibration of all the other compounds. If any large deviations occur (e.g. deviations > 50%), recheck peak assignment and integration.

6.2.3.5 If the standard evaluation criteria are NOT met, corrective action must be taken. Corrective action may include replacement of injection port liner, breaking off the column, or replacing the column. Reinject the continuing calibration standard and/or perform a new initial

calibration.

If these criteria are not met and the decision is made to continue analysis, the rationale must be documented by the individual making that decision. This documentation must be kept on file with the continuing calibration record.

If the standard evaluation criteria have been met or the decision has been made to continue, run program QCAL. QCAL,FILENAME,,C updates the response factors and retention times of the continuing calibration standard just analyzed.

6.3 Sample Analysis

6.3.1 Scheduling

6.3.1.1 Analyses are scheduled by the supervisor or a senior operator.

6.3.1.2 The analyst will determine the type of analysis requested. Access the appropriate lab workcard. CAREFULLY read the workcard to determine the type of analysis required. Modifications to the normal analytical protocol such as low detection limits, special compounds or special criteria will be indicated on the workcard. The sheet from the extractions group will have the bench records associated with the sample preparation.

6.3.1.3 Client sample ID's will be listed along with Quanterra LIMS ID's on the lab workcard attached to the subsheet. The ID's should be used when entering the "Sample ID" accounting parameter in batch acquisition program.

6.3.2 Extract Preparation

6.3.2.1 Place extract box in the hood. Locate appropriate sample vials. Water samples will have separate vials for acid, base/neutral and combined fractions. Unless otherwise instructed, the analyst will only need the combined fractions. Soil samples will have only one vial.

6.3.2.2 Add 10 uL of the 800 ppm internal standard solution to the pre-prepped vials containing 190 uL of sample aliquotted by the extraction group. Transfer the prepared extract containing the internal standard to a 200 uL insert and slip back inside vial. Screw on the septum cap. The vial is now ready to be loaded on the autosampler.

6.3.2.3 Carefully rinse the syringe.

6.3.3 Data Acquisition

6.3.3.1 Samples are analyzed using the same instrument parameters as the calibration standards. Verify that the conditions specified in the "Chromatographic Conditions" section are set.

6.3.3.2 Record sample number and dilutions in the instrument logbook.

6.3.4 Data acquisition and processing using autosamplers.

6.3.4.1 When an autosampler is used to acquire sample data, prepare extracts for analysis as in the Extract Preparation section.

6.3.4.2 Record sample numbers and dilutions on the injection bench sheet.

6.3.4.3 Samples are placed in the autosampler rack and their order is compared with sample numbers on the benchsheet. Single control samples (method blanks) and duplicate control samples will be analyzed first. SCS and LCS sample results must be verified before samples can be analyzed.

If the QC criteria are met, the samples will be analyzed according to the scheduling sheet. Matrix spike and matrix spike duplicates when available are analyzed in conjunction with the associated sample.

NOTE: QC DATA MUST BE VERIFIED BEFORE SAMPLES ARE ANALYZED.

6.4 Data Processing for manual injections

6.4.1 Review the internal standard retention times: No internal standard retention time should vary by more than 30 seconds from the daily standard. If this condition occurs, the chromatographic system should be checked and corrections made as necessary. Affected samples will be reanalyzed.

6.4.2 Review the internal standard areas: Internal standard with the daily standard should not vary by more than a factor of two (-50% to +100%) If the areas do vary by more than a factor of two, the analyst should first check to see if the peak has been correctly integrated. If the area is still outside the limits, the system should be checked and corrected if necessary. If, upon verification that the instrument is operating properly and the areas are still outside of the limits, the standard must be rerun.

6.4.3 Verifying Dilution: Verify that the sample was analyzed at the proper dilution. If any sample contains target compounds that are

outside the range of the calibration curve (over 160 on the QUANT report), the sample should be diluted by the appropriate factor and reanalyzed. The dilution should be performed from the remaining sample aliquot that does not contain internal standard if this is available. Any sample that has been diluted should contain levels of compounds (either target or non-target compounds) that are high enough to justify the dilution. Target compounds should be at least 50 on the quan sheet. In the absence of target compounds, the peak height of non-target compounds should be approximately greater than or equal to the peak height of the internal standard related to the time region. If not, the diluted extract should be returned to the extractions group to be concentrated for reanalysis.

6.4.4 Verifying Integration: Check the quant report to verify that all target compounds identified have been properly integrated interactively on the screen by looking at the mass chromatogram for that compound. Peak areas can be estimated from the mass chromatograms using the peak height printed at the right of the ion profile.

6.4.5 Check to see if any target compounds were missed: Use the total ion chromatogram and the mass chromatograms.

6.4.6 Verify spectra

6.4.6.1 Check the quant report to verify the spectra needed to be searched in the Database.

6.4.6.2 Obtain copies of the corresponding standard spectra for each of the compounds. Each spectrum should be compared to the standard spectrum. The EPA criteria for comparing spectra are:

a.) All ions present in the standard spectrum at a relative intensity greater than 10% of the base peak MUST be present in the sample spectrum.

b.) The relative intensities of the ions specified in (a) must agree within plus or minus 20% between the standard and sample spectra. (Example: For an ion with an abundance of 50% in the standard spectrum, the corresponding sample ion abundance must be between 30% and 70%.)

c.) Ions greater than 10% in the sample spectrum, but not present in the standard spectrum must be considered and accounted for by the analyst making the comparison. If the analyst can easily identify a coeluting compound (e.g. an alkane or a surrogate spike compound)

then the sample spectrum should be labelled with the contaminant.

6.4.6.4 Any spectra that meet these criteria should be marked by the analyst. Any spectra that do not meet these criteria should be noted as a bad spectrum and properly marked by the analyst. The corresponding entry on the quan list should be lined out with a "NO" notation written next to it. If a compound cannot be verified by all of the criteria listed above, but in the technical judgment of the analyst the identification is correct, the compound will be reported. If the analyst is uncertain of an identification, a senior operator or a supervisor should be consulted

6.5 Library Searches (optional): Some clients will include the request for mass spectral library searches for non-target compounds (excluding surrogates and internal standards.) The 20 largest unidentified peaks that are greater than 10% of the peak height of the nearest internal standard will be searched against the NBS library. The library search program will calculate the estimated concentrations of the tentatively identified compounds using response factor of 1.

NOTE: DO NOT PERFORM LIBRARY SEARCHES ON MATRIX SPIKE SAMPLES.

6.5.2 When all of the library comparisons have been printed out, a summary sheet listing each peak with the best library fit will print out. The operator should go through each comparison, determine the probability that the match is correct, and assign it into a certain category, such as aromatics, halogenated hydrocarbons, polynuclear aromatics, etc.

6.5.3 The EPA criteria to be used for making these decisions for tentative identifications are as follows:

a.) Relative intensities of major ions present in the library spectrum at a relative intensity greater than 10% of the base peak should be present in the sample spectrum.

b.) The relative intensities of the ions specified in (a) must agree within plus or minus 20% between the library and sample spectra. (Example: For an ion with an abundance of 50% in the standard spectrum, the corresponding sample ion abundance must be between 30% and 70%.)

c.) Molecular ions present in the library spectrum should be present in the sample spectrum

d.) Ions present in the sample spectrum, but not present in the standard spectrum must be considered and accounted for by the analyst making the comparison. If the analyst can easily identify a coeluting compound (e.g. an alkane or a surrogate spike compound) then the sample spectrum should be labelled with the contaminant.

e.) Ions present in the library spectrum but not in the sample spectrum should be reviewed for possible subtraction from the sample spectrum because of background contamination or coeluting compounds.

6.5.4 If in the technical judgment of the analyst, no valid tentative identification can be made, the compound should be reported as unknown. If possible, assign additional compound class information (e.g. unknown hydrocarbon). The analyst should consult with a more experienced analyst or a supervisor if there are questions concerning compound identification.

6.6 Label the RIC: Label the RIC to identify the internal standards, surrogate compounds, and DFTPP. If the sample is particularly dirty and the peaks are buried in other peaks, they need not be labelled. If surrogate compounds are not detected due to sample dilution, label only the internal standards and DFTPP.

6.7 Blank correction: All sample data must be reported with blank contamination, but no blank correction should be performed.

6.7.1 If the blank value lies above the reporting limit, the supervisor is consulted to schedule the blank and all samples associated with the blank for repreparation and/or reanalysis. With the exception of phthalates which are limited to five times the reporting limit.

If the decision is made to continue with the analysis, this must be documented, signed by the person making the decision and the record kept with the method blank data.

7. QA/QC Requirements

7.1 Analytical Batch - The basic unit for quality control is the analytical batch. The analytical batch is a set of samples which have the same set of quality control samples associated with it.

7.2 Lab Control Spike (LCS) - One LCS must be processed with each preparation batch per matrix or every 20 samples whichever is more frequent. The LCS must be carried through the entire analytical procedure. The LCS is used to monitor the accuracy of the analytical process. On-going monitoring of the LCS results provides evidence that the laboratory is performing the method within acceptable accuracy and precision guidelines. If any analyte is outside established control limits the system is out of control and corrective action must occur. Control limits are established using historical laboratory data and are updated on a regular basis. Corrective action will be repreparation and reanalysis of the batch unless the client agrees that other corrective action is acceptable.

7.3 Matrix Spike/Matrix Spike Duplicate (MS/MSD) - One MS/MSD pair must be processed for each QC batch per matrix or every 20 samples whichever is more frequent. A matrix spike (MS) is a field sample to which known concentrations of target analytes have been added. A matrix spike duplicate (MSD) is a second aliquot of the sample sample (spiked identically as the MS) prepared and analyzed along with the sample and matrix spike. The MS/MSD results are used to determine the effect of a matrix on the precision and accuracy of the analytical process. Due to the potential variability of the matrix of each sample, these results may have immediate bearing only on the specific sample spiked.

- If the analyte recovery or RPD falls outside the acceptance range, the recovery of that analyte must be in control for the LCS. Control limits are established using historical laboratory data and are updated on a regular basis. If the LCS recovery is within limits, then the laboratory operation is in control and the results may be accepted. If the recovery of the LCS is outside limits corrective action must be taken. Corrective action will include repreparation and reanalysis of the batch.

- If a MS/MSD is not possible due to limited sample volume than a LCS duplicate must be analyzed. The RPD of the LCS and LCSD must be compared to the matrix spike limits.

7.4 SCS: Single control samples are analyzed with every analytical lot. This sample serves as the method blank. An analytical lot for extractable organics is defined as samples extracted or prepared at the same time.

7.5 Surrogates Spiked into Samples: Surrogate compounds are required to be spiked into all samples and QC samples for this method. Organic compounds added to every blank, samples, matrix spike duplicate, and standard prior to extraction; used to evaluate analytical efficiency by measuring recovery. Surrogates are compounds that are similar to

analytes of interest in chemical composition, extraction, and chromatographic properties, but which are not expected to be detected in environmental media.

Surrogates and spike concentrations are given in Appendix D.

7.6 Data acceptability: Data acceptability is based upon the results of the Laboratory Control Samples unless otherwise negotiated with the client. QC data must fall within established control limits in order for the laboratory to be considered "in control" when samples from that QC lot were analyzed.

7.6.1 When an out of control event has been noted, corrective action is required. Corrective actions may include, but are not limited to, validation of analytical standards, inspection of instrument operational settings affecting linearity and sensitivity, repreparation and reanalysis of samples, and inspection of sample data for matrix effects.

7.7 Control Limits: Control limits are based on historical laboratory data. They are updated periodically.

8. Calculations

8.1 Calculations required to run data processing programs

8.1.1 ACID and B/N CONCENTRATION FACTORS (CF):

$$CF = (FV/IV) \times 1000$$

Where: FV = final volume (mL)
IV = initial volume (g or mL)

8.1.2 ACID and B/N SURROGATE CONCENTRATION FACTORS (SCF):

SCF = (FINAL VOLUME X 100)/AMOUNT SPIKED

Percent recovery = value in quant report/SCF

8.2 Calculations required to verify automated data reduction

8.2.1 Response factors

$$RF = \frac{Ax}{Ais} \times \frac{Cis}{Cx}$$

Where: Ax = area of the characteristic ion for the compound to be measured.
Ais = area of the characteristic ion for the specific internal standard.
Cis = concentration of the internal standard (ng/uL).
Cx = concentration of the compound to be measured (ng/uL).

8.2.2 Average response factor

$$RFave = (RF20 + RF50 + RF80 + RF120 + RF160)/5$$

Where: RFx = response factor of a compound in each of the calibration solutions.

8.2.3 Percent Relative Standard Deviation

$$\%RSD = \frac{SD}{RFave} \times 100$$

Where: RSD = relative standard deviation
RFave= mean of intial response factors (per compound)
SD = standard deviation of initial response factors (per compound)

Where:

$$SD = \sum_{i=1}^{N} \frac{(xi - x)2}{N-1}$$

8.2.4 Percent Deviation from average response factor:

$$\% \text{ Difference} = \frac{RFI - RFC}{RFI} \times 100$$

Where: RFI = average response factor from initial calibration.
RFC = response factor from current calibration check standard.

8.2.5 Percent Recovery

$$\text{Matrix Spike Percent Recovery} = \frac{SSR - SR}{SA} \times 100$$

Where: SSR = spike sample results
SR = sample result
SA = spike added from spiking mix

8.2.6 Relative percent difference

$$RPD = \frac{D1 - D2}{(D1 + D2)/2} \times 100$$

Where: RPD = relative percent difference
D1 = first sample value
D2 = second sample value (duplicate)

8.2.7 Analyte concentration in a water sample

$$\text{Concentration ug/L} = \frac{(Ax)(Is)(Vt)}{(Ais)(RF)(Vo)(Vi)}$$

Where: Ax = area of the characteristic ion for the compound to be measured.
Ais = area of the characteristic ion for the internal standard
Is = amount of internal standard injected in nanograms (ng)
RF = response factor for the compound being measured, determined from the 50 ug/mL calibration solution.
Vo = volume of water extracted in milliliters (mL)
Vt = volume of total extract in microliters, taking into account dilutions (i.e. a 1-to-10 dilution of a 1-mL extract will mean Vt = 10,000 uL. If half the base/neutral extract and half the acid extract are combined, Vt = 2000)

8.2.8 Analyte concentration in a soil sample (dry weight):

$$\text{Concentration ug/Kg} = \frac{(Ax)(Is)(Vt)}{(Ais)(RF)(Vi)(Ws)(D)}$$

Where: Ax,Is,Ais,RF,Vt = same as given for water, above
Vi = volume of extract injected (uL) if differs from the volume used in standard
D = (100 - % moisture)/100
Ws = weight of sample extracted (grams)

8.2.9 Analyte concentration in a soil sample (wet weight):

$$\text{Concentration ug/Kg} = \frac{(Ax)(Is)(Vt)}{(Ais)(RF)(Vi)(Ws)}$$

Where: Ax,Is,Ais,RF,Vt = same as given for water, above
Vi = volume of extract injected (uL)
Ws = weight of sample extracted (grams)

9. Reporting requirements

9.1 Units: Aqueous samples will be reported in ug/L. Solid and sludge samples will be reported in mg/kg on a wet weight basis, unless requested otherwise by the client.

9.2 Reporting limits: See Appendix A.

11. References

11.1 Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 3rd Edition, Final Update I, July 1992. Method 8270A.

11.2 Deviations from Source Methods

11.2.1 Column performance is monitored through the response factors of the system performance check compounds.

11.2.2 An internal QA/QC program has been adopted by Quanterra, Inc. This is described in Quanterra's Quality Assurance Program Plan for Environmental Chemical Monitoring. Internal QC Checks--Laboratory Performance QC. The laboratory control samples generated in this program are used to monitor method performance. Matrix spikes are performed at the request of the client.

analyte
cure
in
an sample

APPENDIX A

TARGET ANALYTE LISTS WITH REPORTING LIMITS

TABLE A-1 a) EPA 8270 list
b) EPA 8270-L list

TABLE A-2 a) EPA 8270 priority pollutant list
b) EPA 8270-L priority pollutant list

TABLE A-3 a) EPA 8270 appendix IX list
b) EPA 8270-L appendix IX list

Table A-1a

EPA 8270 Target Analyte List
and Reporting Limits

Compound	Reporting Limit (mg/kg)
Phenol	.33
bis-(2-Chloroethyl)Ether	.33
2-Chlorophenol	.33
1,3-Dichlorobenzene	.33
1,4-Dichlorobenzene	.33
Benzyl Alcohol	.33
1,2-Dichlorobenzene	.33
2-Methylphenol	.33
bis(2-Chloroisopropyl)Ether	.33
3/4-Methylphenol	.33
N-Nitroso-Di-n-Propylamine	.33
Hexachloroethane	.33
Nitrobenzene	.33
Isophorone	.33
2-Nitrophenol	.33
2,4-Dimethylphenol	.33
Benzoic Acid	1.7
bis(2-Chloroethoxy)Methane	.33
2,4-Dichlorophenol	.33
1,2,4-Trichlorobenzene	.33
Naphthalene	.33
4-Chloroaniline	.33
Hexachlorobutadiene	.33
4-Chloro-3-methylphenol	.33
2-Methylnaphthalene	.33
Hexachlorocyclopentadiene	.33
2,4,6-Trichlorophenol	.33
2,4,5-Trichlorophenol	1.7
2-Chloronaphthalene	.33
2-Nitroaniline	1.7

Compound	Reporting Limit (mg/kg)
Dimethylphthalate	.33
Acenaphthylene	.33
3-Nitroaniline	1.7
Acenaphthene	.33
2,4,-Dinitrophenol	1.7
4-Nitrophenol	1.7
Dibenzofuran	.33
2,4-Dinitrotoluene	.33
2,6-Dinitrotoluene	.33
Diethylphthalate	.33
4-Chlorophenyl-phenylether	.33
Fluorene	.33
4-Nitroaniline	1.7
4,6-Dinitro-2-Methylphenol	1.7
N-Nitrosodiphenylamine	.33
4-Bromophenyl-phenylether	.33
Hexachlorobenzene	.33
Pentachlorophenol	1.7
Phenanthrene	.33
Anthracene	.33
Di-n-Butylphthalate	.33
Fluoranthene	.33
Pyrene	.33
Butylbenzylphthalate	.33
3,3'-Dichlorobenzidine	.66
Benzo(a)Anthracene	.33
bis(2-Ethylhexyl)Phthalate	.33
Chrysene	.33
Di-n-octylphthalate	.33
Benzo(b)Fluoranthene	.33
Benzo(k)Fluoranthene	.33
Benzo(a)Pyrene	.33
Indeno(1,2,3-cd)Pyrene	.33
Dibenz(a,h)Anthracene	.33
Benzo(g,h,i)Perylene	.33

Table A-1b

EPA 8270 Target Analyte List
and Reporting Limits

Compound	Reporting Limit (ug/L)
Phenol	10
bis-(2-Chloroethyl)Ether	10
2-Chlorophenol	10
1,3-Dichlorobenzene	10
1,4-Dichlorobenzene	10
Benzyl Alcohol	10
1,2-Dichlorobenzene	10
2-Methylphenol	10
bis(2-Chloroisopropyl)Ether	10
3/4-Methylphenol	10
N-Nitroso-Di-n-Propylamine	10
Hexachloroethane	10
Nitrobenzene	10
Isophorone	10
2-Nitrophenol	10
2,4-Dimethylphenol	10
bis(2-Chloroethoxy)Methane	10
2,4-Dichlorophenol	10
1,2,4-Trichlorobenzene	10
Naphthalene	10
4-Chloroaniline	10
Hexachlorobutadiene	10
4-Chloro-3-methylphenol	10
2-Methylnaphthalene	10
Hexachlorocyclopentadiene	10
2,4,6-Trichlorophenol	10
2,4,5-Trichlorophenol	50
2-Chloronaphthalene	10
2-Nitroaniline	50

Compound	Reporting Limits (ug/L)
Dimethylphthalate	10
Acenaphthylene	10
3-Nitroaniline	50
Acenaphthene	10
2,4,-Dinitrophenol	50
4-Nitrophenol	50
Dibenzofuran	10
2,4-Dinitrotoluene	10
2,6-Dinitrotoluene	10
Diethylphthalate	10
4-Chlorophenyl-phenylether	10
Fluorene	10
4-Nitroaniline	50
4,6-Dinitro-2-Methylphenol	50
N-Nitrosodiphenylamine	10
4-Bromophenyl-phenylether	10
Hexachlorobenzene	10
Pentachlorophenol	50
Phenanthrene	10
Anthracene	10
Di-n-Butylphthalate	10
Fluoranthene	10
Pyrene	10
Butylbenzylphthalate	10
3,3'-Dichlorobenzidine	20
Benzo(a)Anthracene	10
bis(2-Ethylhexyl)Phthalate	10
Chrysene	10
Di-n-octylphthalate	10
Benzo(b)Fluoranthene	10
Benzo(k)Fluoranthene	10
Benzo(a)Pyrene	10
Indeno(1,2,3-cd)Pyrene	10
Dibenz(a,h)Anthracene	10
Benzo(g,h,i)Perylene	10
N-Nitrosodimethylamine	10
1,2-Diphenylhydrazine	10
Benzidine	100
1,2-Diphenylhydrazine	10

Table A-2a

EPA 8270-PP Compounds List
and Reporting Limits

Compound	Reporting Limit (mg/kg)
Phenol	.33
bis-(2-Chloroethyl)Ether	.33
2-Chlorophenol	.33
1,3-Dichlorobenzene	.33
1,4-Dichlorobenzene	.33
Benzyl Alcohol	.33
1,2-Dichlorobenzene	.33
2-Methylphenol	.33
bis(2-Chloroisopropyl)Ether	.33
3/4-Methylphenol	.33
N-Nitroso-Di-n-Propylamine	.33
Hexachloroethane	.33
Nitrobenzene	.33
Isophorone	.33
2-Nitrophenol	.33
2,4-Dimethylphenol	.33
bis(2-Chloroethoxy)Methane	.33
2,4-Dichlorophenol	.33
1,2,4-Trichlorobenzene	.33
Naphthalene	.33
4-Chloroaniline	.33
Hexachlorobutadiene	.33
4-Chloro-3-methylphenol	.33
2-Methylnaphthalene	.33
Hexachlorocyclopentadiene	.33
2,4,6-Trichlorophenol	.33
2,4,5-Trichlorophenol	1.7
2-Chloronaphthalene	.33
2-Nitroaniline	1.7

Compound	Reporting Limits (mg/kg)
Dimethylphthalate	.33
Acenaphthylene	.33
3-Nitroaniline	1.7
Acenaphthene	.33
2,4,-Dinitrophenol	1.7
4-Nitrophenol	1.7
Dibenzofuran	.33
2,4-Dinitrotoluene	.33
2,6-Dinitrotoluene	.33
Diethylphthalate	.33
4-Chlorophenyl-phenylether	.33
Fluorene	.33
4-Nitroaniline	1.7
4,6-Dinitro-2-Methylphenol	1.7
N-Nitrosodiphenylamine	.33
4-Bromophenyl-phenylether	.33
Hexachlorobenzene	.33
Pentachlorophenol	1.7
Phenanthrene	.33
Anthracene	.33
Di-n-Butylphthalate	.33
Fluoranthene	.33
Pyrene	.33
Butylbenzylphthalate	.33
3,3'-Dichlorobenzidine	.66
Benzo(a)Anthracene	.33
bis(2-Ethylhexyl)Phthalate	.33
Chrysene	.33
Di-n-octylphthalate	.33
Benzo(b)Fluoranthene	.33
Benzo(k)Fluoranthene	.33
Benzo(a)Pyrene	.33
Indeno(1,2,3-cd)Pyrene	.33
Dibenz(a,h)Anthracene	.33
Benzo(g,h,i)Perylene	.33
N-Nitrosodimethylamine	.33
1,2-Diphenylhydrazine	.33
Benzidine	3.3

Table A-2b

EPA 8270-PP-L Compounds List
and Reporting Limits

Compound	Reporting Limit (ug/L)
Phenol	10
bis-(2-Chloroethyl)Ether	10
2-Chlorophenol	10
1,3-Dichlorobenzene	10
1,4-Dichlorobenzene	10
Benzyl Alcohol	10
1,2-Dichlorobenzene	10
2-Methylphenol	10
bis(2-Chloroisopropyl)Ether	10
3/4-Methylphenol	10
N-Nitroso-Di-n-Propylamine	10
Hexachloroethane	10
Nitrobenzene	10
Isophorone	10
2-Nitrophenol	10
2,4-Dimethylphenol	10
bis(2-Chloroethoxy)Methane	10
2,4-Dichlorophenol	10
1,2,4-Trichlorobenzene	10
Naphthalene	10
4-Chloroaniline	10
Hexachlorobutadiene	10
4-Chloro-3-methylphenol	10
2-Methylnaphthalene	10
Hexachlorocyclopentadiene	10
2,4,6-Trichlorophenol	10
2,4,5-Trichlorophenol	50
2-Chloronaphthalene	10
2-Nitroaniline	50

Compound	Reporting Limits (ug/L)
Dimethylphthalate	10
Acenaphthylene	10
3-Nitroaniline	50
Acenaphthene	10
2,4,-Dinitrophenol	50
4-Nitrophenol	50
Dibenzofuran	10
2,4-Dinitrotoluene	10
2,6-Dinitrotoluene	10
Diethylphthalate	10
4-Chlorophenyl-phenylether	10
Fluorene	10
4-Nitroaniline	50
4,6-Dinitro-2-Methylphenol	50
N-Nitrosodiphenylamine	10
4-Bromophenyl-phenylether	10
Hexachlorobenzene	10
Pentachlorophenol	50
Phenanthrene	10
Anthracene	10
Di-n-Butylphthalate	10
Fluoranthene	10
Pyrene	10
Butylbenzylphthalate	10
3,3'-Dichlorobenzidine	20
Benzo(a)Anthracene	10
bis(2-Ethylhexyl)Phthalate	10
Chrysene	10
Di-n-octylphthalate	10
Benzo(b)Fluoranthene	10
Benzo(k)Fluoranthene	10
Benzo(a)Pyrene	10
Indeno(1,2,3-cd)Pyrene	10
Dibenz(a,h)Anthracene	10
Benzo(g,h,i)Perylene	10
N-Nitrosodimethylamine	10
1,2-Diphenylhydrazine	10
Benzidine	100
1,2-Diphenylhydrazine	10

Table A-3a

EPA 8270-APP IX Compounds List
and Reporting Limits

Compound	Reporting Limit (mg/kg)
Phenol	.33
bis-(2-Chloroethyl)Ether	.33
2-Chlorophenol	.33
1,3-Dichlorobenzene	.33
1,4-Dichlorobenzene	.33
Benzyl Alcohol	.33
1,2-Dichlorobenzene	.33
2-Methylphenol	.33
bis(2-Chloroisopropyl)Ether	.33
3/4-Methylphenol	.33
N-Nitroso-Di-n-Propylamine	.33
Hexachloroethane	.33
Nitrobenzene	.33
Isophorone	.33
2-Nitrophenol	.33
2,4-Dimethylphenol	.33
bis(2-Chloroethoxy)Methane	.33
2,4-Dichlorophenol	.33
1,2,4-Trichlorobenzene	.33
Naphthalene	.33
4-Chloroaniline	.33
Hexachlorobutadiene	.33
4-Chloro-3-methylphenol	.33
2-Methylnaphthalene	.33
Hexachlorocyclopentadiene	.33
2,4,6-Trichlorophenol	.33
2,4,5-Trichlorophenol	1.7
2-Chloronaphthalene	.33
2-Nitroaniline	1.7
Dimethylphthalate	.33
Acenaphthylene	.33
3-Nitroaniline	1.7
Acenaphthene	.33
2,4,-Dinitrophenol	1.7
4-Nitrophenol	1.7

Compound	Reporting Limit (mg/kg)
Dibenzofuran	.33
2,4-Dinitrotoluene	.33
2,6-Dinitrotoluene	.33
Diethylphthalate	.33
4-Chlorophenyl-phenylether	.33
Fluorene	.33
4-Nitroaniline	1.7
4,6-Dinitro-2-Methylphenol	1.7
N-Nitrosodiphenylamine	.33
4-Bromophenyl-phenylether	.33
Hexachlorobenzene	.33
Pentachlorophenol	1.7
Phenanthrene	.33
Anthracene	.33
Di-n-Butylphthalate	.33
Fluoranthene	.33
Pyrene	.33
Butylbenzylphthalate	.33
3,3'-Dichlorobenzidine	.66
Benzo(a)Anthracene	.33
bis(2-Ethylhexyl)Phthalate	.33
Chrysene	.33
Di-n-octylphthalate	.33
Benzo(b)Fluoranthene	.33
Benzo(k)Fluoranthene	.33
Benzo(a)Pyrene	.33
Indeno(1,2,3-cd)Pyrene	.33
Dibenz(a,h)Anthracene	.33
Benzo(g,h,i)Perylene	.33
N-Nitrosodimethylamine	.33
Aniline	.33
Pyridine	1.7
2-Picoline	.33
n-Nitrosomethylethylamine	.33
Methyl Methanesulfonate	.33
N-Nitrosodiethylamine	.33
Ethylmethansulfonate	.33
Pentachloroethane	.33
Acetophenone	.33

Compound	Reporting Limit (mg/kg)
n-Nitrosopyrrolidine	.33
N-Nitrosomorpholine	.33
N-Nitrosopiperidine	.33
a,a-Dimethylphenethylamine	.33
2,6-Dichlorophenol	.33
Hexachloropropene	.33
p-Phenylenediamine	---
N-Nitroso-di-n-butylamine	.33
Safole	.33
Isosafole #1	.33
1,2,4,5-Tetrachlorobenzene	.33
Isosafole #2	.33
1,4-Naphthoquinone	.33
Pentachlorobenzene	.33
1-Napthylamine	.33
2-Napthylamine	.33
2,3,4,6-Tetrachlorophenol	1.7
5-Nitro-o-toluidine	.33
sym-Trinitrobenzene	.33
Phenacetin	.33
4-Aminobiphenyl	.33
Pronamide	.33
Pentachloronitrobenzene	1.7
2-sec-Butyl-4,6-dinitrophenol	.33
4-Nitroquinoline-1-oxide	---
Methapyrilene	.33
Aramite #1	.33
Aramite #2	.33
p-Dimethylaminoazobenzene	.33
3,3-Dimethylbenzidine	.66
2-Acetylaminofluorene	.33
7,12-Dimethylbenzanthracene	.33
Hexachlorophene	---
3-Methylcholanthrene	.33
o-Toluidine	.33
1,3-Dinitrobenzene	.33

Table A-3b

EPA 8270-APP IX-L Compounds List
and Reporting Limits

Compound	Reporting Limit (ug/L)
Phenol	10
bis-(2-Chloroethyl)Ether	10
2-Chlorophenol	10
1,3-Dichlorobenzene	10
1,4-Dichlorobenzene	10
Benzyl Alcohol	10
1,2-Dichlorobenzene	10
2-Methylphenol	10
bis(2-Chloroisopropyl)Ether	10
3/4-Methylphenol	10
N-Nitroso-Di-n-Propylamine	10
Hexachloroethane	10
Nitrobenzene	10
Isophorone	10
2-Nitrophenol	10
2,4-Dimethylphenol	10
bis(2-Chloroethoxy)Methane	10
2,4-Dichlorophenol	10
1,2,4-Trichlorobenzene	10
Naphthalene	10
4-Chloroaniline	10
Hexachlorobutadiene	10
4-Chloro-3-methylphenol	10
2-Methylnaphthalene	10
Hexachlorocyclopentadiene	10
2,4,6-Trichlorophenol	10
2,4,5-Trichlorophenol	50
2-Chloronaphthalene	10
2-Nitroaniline	50
Dimethylphthalate	10
Acenaphthylene	10
3-Nitroaniline	50
Acenaphthene	10
2,4,-Dinitrophenol	50
4-Nitrophenol	50

Compound	Reporting Limit (ug/L)
Dibenzofuran	10
2,4-Dinitrotoluene	10
2,6-Dinitrotoluene	10
Diethylphthalate	10
4-Chlorophenyl-phenylether	10
Fluorene	10
4-Nitroaniline	50
4,6-Dinitro-2-Methylphenol	50
N-Nitrosodiphenylamine	10
4-Bromophenyl-phenylether	10
Hexachlorobenzene	10
Pentachlorophenol	50
Phenanthrene	10
Anthracene	10
Di-n-Butylphthalate	10
Fluoranthene	10
Pyrene	10
Butylbenzylphthalate	10
3,3'-Dichlorobenzidine	20
Benzo(a)Anthracene	10
bis(2-Ethylhexyl)Phthalate	10
Chrysene	10
Di-n-octylphthalate	10
Benzo(b)Fluoranthene	10
Benzo(k)Fluoranthene	10
Benzo(a)Pyrene	10
Indeno(1,2,3-cd)Pyrene	10
Dibenz(a,h)Anthracene	10
Benzo(g,h,i)Perylene	10
N-Nitrosodimethylamine	10
Aniline	10
Pyridine	50
2-Picoline	10
n-Nitrosomethylethylamine	10
Methyl Methanesulfonate	10
N-Nitrosodiethylamine	10
Ethylmethansulfonate	10
Pentachloroethane	10
Acetophenone	10

Compound	Reporting Limit (ug/L)
n-Nitrosopyrrolidine	10
N-Nitrosomorpholine	10
N-Nitrosopiperidine	10
a,a-Dimethylphenethylamine	10
2,6-Dichlorophenol	10
Hexachloropropene	10
p-Phenylenediamine	---
N-Nitroso-di-n-butylamine	10
Safole	10
Isosafole #1	10
1,2,4,5-Tetrachlorobenzene	10
Isosafole #2	10
1,4-Naphthoquinone	10
Pentachlorobenzene	10
1-Napthylamine	10
2-Napthylamine	10
2,3,4,6-Tetrachlorophenol	50
5-Nitro-o-toluidine	10
sym-Trinitrobenzene	10
Phenacetin	10
4-Aminobiphenyl	10
Pronamide	10
Pentachloronitrobenzene	50
2-sec-Butyl-4,6-dinitrophenol	10
4-Nitroquinoline-1-oxide	---
Methapyrilene	10
Aramite #1	10
Aramite #2	10
p-Dimethylaminoazobenzene	10
3,3-Dimethylbenzidine	20
2-Acetylaminofluorene	10
7,12-Dimethylbenzanthracene	10
Hexachlorophene	---
3-Methylcholanthrene	.33
O-toluidine	.33
1,3-Dinitrobenzene	.33

APPENDIX B

TABLES OF SOLUTIONS USED IN THIS METHOD--TO INCLUDE ANALYTE LIST, CONCENTRATION OF SOLUTION, AND AMOUNT TO USE TO SPIKE SAMPLES OR INJECT

TABLE B-1 SURROGATE STANDARD SPIKING SOLUTION

TABLE B-2 LCS/MATRIX STANDARD SPIKING SOLUTION

TABLE B-3 INTERNAL STANDARD SOLUTION

TABLE B-4 CALIBRATION STANDARD SOLUTIONS

TABLE B-5 CALIBRATION STANDARDS STOCKS (FROM SULPELCO OR EQUIVALENT)

Table B-1

Surrogate Spiking Mix

Compound	Conc. (mg/l)
Phenol-d6	200
2-Fluorophenol	200
2,4,6-Tribromophenol	200
Nitrobenzene-d5	100
2-Fluorobiphenyl	100
Terphenyl-d14	100

Table B-2

LCS/MS Spiking Mix

Compound	Conc. (mg/l)
Pentachlorophenol	200
Phenol	200
2-Chlorophenol	200
4-Chloro-3-cresol	200
4-Nitrophenol	200
1,2,4-Trichlorobenzene	100
Acenaphthene	100
2,4-Dinitrotoluene	100
Pyrene	100
N-Nitroso-di-n-Propylamine	100
1,4-Dichlorobenzene	100

Table B-3

Internal Standard Mix

Compound	Conc. (mg/L)
Acenphthene-D10	800
Chrysene-D12	800
Naphthalene-D8	800
Perylene-D12	800
Phenanthrene-D10	800
1,4-Dichlorobenzene	800

Table B-4

Calibration Standard Compounds List
with Internal Standard Compounds

	Compound	Conc. (mg/l)
*	1. 1,4-Dichlorobenzene-d4	40
	2. Pyridine	50
	3. N-Nitrosodimethylamine	50
	4. Aniline	50
	5. Phenol	50
	6. bis-(2-Chloroethyl)Ether	50
	7. 2-Chlorophenol	50
	8. 1,3-Dichlorobenzene	50
	9. 1,4-Dichlorobenzene	50
	10. Benzyl Alcohol	50
	11. 1,2-Dichlorobenzene	50
	12. 2-Methylphenol	50
	13. bis(2-Chloroisopropyl)Ether	50
	14. 3/4-Methylphenol	50
	15. N-Nitroso-Di-n-Propylamine	50
	16. Hexachloroethane	50
	17. 2-Fluorophenol	50
	18. Phenol-d6	50
*	19. Naphthalene-d8	40
	20. Nitrobenzene	50
	21. Isophorone	50
	22. 2-Nitrophenol	50
	23. 2,4-Dimethylphenol	50
	24. Benzoic Acid	50
	25. bis(2-Chloroethoxy)Methane	50
	26. 2,4-Dichlorophenol	50
	27. 1,2,4-Trichlorobenzene	50
	28. Naphthalene	50
	29. 4-Chloroaniline	50
	30. Hexachlorobutadiene	50
	31. 4-Chloro-3-methylphenol	50
	32. 2-Methylnaphthalene	50
	33. Nitrobenzene-d5	50
*	34. Acenaphthene-d10	40

	Compound	Conc. (mg/l)
	35. Hexachlorocyclopentadiene	50
	36. 2,4,6-Trichlorophenol	50
	37. 2,4,5-Trichlorophenol	50
	38. 2-Chloronaphthalene	50
	39. 2-Nitroaniline	50
	40. Dimethylphthalate	50
	41. Acenaphthylene	50
	42. 3-Nitroaniline	50
	43. Acenaphthene	50
	44. 2,4,-Dinitrophenol	50
	45. 4-Nitrophenol	50
	46. Dibenzofuran	50
	47. 2,4-Dinitrotoluene	50
	48. 2,6-Dinitrotoluene	50
	49. Diethylphthalate	50
	50. 1,2-Diphenylhydrazine	50
	51. 4-Chlorophenyl-phenylether	50
	52. Fluorene	50
	53. 4-Nitroaniline	50
	54. 2,3,4,6-tetrachlorophenol	50
	55. 2-Fluorobiphenyl	50
	56. 2,4,6-Tribromophenol	50
*	57. Phenanthrene-d10	40
	58. 4,6-Dinitro-2-Methylphenol	50
	59. N-Nitrosodiphenylamine	50
	60. 4-Bromophenyl-phenylether	50
	61. Hexachlorobenzene	50
	62. Pentachlorophenol	50
	63. Phenanthrene	50
	64. Anthracene	50
	65. Di-n-Butylphthalate	50
	66. Fluoranthene	50
*	67. Chrysene-d12	40
	68. Pyrene	50
	69. Benzidine	50

Compound	Conc. (mg/l)
70. Butylbenzylphthalate	50
71. 3,3'-Dichlorobenzidine	50
72. Benzo(a)Anthracene	50
73. bis(2-Ethylhexyl)Phthalate	50
74. Chrysene	50
75. Terphenyl-d14	50
* 76. Perylene-d12	40
77. Di-n-octylphthalate	50
78. Benzo(b)Fluoranthene	50
79. Benzo(k)Fluoranthene	50
80. Benzo(a)Pyrene	50
81. Indeno(1,2,3-cd)Pyrene	50
82. Dibenz(a,h)Anthracene	50
83. Benzo(g,h,i)Perylene	50

* Internal Standard Compounds

Table B-5

Calibration Standard Stocks List
from Supelco or Equivalent

Seven (7) priority pollutant stocks (from Sulpelco or equivalent) at 2000 ug/ml each:

SV Calibration Mix #1

Component	Concentration
1. Benzyl alcohol	2001 ug/ml
2. 4-Chloroaniline	2000
3. 2-Nitroaniline	2000
4. 3-Nitroaniline	2000
5. 4-Nitroaniline	2000

SV Calibration Mix #2

Component	Concentration
1. Phenol	2001 ug/ml
2. 2-Chlorophenol	2000
3. 2-Methylphenol	2000
4. 4-Methylphenol	2000
5. 2-Nitrophenol	2000
6. 2,4-Dimethylphenol	2001
7. Benzoic Acid	2000
8. 2,4-Dichlorophenol	2000
9. 4-Chloro-3-methylphenol	2000
10. 2,4,6-Trichlorophenol	2000
11. 2,4,5-Trichlorophenol	2000
12. 2,4-Dinitrophenol	2000
13. 4-Nitrophenol	2000
14. 4,6-Dinitro-2-methylphenol	2000
15. Pentachlorophenol	2000

SV Calibration Mix #3

Component	Concentration
1. n-Nitrosodimethylamine	2000 ug/ml
2. bis(2-Chloroethyl)ether	2000
3. 2,2'-oxybis(1-Chloropropane)	2000**
4. n-Nitroso-di-n-propylamine	2000
5. bis(2-Chloroethoxy)methane	2000
6. 2-Chloronaphthalene	2001
7. Dimethyl phthalate	2000
8. 4-Chlorophenyl phenyl ether	2000
9. n-Nitrosodiphenylamine	2000
10. 4-Bromophenyl phenyl ether	2000
11. Di-n-butyl phthalate	2000
12. Butyl benzyl phthalate	2001
13. bis(2-Ethylhexyl)phthalate	2000
14. Di-n-octyl phthalate	2000

SV Calibration Mix #4

Component	Concentration
1. Hexachloroethane	2000 ug/ml
2. Nitrobenzene	2000
3. Isophorone	2000
4. 1,2,4-Trichlorobenzene	2000
5. Hexachlorobutadiene	2000
6. Hexachlorocyclopentadiene	2000
7. 2-Methylnaphthalene	2000
8. 2,6-Dinitrotoluene	2000
9. Diethyl phthalate	2000
10. Dibenzofuran	2000
11. 2,4-Dinitrotoluene	2000
12. Hexachlorobenzene	2000
13. Carbazole	2000

SV Calibration Mix #5

Component	Concentration
1. Naphthalene	2000 ug/ml
2. Acenaphthylene	2000
3. Acenaphthene	2000
4. Fluorene	2000
5. Phenanthrene	2000
6. Anthracene	2000
7. Fluoroanthene	2000
8. Pyrene	2000
9. Benzo(a)anthracene	2000
10. Chrysene	2000
11. Benzo(b)fluoranthene	2000
12. Benzo(k)fluoranthene	2000
13. Benzo(a)pyrene	2000
14. Indeno(1,2,3-c,d)pyrene	2000
15. Dibenzo(a,h)anthracene	2000
16. Benzo(g,h,i)perylene	2000

SV Calibration Mix #7

Component	Concentration
1. 1,3-Dichlorobenzene	1999 ug/ml
2. 1,4-Dichlorobenzene	2000
3. 1,2-Dichlorobenzene	2000

APPENDIX C

TABLE C-1

DFTPP KEY IONS AND ION ABUNDANCE CRITERIA

Mass	Ion Abundance Criteria
51	30.0 - 60.0 percent of mass 198
68	less than 2.0 percent of mass 69
70	less than 2.0 percent of mass 69
127	40.0 - 60.0 percent of mass 198
197	less than 1.0 percent of mass 198
198	base peak, 100 percent relative abundance
199	5.0 - 9.0 percent of mass 198
275	10.0 - 30.0 percent of mass 198
365	greater than 1.00 percent of mass 198
441	present but less than mass 443
442	greater than 40.0 percent of mass 198
443	17.0 - 23.0 percent of mass 442

TABLE C-2

CALIBRATION CHECK COMPOUNDS

Initial Calibration: The percent relative standard deviation for the each compound listed below should be <30%.

Continuing Calibration: The percent deviation from the average response factor determined in the initial calibration should be <30% for each compound listed below.

Base/Neutral Fraction	Acid Fraction
Acenaphthene	4-Chloro-3-Methylphenol
1,4-Dichlorobenzene	2,4-Dichlorophenol
Hexachlorobutadiene	2-Nitrophenol
N-Nitroso-di-n-phenylamine	Phenol
Di-n-octylphthalate	Phentachlorophenol
Fluoranthene	2,4,6-Trichlorophenol
Benzo(a)pyrene	

SYSTEM PERFORMANCE CHECK COMPOUNDS

Initial calibration: The average response factor for each compound listed below should be > 0.05.

Continuing calibration: The response factor for each compound listed below should be > 0.05.

Base/Neutral Fraction	Acid Fraction
N-Nitroso-Di-n-Propylamine	2,4-Dinitrophenol
Hexachlorocyclopentadiene	4-Nitrophenol

APPENDIX D

TABLE D-1

SPIKE LEVELS FOR LABORATORY CONTROL SAMPLES

	Spike Level	
	Aqueous	Solid*
LCS	(ug/L)	(mg/kg)
Pentachlorophenol	200	6.67
Phenol	200	6.67
2-Chlorophenol	200	6.67
4-Chloro-3-cresol	200	6.67
4-Nitrophenol	200	6.67
1,2,4-Trichlorobenzene	100	3.33
Acenaphthene	100	3.33
2,4-Dinitrotoluene	100	3.33
Pyrene	100	3.33
N-Nitroso-di-N-propylamine	100	3.33
1,4-Dichlorobenzene	100	3.33
SCS		
Phenol-d5	200	6.67
2-Fluorophenol	200	6.67
2,4,6-Tribromophenol	200	6.67
Nitrobenzene-d5	100	3.33
2-fluorobiphenyl	100	3.33
Terphenyl-d14	100	3.33

Surrogates added to samples Same as SCS

* Assumes 30g sample (wet weight).

TABLE D-2

Historical Control Limits

	Minimum Control Limit WATER		Minimum Control Limit SOIL	
LCS:	%R	RPD	%R	RPD
Pentachlorophenol	9-103	50	17-109	47
Phenol	12-89	42	26-90	35
2-Chlorophenol	27-123	40	25-102	50
4-Chloro-3-cresol	23-97	42	26-103	33
4-Nitrophenol	10-80	50	11-114	50
1,2,4-Trichlorobenzene	39-98	28	38-107	23
Acenaphthene	46-118	31	31-137	19
2,4-Dinitrotoluene	24-96	38	28-89	47
Pyrene	26-127	31	35-142	36
N-Nitroso-di-N-propylamine	41-116	38	41-126	38
1,4-Dichlorobenzene	36-97	28	28-104	27
SCS:				
Phenol-d5	10-94		24-113	
2-Fluorophenol	21-100		25-121	
2,4,6-Tribromophenol	10-123		19-122	
Nitrobenzene-d5	35-114		23-120	
2-Fluorobiphenyl	43-116		30-115	
Terphenyl-d14	33-141		18-137	

APPENDIX E

Table E-1

Characteristic Ions For
Internal Standards For Semivolatile Compounds

Internal Standards	Primary Ion	Secondary Ions
1,4-Dichlorobenzene-d4	152	115
Naphthalene-d8	136	68
Acenaphthene-d10	164	162,160
phenanthrene-d10	188	94,80
Chrysene-d12	240	120,236
Perylene-d12	264	260,265

Table E-2

Characteristic Ions For Semivolatile

Target Compounds

Compound	Primary Ion	Secondary Ion
Pyridine	79	78
N-Nitrosodimethylamine	42	74,44
Aniline	93	66,65
Phenol	94	65,66
bis-(2-Chloroethyl)Ether	93	63,95
2-Chlorophenol	128	64,130
1,3-Dichlorobenzene	146	148,111
1,4-Dichlorobenzene	146	148,111
Benzyl Alcohol	108	79,77
1,2-Dichlorobenzene	146	148,111
2-Methylphenol	108	107,79
bis(2-Chloroisopropyl)Ether	45	77,121
3/4-Methylphenol	108	107,79
N-Nitroso-Di-n-Propylamine	70	42,101,130
Hexachloroethane	117	201,199
Nitrobenzene	77	123,65
Isophorone	82	95,138
2-Nitrophenol	139	109,65
2,4-Dimethylphenol	122	107,121
Benzoic Acid	122	105,77
bis(2-Chloroethoxy)Methane	93	95,123
2,4-Dichlorophenol	162	164,98
1,2,4-Trichlorobenzene	180	182,145
Naphthalene	128	129,127
4-Chloroaniline	127	129
Hexachlorobutadiene	225	223,227
4-Chloro-3-methylphenol	107	144,142
2-Methylnaphthalene	142	141
Hexachlorocyclopentadiene	237	235,272
2,4,6-Trichlorophenol	196	198,200
2,4,5-Trichlorophenol	196	198,200
2-Chloronaphthalene	162	127,164
2-Nitroaniline	65	92,138
Dimethylphthalate	163	194,164

Compound	Primary Ion	Secondary Ion
Acenaphthylene	152	151,153
3-Nitroaniline	138	108,92
Acenaphthene	154	153,152
2,4,-Dinitrophenol	184	63,154
4-Nitrophenol	109	139,65
Dibenzofuran	168	139
2,4-Dinitrotoluene	165	63,89
2,6-Dinitrotoluene	165	63,89
Diethylphthalate	149	177,150
1,2-Diphenylhydrazine	77	105,182
4-Chlorophenyl-phenylether	204	206,141
Fluorene	166	165,167
4-Nitroaniline	138	108,92
4,6-Dinitro-2-Methylphenol	198	51,105
N-Nitrosodiphenylamine	169	168,167
4-Bromophenyl-phenylether	248	250,141
Hexachlorobenzene	284	142,249
Pentachlorophenol	266	264,268
Phenanthrene	178	179,176
Anthracene	178	176,179
Di-n-Butylphthalate	149	150,104
Fluoranthene	202	101,203
Pyrene	202	200,203
Benzidine	184	
Butylbenzylphthalate	149	91,206
3,3'-Dichlorobenzidine	252	254,126
Benzo(a)Anthracene	228	229,226
bis(2-Ethylhexyl)Phthalate	149	167,279
Chrysene	228	226,229
Di-n-octylphthalate	149	167,43
Benzo(b)Fluoranthene	252	253,125
Benzo(k)Fluoranthene	252	253,125
Benzo(a)Pyrene	252	253,125
Indeno(1,2,3-cd)Pyrene	276	138,227
Dibenz(a,h)Anthracene	278	139,279
Benzo(g,h,i)Perylene	276	138,277

Table E-3

Characteristic Ions for Semivolatile Surrogates

Surrogate	Primary Ion	Secondary Ion
Phenol-d6	99	42,71
2-Fluoeophenol	112	64
2,4,6-Tribromophenol	330	332,141
Nitrobenzene-d5	82	128,54
2-Fluorobiphenyl	172	171
Terphenyl-d14	244	122,212

Table E-4

Semivolatile Internal Standards With
Corresponding Analytes Assigned For Quantitation

*1,4-Dichlorobenzene-d4	*Naphthalene-d8	*Acenaphthene-d10
Analine	Benzoic Acid	Acenaphthene
Benzyl Alcohol	bis(2-Chloroethoxy)methane	Acenaphthylene
bis-(2-chloroethyl)ether	1,2,4-Trichlorobenzene	4-chlorophenylphenylether
bis-(2-chloroisopropyl)ether	4-Chloroaniline	Dibenzofuran
Phenol-d6 (s)	4-Chloro-3-methylphenol	Diethylphthaltae
2-Chlorophenol	2,4-Dichlorophenol	Dimethylphthalate
1,3-Dichlorobenzene	2,6-Dichlorophenol	2,4-Dinitrophenol
1,4-Dichlorobenzene	2,4-Dimethylphenol	2,4-Dinitrotoluene
1,2-Dichlorobenzene	Hexachlorobutadiene	2,6-Dinitrotoluene
2-Fluorophenol (s)	Isophorone	Fluorene
Hexachloroethane	2-Methylnaphthalene	2-Fluorobiphenyl (s)
2-Methylphenol	Naphthalene	Hexachlorocyclopentadiene
4-Methylphenol	Nitrobenzene	2-Nitroaniline
N-Nitrosodimethylamine	Nitrobenzene-d5 (s)	3-Nitroaniline
N-Nitroso-di-n-propylamine	2-Nitrophenol	4-Nitroaniline
Phenol		4-Nitrophenol
		2,3,4,6-Tetrachlorophenol
		2,4,6-Tribromophenol (s)
		2,4,6-Trichlorophenol
		2,4,5-Trichlorophenol
		2-Chloronaphthalene
		1,2-Diphenylhydrazine
*Phenanthrene-d10	*Chrysene-d12	*Perylene-d12
Anthracene	Benzidine	Benzo(b)fluoranthene
4-Bromophenylphenylether	Benzo(a)anthracene	Benzo(k)fluoranthene
Di-n-butylphthalate	Bis(2-ethylhexyl)phthalate	Benzo(g,h,i)perylene
4,6-Dinitro-2-methylphenol	Terphenyl-d14 (s)	Benzo(a)pyrene
Phenanthrene	Butylbenzylphthalate	Dibenz(a,h)anthracene
Fluoranthene	Chrysene	Di-n-octylphthalate
Hexachlorobenzene	3,3'-Dichlorobenzidine	Indeno(1,2,3-cd)pyrene
N-Nitrosodiphenylamine	Pyrene	
Pentachlorophenol		

* Internal Standards s Surrogates

TABLE 4

SURROGATE RECOVERY LIMITS

Compounds	%Recovery Water	%Recovery Soil
Nitrobenzene-d5	35-114	23-120
2-Fluorobiphenyl	43-116	30-115
Terphenyl-d14	33-141	18-137
Phenol-d5	10-94	24-113
2-Fluorophenol	21-100	25-121
2,4,6-Tribromophenol	10-123	19-122

TABLE 6

MATRIX SPIKE RECOVERY AND RELATIVE PERCENT DIFFERENCE LIMITS

Compound	%Recovery Water	RPD Water	%Recovery Soil	RPD Soil
Phenol	12-89	42	26-90	35
2-Chlorophenol	27-123	40	25-102	50
1,4-Dichlorobenzene	36-97	28	28-104	27
N-Nitroso-di-n-propylamine	41-116	38	41-126	38
1,2,4-Trichlorobenzene	39-98	28	38-107	23
4-Chloro-3-methylphenol	23-97	42	26-103	33
Acenaphthene	46-118	31	31-137	19
4-Nitrophenol	10-80	50	11-114	50
2,4-Dinitrotoluene	24-96	38	28-89	47
Pentachlorophenol	9-103	50	17-109	47
Pyrene	26-127	31	35-142	36

TABLE 8

CHARACTERISTIC IONS FOR INTERNAL STANDARDS FOR SEMIVOLATILE COMPOUNDS

Internal Standards	Primary Ion	Secondary Ions
1,4-Dichlorobenzene-d4	152	115, 150
Naphthalene-d8	136	68
Acenaphthene-d10	164	162, 160
Phenanthrene-d10	188	94, 80
Chrysene-d12	240	120, 236
Perylene-d12	264	260, 265

TABLE 9

SEMIVOLATILE STANDARDS WITH CORRESPONDING TARGET COMPOUNDS AND SURROGATES ASSIGNED FOR QUANTITATION

1,4-Dichlorobenzene-d4	Naphthalene-d8
Phenol	Nitrobenzene
bis(2-Chloroethyl)ether	Isophorone
2-Chlorophenol	2-Nitrophenol
1,3-Dichlorobenzene	2,4-Dimethylphenol
1,4-Dichlorobenzene	bis(2-Chloroethoxy)methane
1,2-Dichlorobenzene	2,4-Dichlorophenol
2-Methylphenol	1,2,4-Trichlorobenzene
Bis(2-chloroisoproply)ether	Naphthalene
4-Methylphenol	4-Chloroaniline
N-Nitroso-di-propylamine	Hexachlorobutadiene
Hexachloroethane	4-Chloro-3-methylphenol
2-Fluorophenol (surr)	2-Methylnaphthalene
Phenol-d5 (surr)	Nitrobenzene-d5 (surr)
N-Nitrosodimethylamine	Benzoic acid

Acenaphthene-d10	Phenanthrene-d10
Hexachlorocyclopentadiene	4,6-Dinitro-2-methylphenol
2,4,6-Trichlorophenol	N-Nitrosodiphenylamine
2,4,5-Trochlorophenol	4-Bromophenyl-phenyl ether
2-Chloronaphthalene	Hexachlorobenzene
2-Nitroanaline	Pentachlorophenol
Dimethyl phthalate	Phenanthrene
Acenaphthylene	1,2-Diphenylhydrazine
3-Nitroaniline	Anthracene
Acenaphthene	Di-n-butylphthalate
2,4-Dinitrophenol	Fluoranthene
4-Nitrophenol	
Dibenzofuran	
2,4-Dinitrotoluene	
2,6-Dinitrotoluene	
Diethylphthalate	
4-Chlorophenyl-phenylether	
Fluorene	
4-Nitroaniline	
1,2-Diphenylhydrazine	
2-Fluorobiphenyl (surr)	
2,4,6-Tribromophenol (surr)	

TABLE 9 (continued)

SEMIVOLATILE STANDARDS WITH CORRESPONDING TARGET COMPOUNDS AND SURROGATES ASSIGNED FOR QUANTITATION

Chrysene-d12	Perylene-d12
Pyrene	Di-n-octyl phthalate
Butylbenzylphthalate	Benzo(b)fluoranthene
3,3'-Dichlorobenzidine	Benzo(k)fluoranthene
Benzo(a)anthracene	Benzo(a)pyrene
bis(2-Ethylhexyl)phthalate	Indeno(1,2,3-cd)pyrene
Chrysene	Dibenz(a,h)anthracene
Terphenyl-d14 (surr)	Benzo(g,h,i)perylene
Benzidine	

TABLE 10

LCS RECOVERY LIMITS

Compound	%Recovery Water	%Recovery Soil
Phenol	12-110	29-120
2-Chlorophenol	27-123	27-126
1,4-Dichlorobenzene	36-97	34-121
N-Nitroso-di-n-propylamine	41-116	36-123
1,2,4-Trichlorobenzene	39-98	34-123
4-Chloro-3-methylphenol	23-97	25-133
Acenaphthene	46-118	35-121
4-Nitrophenol	10-80	9-146
2,4-Dinitrotoluene	24-96	35-122
Pentachlorophenol	9-103	10-135
Pyrene	26-127	23-136

GC/MS Analysis of Volatile Organics

(SW 8260)

Quanterra
Environmental Services

QUANTERRA - SANTA ANA
SOP CHANGE FORM

SOP NUMBER: LM-CRL-3005
SOP TITLE: GC/MS Analysis of Volatile Organics - Method 8260
SOP SECTION(S) AFFECTED BY CHANGE: Title Page, Section 8.3.1 and Table 2
REASON FOR ADDITION OR CHANGE: Update SOP to be compliant with SW-846 Update II
CHANGE EFFECTIVE FROM: (Date) 7-17-95
CHANGE OR ADDITION (SPECIFY SECTION; USE ADDITIONAL SHEETS IF NECESSARY) **Title Page**: Change 8260 to 8260A **Section 8.3.1 and Table 2**: Change 30% to 20%
SUBMITTED BY/DATE: Manny Velazquez 7/5/95
*APPROVED BY:

Technical Review Signature	Date: 7-5-95
Environmental Health and Safety Signature	Date: 7-10-95
QA Signature	Date: 7/5/95
Management Signature	Date: 7/10/95

*Must be same signature authorities of SOP being revised.

Control Copy Number _____

SOPCHNG.DOC
4/11/95 SCH

QUANTERRA - SANTA ANA
SOP CHANGE FORM

SOP NUMBER:	LM-CRL-3005
SOP TITLE:	GCMS Analysis of Volatile Organics (Method 8260)
SOP SECTION(S) AFFECTED BY CHANGE Section	6.3 & 6.4
REASON FOR ADDITION OR CHANGE:	Compounds listed don't reflect compounds in use
CHANGE EFFECTIVE FROM: (Date)	12/1/95
CHANGE OR ADDITION (SPECIFY SECTION; USE ADDITIONAL SHEETS IF NECESSARY)	Section 6.3; change dibromofluorobenzene to 1,4-Dichloroethane-d4 Section 6.4; change pentafluorobenzene to Bromoethane-d5
SUBMITTED BY/DATE:	DJB 12/1/95
*APPROVED BY:	Mona Nassimi
Mona Nassimi Technical Review Signature	12/5-95 Date
Sylvia Ward Environmental Health and Safety Signature	12-5-95 Date
Linda K Anderson QA Signature	12-5-95 Date
Steve Shaw Management Signature	12/5/95 Date

*Must be same signature authorities of SOP being revised.

Control Copy Number _____

SOPCHNG.DOC
4/11/95 SCH

STANDARD OPERATING PROCEDURE

Subject or Tile: **GC/MS Analysis of Volatile Organics (Method 8260)**		Page 1 of 40
SOP No.: **LM-CRL-3005**	Revision: 1.0	Effective Date: 01-03-94
Supersedes: Original		

ENSECO PROPRIETARY INFORMATION STATEMENT

These documents have been prepared by and remain the sole property of Enseco, Inc. They are submitted to (client/government entity) solely for its use in evaluating Enseco's qualifications in connection with the particular project, certification or approval for which they were prepared, and are to be held proprietary to Enseco.

The user agrees by her/his acceptance or use of these documents to return them upon Enseco's request, and not to reproduce, copy, lend or otherwise disclose or dispose of the contents, directly or indirectly, and not to use them for any purpose other than that for which they were specifically furnished. The user also agrees that where consultants or others outside of user's organization are involved in the evaluation process, access to these documents shall not be given to those parties, unless those parties also specifically agree to the conditions stated above.

Prepared by: Mona Nassimi and Robert Sundberg	Date: 01-03-94	
Safety Officer Approval: Peri Suchy	Date: 02-17-94	2-17-94
Management Approval: Manny Velazquez	Date: 02-17-94	2-28-94
QA Officer Approval: Steve Ballard	Date: 02-17-94	2-28-94

1. SUMMARY OF METHOD

1.1 Liquid and solid samples are analyzed by quantitative and/or qualitative purge-and- trap GC/MS using an internal standard method.

1.2 Solid samples can also be extracted with methanol, and the extract analyzed by purge-and-trap GC/MS for quantitative and/or qualitative identification using the same internal standard method.

2. SCOPE AND APPLICATION

2.1 Note: This procedure may be used in conjunction with any project specific requirements, as requested by the end user. When such requirements are defined in writing, e.g. in a QAPjP, their application shall take precedence.

2.2 Analytes: Quantitative analysis is performed for the compounds listed in Table 1-1. Qualitative analysis by mass spectral identification can be performed on other purgeable, chromatographable compounds.

2.3 Reporting Limits: See Appendix A, Table 1.

2.4 Applicable matrices: Soil and liquid.

2.5 Dynamic range: Analytes can typically be quantitated between 5 ppb and 400 ppb for soil and between 1 ppb to 100 ppb for liquid by the low level direct purge method. Analytes detected by the methanol extraction method can be quantitated between 500 and 40000 ppb. Samples which exceed this concentration range for any analyte in Appendix A, Table 1 should be diluted to be within the dynamic range of the method. Samples should also be diluted when any other volatile component of the sample exceeds this range. Reporting limits will be adjusted to reflect the dilution performed.

2.6 Analysis time: Approximate analytical time is 35 minutes. The time required for data reduction will be dependent upon the complexity of the sample.

2.7 Comments

2.7.1 All deviations made from this SOP MUST be approved by the

supervisor or manager, and QA officer, and documented.

2.7.2 Care should be taken not to introduce contamination into the samples. Particular attention should be paid to contamination with common laboratory solvents.

2.7.3 Care should be taken when handling samples for volatiles analysis to avoid loss of analytes.

2.7.4 Do not overstock traps. Tenax has a lifetime of only a few months. Traps will also degrade with use due to the breakdown of tenax from rapid temperature changes.

2.7.5 The GC/MS systems are designated by a letter assignment scheme: MA, MB, MC, etc. In this SOP the references will be made to the five volatile instruments: MC, MD, MF, MG, and MH.

3. SAFETY ISSUES

3.1 Safe Work Practices

All laboratory personnel must have a working knowledge of the pertinent safe work practices and procedures outlined in the Enseco Health and Safety Manual. Employees must receive Hazard Communication and Chemical Hygiene training prior to working with chemicals used in this SOP.

3.2 Personal Protective Equipment

Lab coats and gloves are required whenever samples and or reagents are being handled. Employees should familiarize themselves with the glove compatibility chart for proper choice of gloves. Other specialized safety equipment may be required depending on procedure, reagents used and known hazards of samples.

3.3 Chemical Exposure Potential

The toxicity/carcinogenicity or other inherent hazards of each chemical used in this procedure may not be precisely defined. Therefore, each chemical compound should be treated as a potential health hazard. Exposure to these chemicals should be reduced to the lowest possible level by engineering controls and Personal Protective Equipment. A Material Safety Data Sheet (MSDS) is available for each laboratory standard and reagent chemical. Employees must review all MSDS's for all chemicals listed in the procedure prior to initial use.

3.4 Hazardous Waste

Laboratory personnel assigned to perform hazardous waste disposal procedures must have a working knowledge of the established procedures and practices outlined in the Enseco Health and Safety Manual. These employees must have training on the hazardous waste disposal practices initially upon assignment of these tasks, followed by an annual refresher training.

4. SAMPLE COLLECTION, PRESERVATION, CONTAINERS AND HOLDING TIMES

4.1 Standard 40 mL glass screw-cap VOA vials with Teflon-faced silicone septa may be used for liquid sample collection. Soil samples may be collected in wide-mouth glass jars with Teflon-lined caps. Samples should be introduced into the containers with minimum agitation to avoid loss of volatile components. It is best to collect two or three vials of each sample in case of a need to analyze the sample more than once. Sample containers should be filled as completely as possible with minimum air space.

4.2 All samples must be iced or refrigerated at 4 $\pm$ 2°C from the time of collection until analysis or extraction. Water samples should be preserved with 6 drops of 6N HCl.

4.3 Samples must be analyzed within 14 days from the sampling date. Samples requiring extraction must be extracted and analyzed within 14 days of collection .

5. APPARATUS

5.1 Gas-tight syringes: 10, 25, 50, 100, 250, and 500 uL; 1 ml; and luer-lock type 5 and 25 ml.

5.2 Analytical balance capable of weighing 0.0001 g.

5.3 Top-loading balance capable of weighing 0.1 g.

5.4 20 mL VOA vials for soil extractions.

5.5 Graduated microsample vials with mininert valves for standards: 1 ml, 2 ml, and 5 ml.

5.6 Volumetric flasks: 10 ml - 100 ml.

5.7 GC autosampler vials for storage of methanol extracts.

5.8 Disposable pasteur pipets.

5.9 Stainless steel spatula

5.10 Purge-and-trap device (sample purger, trap, and desorber): Tekmar LSC-2 concentrator with a Tekmar ALS autosampler, and Tekmar LSC 2000 concentrator with a Tekmar ALS 2016 autosampler (or equivalent)

5.10.1 The sparging vessels used are 19 x 150 mm Disposal culture tubes.

5.10.2 Four phase traps: 1 cm 3% SP-2100 on 60/80 Chromosorb W AW, 7.7 cm 60/80 Tenax TA, 7.7 cm 35/60 silica gel Gd-15, 7.7 cm 20/50 charcoal (Supelco catalog no. 2-0294 or equivalent) for the analysis of all volatile compounds.

5.10.3 Three phase traps: 1 cm 3% SP-2100 on 60/80 Chromosorb W AW, 15 cm 60/80 Tenax TA, 8 cm 35/60 silica gel Gd-15 (Supelco catalog no. 2-0293 or equivalent) Silica Gel/Tenax/3%OV-1 for the analysis of volatile compounds excluding fluorocarbons.

5.11 Gas Chromatograph/Mass Spectrometer

5.11.1 Gas chromatograph: Currently in use are five HP5890 temperature programmable gas chromatographs each with at least one injection port and a jet separator for capillary work (MC, MD, and MF).

5.11.2 Chromatographic columns: Restek Rtx-502.2 105 meter, 0.53 mm i.d., 3.00 um df capillary columns (or equivalent).

5.11.3 Mass spectrometer: An HP5970 set to scan from 35 to 260 amu every 3 sec or less, using 70 volts (nominal) electron energy in the electron impact ionization mode.

5.11.4 GC/MS interface: An interface that gives acceptable calibration points at 50 ng or less per injection for each of the analytes and achieves all acceptable performance criteria. An all glass interface is recommended.

5.11.5 Data system: An RTE-A (MC, MD, and MG) or RTE-6 (MF and MH) computer system interfaced to the mass spectrometer which allow the continuous acquisition and storage on machine readable media of all mass spectra obtained throughout the analytical run. The software is capable of producing

extracted ion profiles and integrating these abundances. The EPA/NIH Mass Spectral Library is also available on the system.

5.12 Chromatographic Conditions

5.12.1 Temperature Program

Initial Temperature:	45°C
Initial hold time:	1 minutes
Temperature ramp:	5°C/min
Final temperature:	210°C
Final hold time:	5 minutes

5.12.2 Helium carrier gas flow rate: 17-22 ml/min. With this high flow no make up gas is needed at the jet separator end of the column.

5.13 Purge and Trap Parameters

5.13.1 Purge Flow: 35-40 ml/min (measured at vent in purge mode).

5.13.2 Purge pressure: 20 lb/in^2 (measured on the gauge). MC and MD are at 40 lb/in^2 and 60 lb/in^2, respectively.

5.13.3

Purge Time:	10-11 min
Dry Purge:	1 min
Desorb Time:	4 min
Bake Time:	11 min

5.13.4 Temperature settings

Purge Ready Temp:	30-35°C
Desorb Preheat Temp:	175°C
Desorb Temp:	180°C
Trap Bake Out Temp:	220-225°C

5.14 Installation and conditioning of trap in the purge and trap device

All traps should be installed with accompanying brass nut down or inlet marker to the top. A brass nut and ferrule should be used at the bottom connections. A teflon ferrule should be used at the top. The top nut only needs to be finger tight.

Adjust purge flow by measuring the flow at the vent in purge mode. The faster the purge flow the more efficient the purging process, however, the limit to increasing the flow is governed by the ability of the trap to adsorb and contain the purged analytes. If the total purge volume is too large (flow rate too high), the lightest compounds such as the gases will break through the end of the trap and their respective response factors will drop correspondingly. If the purge flow is too slow, the heavier and more polar compounds will not purge efficiently. Thus to improve the gases, the purge flow should be decreased, and to improve bromoform the purge flow should be increased. If optimization of the overall response factors cannot be attained by changing the purge flow, a new trap may need to be installed.

To condition the trap, place the autosampler into BAKE mode and put the top switch in the HOLD position on the LSC-2, or press the HOLD button on the LSC-2000. This will heat the trap under reverse flow indefinitely. The trap should be baked out for a minimum of 1 hour. It can be left in BAKE mode indefinitely. Tenax breakdown occurs largely during the heating and cooling phases, not at constant elevated temperatures.

5.15 Mass Spectrometer Parameters

- Mass range: 35-260 amu
- Scanning rate: 1 s/scan
- Zone temperatures:

Injection port:	250°C
Interface heater:	280°C
Source temperature:	250°C
Transfer Line:	250°C
Analyzer:	200°C

5.15.1 Method Files: Method files containing the above parameters for the GC/MS systems are named using the following naming scheme:

Instrument	Method File Name
MC	C524
MD	D524
MF	F524

6. REAGENTS AND STANDARDS

6.1 Reagent water: Helium purged Arrowhead purified distilled water. A 500 mL stoppered flask is filled for use near the autosampler. At times the analyst will need to take the reagent water directly from the spigot to assure clean reagent blank runs.

6.2 GC/MS calibration solution: 50 ng/ul p-bromofluorobenzene in methanol.

6.3 Surrogate standard spiking solutions: Prepared at 250 mg/l for spiking extracts and at 25 mg/l for spiking low level analyses.

dibromofluorobenzene
toluene-d8
p-bromofluorobenzene

6.4 Internal standard solution: Prepared at 25 mg/l.

pentaflourobenzene
1,4-dichlorobenzene-d4
1,4-difluorobenzene
chlorobenzene-d5

6.5 LCS/LCD and MS/MSD standard spiking solution:

1,1-dichloroethene
trichloroethene
benzene
toluene
chlorobenzene

6.6 Calibration standard solution: See Appendix A, Table 1.

6.7 Methanol: purge-and-trap grade or equivalent. Store apart from other solvents. One liter bottles are used to help protect against contamination.

6.8 Standard Receiving Log Book: When standards are received from the vendor they must by entered into the GC/MS Standards Receiving Log Book. The following items must be entered: date, lot number, supplier (vendor), analyst's initials, and a brief description of the standard (e.g., Cat. no. 4-0203 p-Xylene 5000 ug/ml in MeOH).

7. STANDARDS PREPARATION FOR VOLATILE ANALYSIS

7.1 All standards are made in a fume hood. Methanol and standard waste are disposed of in a container compatible with the waste. Information on the container label shall include the words "Hazardous Waste", the specific contents (in this case "Methanol Waste") and the accumulation start date. Items needed for standard preparation are gloves, safety glasses, labcoat, clean micro-syringes of appropriate volumes, contaminant free methanol, clean mininert vials, a VOA vial for waste methanol, and any standard stock solutions or unopened ampuls of new standards, or bottles of neat compounds. All working standards expire after one month.

7.2 All medium level stock solutions have expiration dates of three months and high level stock solutions are given a six month expiration date. Some exceptions will be made in the case of extremely volatile or unstable compounds; their stock solutions will be given a shorter expiration period. When making a standard, it is best to go to the Volatiles GC/MS Standard Preparation Log Book and see how it was previously prepared. Whether the standard is made by simply cracking an ampul and transferring the contents to a mininert vial or mixing many stock standards together to make a working standard, the Standard Preparation Log Book will have the method.

7.3 The tracking system for standards follows the convention:

MSVOAXXX-Y[CS, A, B,...]

Where: XXX = page number of standard prep. log book
Y = 1 or 2 (1 for top half of standard prep. log page 2 for bottom half of standard prep. log page)
[CS, A, B,...] = CS for check standard, A, B,... for differentiating many standards made together and entered into the same half page of the log book.

After the standard is made it must be labeled and entered into the Volatiles GC/MS Standards Preparation Log Book. The label should contain the standard name, MSVOA number, concentration, solvent, date of preparation and expiration, and the analyst's initials. The logbook entries are the same as the label but also include method reference; standard supplier, lot number; and expiration date, initial and final concentrations, and added and final volumes. Any paperwork accompanying the standard solutions is kept in the Standard Preparation Log Book.

8. INSTRUMENT CALIBRATION

8.1 BFB Tune

8.1.1 Each GC/MS MUST be hardware tuned to meet the EPA ion abundance criteria for BFB. The instrument tune MUST be verified at the start of every 12 hours of operation. Ion abundance criteria are listed below.

BFB ION ABUNDANCE CRITERIA

Mass	Ion Abundance Criteria
50	15.0-40.0 % of the base peak
75	30.0-60.0 % of the base peak
95	base peak, 100 % relative abundance
96	5.0-9.0 % of the base peak
173	less than 1.0 % of the base peak
174	greater than 50.0 % of the base peak
175	5.0-9.0 % of mass 174
176	greater than 95 % but less than 101 % of mass 174
177	5.0-9.0 % of mass 176

8.1.2 Inject 50 ng of BFB at 220°C isothermal. Scan from about 3 minutes to 8 minutes acquiring 200-300 scans. The Instrument Method Files follow the naming scheme:

TBFBi e.g., TBFBC

Where: i = Instrument ID, i.e. B, C, D, F.

8.1.3 Evaluate the spectrum of BFB by running the procedure file TUNVOA thus: "TRF, TUNVOA, >DATAFILENAMR" or enter TUNVOA into the "FMGR TR File:" field when setting up the single sample sequence. Averaging scans across the peak (enhancing) and reasonable background subtraction is acceptable. Manipulations which will distort the spectrum, such as excessive background subtraction, are not acceptable. TUNVOA generates the required hardcopies of the spectrum, mass abundance table, and ion abundance summary. If the tune passes, check the "RUN OK?" column on the Instrument Shift Log sheet.

8.1.4 If the ion abundance criteria are not met, retune the instrument and reinject BFB. To retune, first type MSCAL at

the FMGR prompt. Pick the instrument to be tuned and then select AUTOTUNE. If the mass spectrometer consistently fails autotune then corrective action should be taken, e.g. cleaning the analyzer source. If the mass spectrometer passes autotune consistently (at least two attempts), then the mass spectrometer can be manually tuned. To manually tune, type MTUNE at the FMGR prompt and choose an instrument. Hit the NEW TUNE FILE softkey and enter the instrument tune file. The tune file names follow the naming scheme:

MBFBi e.g., BFBC

Where i = Instrument ID, i.e. B, C, D, F.

Hit EXECUTE and REPEAT PROFILE to let the mass spectrometer warm up. The PROFILE SCAN will show all the settings, the current relative ion abundance, and three ion profiles of the currently monitored ions. The approximate target abundance ratios for volatile work are:

Mass	% of Base Peak
69.0	100.0
131.0	32.0-41.0
219.0	33.0-45.0

The PARAMETER RAMP softkey allows ajustment of the voltages on the different lenses in the analyzer. Approximate voltage settings for the different source parameters that will most likely achieve the desired ratios are:

Lens	Voltages
Repellar	9.0-10.2 V
Ion Focus	20.0-50.0 V
Entrance Lens	40.0-100 mV/amu
X-Ray	Set to maximum ion abundance (V)

The AXIS CALIBRATE and WIDTH CALIBRATE softkeys automatically adjust the mass axis and the mass width, respectively.

Once the tune looks satisfactory, save it to the appropriate tune file by hitting the TOP LEVEL softkey then the STORE TUNE softkey, and hit RETURN to accept the default file name which should start with MBFB and end with the instrument's ID as described above. After retuning, shoot BFB again to see if the instrument passes the criteria.

8.2 Initial calibration: An initial calibration must be performed before analyses of samples can begin. This consists of a five point calibration curve for all of the analytes of interest. Standards are analyzed at concentrations of 20, 50, 100, 200, and 400 ppb for soil and liquid 5 ml purge samples, and 1, 10, 20, 50, and 100 ppb for liquid 25 ml purge samples.

8.2.1 SPCC and CCC Compounds: Certain compounds have been selected to monitor instrument performance. These compounds are identified as System Performance Check Compounds (SPCC) and Calibration Check Compounds (CCC) per SW 846.

The average response factor for each System Performance Check Compound (SPCC) MUST be greater than 0.300, except bromoform, which must be greater than 0.250. The average response factor should be qreater than 0.300 for all other analytes.

The percent relative standard deviation, %RSD, for each Calibration Check Compound (CCC) MUST be less than 30%. The %RSD for all compounds should also be reviewed. Any values between 30% and 50% should be evaluated before analyses are continued. Any standard which has a component with a %RSD greater than 50% will be thrown out. The next step would be to reanalyze a standard and if it fails again, problems with the instrumentation should be addressed.

If samples are NOT being analyzed for these specific compounds, the criteria for these compounds need not be met. The fact that these compounds are not in the analyte set should be documented. See Appendix A, Table 2 for a summary of the CCC and SPCC criteria.

8.2.2 Initial Calibration Procedure: Standard solutions should be allowed to warm to room temperature before using.

Remove the plunger from a 5 ml gas-tight syringe. Rinse the syringe with purified reagent water. Fill the syringe barrel with purified reagent water. Replace the syringe plunger and compress the water and adjust the volume to 5.0 ml.

Add internal standards, surrogates, and calibration standard. Load each standard level into a purge chamber on the ALS and begin data acquisition. For the amount of standard and spiking solutions to be added for each standard level, see the table below.

Preparation of 5 Point Calibration Standards: The amount of standard solutions added to the reagent water for each standard level:

Standard Level	Vol. of Purge Water	Vol.of IS	Vol.of Surr.	Vol. of Std.
20 ppb*	5 mL	10 uL	10 uL	4 uL
50 ppb*	5 mL	10 uL	10 uL	10 uL
100 ppb*	5 mL	10 uL	10 uL	20 uL
200 ppb**	5 mL	10 uL	10 uL	4 uL
400 pbb**	5 mL	10 uL	10 uL	8 uL

* Stock Solution is 25 ppm
** Stock Solution IS 250 ppm

8.2.3 The SPCC limits MUST be verified. If a SPCC response factor is < 0.300 consult your supervisor to determine if corrective action will be taken or analyses will proceed. Corrective action may include replacement of the trap or the analytical column. Document corrective action taken or decision to proceed. This documentation will be kept with the output for the initial calibration. If necessary, reinject one of the standard levels.

8.2.4 Review the quantitation list to ensure that the internal standards are correctly identified and that the analytes are properly quantitated. Watch for the following compounds for proper integration and peak assignment:

chloroethane
vinyl chloride
c-1,3-dichloropropene
t-1,3-dichloropropene

Once all five points have been acquired, use "QREP,^DATAFILE NAMR,,N" at the FMGR prompt on RTE to see if the ID file missed any compounds. If the ID file missed any compounds, run the quant program, QT, in the test mode and try to correct the ID file, and requant to see if it's fixed. Otherwise use QAREA to manually integrate the peaks. Also use QAREA to fix any bad integration that may throw off the curve.

8.2.5 Next run the CBUPD program for the calibration curve, entering the file name in the order requested at the prompt. Then run the CBRPT program using the R, D, and T options to get a print out of the curve's response factors, average response factors, and %RSD's with the SPCC's and the CCC's marked off. Verify that the CCC and SPCC criteria have been met. Review average response factors of all the other analytes. Investigate each individual standard level for a compound having a %RSD that is greater than 50%.

8.2.6 Run the CBCHK program for the 50 ppb standard. All SPCC and CCC criteria must be met.

8.2.7 If the curve evaluation criteria have been met, run the QCAL program using the 50 ppb point from the curve. This updates the ID file used for quantifying with the response factors and retention times of the 50 pbb standard just analyzed. For straight 8260's, 8260-L's, and 8260-M's the ID files are:

Instrument	ID File
MC	ID826C
MD	ID826D
MF	ID826F

If the calibration criteria are not met and the decision is made to continue analysis, the rationale must be documented by the individual making the decision. This documentation must be kept on file with the initial calibration record.

8.3 Continuing calibration: The 50 ppb (or 10 ppb for 25 ml purge) standard is used as the continuing calibration standard. It MUST be analyzed for each twelve hour period immediately following a successful BFB analysis.

8.3.1 SPCC and CCC Compounds: The response factor of each CCC compound is compared to the initial calibration. The percent difference for each CCC compound must be less than 30%. If any one CCC compound exceeds this limit, that standard cannot be used. Response factors for all analytes should be reviewed. Any significant deviations from the initial calibration should be evaluated before analyses are continued (i.e. deviations of greater than 50%). All SPCC criteria must be met.

8.3.2 Continuing Calibration Procedure: Purge the 50 ppb standard as described in the initial calibration procedure. The concentration of each of the surrogate compounds and the internal standard compounds is 50 ppb. Analysis of standards should be complete before analysis of any reagent blanks, QC samples, or client samples can begin.

8.3.3 Review the quantitation list to ensure that the internal standards are correctly identified and that the analytes are properly quantitated. Watch for the following compounds for proper integration and peak assignment:

chloroethane
vinyl chloride
cis-1,3-dichloropropene
trans-1,3-dichloropropene

8.3.4 Run program CBCHK to compare the continuing calibration standard with the initial calibration. Evaluate the CCC and SPCC compounds as previously outlined (refer to Appendix A, Table 2). Review the response factors and percent differences from the initial calibration of all the other compounds. If any large deviations occur (i.e. deviations > 50%), recheck peak assignment and integration.

8.3.5 If the standard evaluation criteria are NOT met, corrective action must be taken. Corrective action may include reanalyzing a 50 ppb standard, analyzing a new curve, or replacement of the trap or the analytical column. Document corrective action taken. Repurge the continuing calibration standard and/or perform a new initial calibration.

If these criteria are not met and the decision is made to continue analysis, the rationale must be documented by the individual making that decision. This documentation must be kept on file with the continuing calibration record.

8.3.6 If the standard evaluation criteria have been met or the decision has been made to continue, running program QCAL updates the ID file with the response factors and retention times of the continuing calibration standard just analyzed.

9. SAMPLE ANALYSIS

9.1 Scheduling

9.1.1 Analyses are scheduled by the supervisor or a senior operator according to the following priorities:

a) Meet holding time
b) Meet promised due date

9.1.2 The analyst will determine the type of analysis requested. Access the appropriate lab ticket. CAREFULLY read the subsheet to determine if any special requests apply. Modifications to the normal analytical protocol such as low detection limits, special compounds, or special criteria will be indicated on the subsheet.

9.1.3 Each job is entered into the Sample Log Book noting sample number, sampling date, holding time, due date, client, and any special instructions for each sample. The lab ticket will then be given a folder, the job number written on the folder, and the folder filed in the Active Jobs filing drawer.

9.1.4 Samples will be found in the Sample Control Department. Water samples are kept in VOA vials in the VOA refrigerators and soil samples are in sample jars or in brass cores in the sample walk-in refrigerator. Water samples from current jobs may be kept in the GC/MS sample refrigerator in the GC/MS laboratory.

9.1.5 The analyst scheduling samples for a tune shift must consult the Rerun Log Book to check if any reruns are needed, and the Sample Log Book to schedule new samples. Once a sample is loaded on the instrument it is important to mark in the appropriate log book that the sample has been loaded or reloaded.

9.2 Analysis Sequence

9.2.1 Before the morning shift begins, the trap is baked out and oven temperature raised to about 200°C for approximately ten minutes. All sparge tubes are removed from the autosampler and thrown in a "Hazardous Glass Waste" can. Each needle at each chamber is rinsed with purified reagent water, the

needles are wiped down, and any wet spots on the autosampler dried with Kimwipes or a paper towel. Chambers that are known to have had a sample with high concentrations of target analytes should be rinsed more than once, purged, and if the contamination is severe, a blank should be loaded in that chamber. The evening shift starts as the morning shift ends so the extra bake out will not be necessary unless there were samples with high concentrations of organic compounds during the morning shift. The analyst in charge of the shift should make shift folders which have the instrument ID, date, and shift (a.m. or p.m.) written on the tab.

9.2.2 A Reagent Blank and Laboratory Control Samples will be analyzed first following successful calibration. Reagent Blank and LCS/LCD pair results must be verified before samples can be analyzed.

Contaminants in the Reagent Blank (also known as Surrogate Control Sample or SCS) must be at concentrations less than the reporting limit for all compounds except those that are commonly found in the laboratory, methylene chloride (dichloromethane) and acetone, which must not be present at levels greater than five times the reporting limit. The surrogate recoveries must also fall within the limits determined by the laboratory.

9.2.3 If contaminants are detected at concentrations outside acceptance limits, the source must be determined. This may include, but is not limited to, inspection of the purge-and-trap for evidence of carryover, and analysis of multiple blanks to verify the system is free from contamination, before samples may be analyzed.

A blank must pass for each shift in which samples are analyzed. It is best to set up a single sample sequence for the reagent blank (SCS).

9.2.4 If the QC criteria are met for the reagent blank (SCS) and the LCS/LCD pairs, client samples can be analyzed. Matrix spike and matrix spike duplicates are analyzed in the same shift as the associated sample when possible.

9.3 Analysis of Low Level Soil (8260)

9.3.1 Consult any available screen data to determine if target analyte concentrations in the sample necessitates a dilution before analysis. If the sample has a strong odor, especially a fuel odor, than a medium level soil analysis is in order.

9.3.2 Weigh 5.0 g of sample (± 0.1 g) into a sparge tube. Tare the balance with the sparge tube on the weighing tray, and using a spatula, introduce sample into the tube. Note and record the actual weight in the instrument shift log book. Secure the sparge tube to a cleaned chamber on the autosampler. To avoid problems with the needle sparging technique on soils it is best to have the needle end just at or above the surface of the soil, otherwise there is a risk of clogging the needle and possibly introducing sample debris into the plumbing of the autosampler.

9.3.3 Fill a 5 ml gas-tight syringe with 5.0 ml purified reagent water. With a 10 ul syringe add 10.0 ul of 25 ppm internal standard mix and 10 ul of 25 ppm surrogate standard mix to the 5 ml syringe through the luer-lock tip. Fasten the luer-lock tip to the valve assembly at the top of the chamber and introduce the spiked water into the sparge tube. Step the autosampler to purge mode.

9.3.4 LCS/LCD pairs are prepared in the same way as the samples. Tare the balance with a sparge tube on the weighing tray and then weigh out 5 g of Ottawa sand. Secure the sparge tube to a chamber on the autosampler. Fill a 5 ml syringe with purified reagent water and add 10 ul of 25 ppm internal standard and 10 ul of 25 ppm surrogate solution. Spike with 5 ul of 50 ppm matrix spiking solution. Analyze the LCS/LCD in consecutive chambers. LCS/LCD pairs for solids are analyzed every 20 successful sample runs or every four weeks, per instrument. The number of samples assigned to a given LCS/LCD pair is tracked on the header of the instrument shift log book.

9.3.5 Matrix spike pairs (MS/MSD) are prepared like the LCS/LCD pairs. First weigh out 5 g of client sample into a sparge tube. Secure the sparge tube to a chamber of the autosampler. Fill a 5 ml syringe with purified reagent water and add 5 ul of 50 ppm internal standard and 10 ul of 25 ppm surrogate solution. Spike with 5 ul of 50 ppm matrix spiking

solution. If the sample requires dilution, dilute the matrix spike aliquot as well. It is best to analyze the sample and that sample's matrix spike consecutively, but it is not necessary. MS/MSD pairs for solids are analyzed for every 20 succesful sample runs or every two weeks. The number of samples per MS/MSD pair is tracked in the GC/MS VOA Matrix Spike Log Book. MS/MSD pairs may be analyzed more frequently if a client specifically asks for their samples to be spiked.

9.3.6 After analyses are completed, remove and dispose sparge tubes into the "Hazardous Glass Waste" container in the laboratory. Rinse the sample needles with reagent water.

9.4 Analysis of Methanol Extracts for Medium Level Soil (8260-M)

9.4.1 Tare a balance with a 20 ml VOA vial with a Teflon cap on the weighing tray. Weigh out 5 g of sample to the nearest 0.1 g into the VOA vial with teflon cap. Add 5.0 ml of methanol. Add 50 ul of the 250 ug/ml surrogate standard mix. Cap and shake vial for 2 minutes. Log the extraction in the Extraction Log Book noting sample number, amount of sample weighed, amount of extraction fluid, amount of surrogate spike, extraction date, extracting analyst, and amount of matrix spike solution if the extraction was a matrix spike or a laboratory control sample.

9.4.2 Rinse and fill a 5 ml gas-tight syringe with purified reagent water. Adjust the volume to 4.9 ml. Thoroughly rinse a 100 ul syringe with methonal and add 100 ul of the methanol extract to the syringe through the luer-lock tip. If the sample requires dilution add the appropriate volume of the methanol extract.

9.4.3 Add 10 ul of 25 ppm internal standard mix to the syringe and fasten the luer-lock tip of the syringe to the valve assembly at the top of a clean chamber, introduce the sample into the sparge tube, and close the valve. Current extracts may be kept in the GC/MS laboratory sample refrigerator for storage.

9.4.4 With every sample or batch of samples extracted, a methanol reagent extraction blank must be prepared and analyzed. Place 5 ml of methanol in a 20 ml VOA vial and add 50 ul of 250 ppm surrogate solution. Next add internal standard and load as described above.

9.4.5 LCS/LCD pairs are prepared in the same manner. Use 5 g of Ottawa sand for a laboratory control sample. In addition to the 5 ml of methanol and the 50 ul of 250 ppm surrogate solution, add 250 ul of 50 ppm matrix spike standard solution. Take a 100 ul aliquot of the extract and load the LCS/LCD pair into two consecutive chambers on the autosampler. A LCS/LCD pair for a methanol extract is run every 20 successful samples or every four weeks. The sample count per LCS/LCD pair is tracked on the header of each instrument shift log sheet.

9.4.6 Matrix spikes are prepared in the same way as the samples. Weigh the same amount of sample for each aliquot. Add 250 ul of 50 ppm Matrix Spike standard solution in addition to 50 ul of 250 ppm surrogate standard mix. If the sample requires dilution, dilute the matrix spike aliquot as well. Matrix spike samples should be analyzed along with corresponding samples but it is not necessary. A MS/MSD pair for methanol extracts is run every 20 samples or every two weeks. The sample count per MS/MSD pair is tracked in the GC/MS Matrix Spike Log Book.

9.5 Analysis of Water Samples (8260)

9.5.1 Consult available screen data to determine if target analyte concentrations in the sample necessitates analysis of a reduced volume of sample.

9.5.2 After checking the pH of the sample using pH paper and noting it on the instrument run log sheet, fill a 5 ml gas-tight syringe with sample. With a 10 ul syringe, add 10 ul of 25 ppm internal standard mix to the 5 ml syringe through the luer-lock tip. Fasten the luer-lock tip to the valve assembly at the top of the chamber and introduce the spiked sample into the sparge tube. Step the autosampler to purge mode.

9.5.3 LCS/LCD pairs are prepared in the same manner as the samples, substituting purified reagent water for the sample. Fill a 5 ml syringe with purified reagent water and add 10 ul of 25 ppm internal standard mix and 10 ul of 25 ppm surrogate solution. Then spike with 5 ul of 50 ppm matrix spiking solution. Analyze the LCS and LCD in consecutive chambers. LCS/LCD pairs for liquids are analyzed every 20 successful sample runs, or every 4 weeks per instrument, whichever is

more frequent. The number of samples assigned to a given LCS/LCD pair is tracked on the header of the instrument shift log book.

9.5.4 MS/MSD pairs are prepared like the LCS/LCD pairs. Fill a 5 ml syringe with client sample and add 5 ul of 50 ppm internal standard, 10 ul of 25 ppm surrogate solution, and 5 ul of 50 ppm matrix spiking solution. If the sample requires dilution, dilute the matrix spike aliquot as well. It is best to analyze the sample and the associated matrix spike consecutively, but this is not required. MS/MSD pairs for liquids are analyzed every 20 successful sample runs, or every 2 weeks, whichever is more frequent. The number of samples per MS/MSD pair is tracked in the GC/MS VOA Matrix Spike Log Book. MS/MSD pairs might be analyzed more frequently if a client specifically asks for their samples to be spiked.

10. DATA ACQUISITION AND PROCESSING

10.1 Loading Samples using the LCS-2/ALS: The analyst must record each loaded sample in the instrument shift log book noting the sample number, the matrix, the dilution, and the chamber number.

10.1.1 After loading a sample on the ALS, check which chamber is ready to purge by noting which chamber has an indicator light on. With the LSC-2 step and desorb preheat switches set to HOLD, and the bake switch set to AUTO, step to the desired chamber using the AUTO/HOLD/STEP switch on the ALS. Push the FIRST SAMPLE switch so that the light comes on. Set the LAST SAMPLE knob to the number of the chamber with the last sample.

10.1.2 If analyzing only one sample set the LAST SAMPLE knob to the chamber in which the sample is loaded. Then flip the step switch on the LSC-2, and the position switch on the ALS, to AUTO. The autosampler will run until it reaches the chamber flagged by the LAST SAMPLE knob. Alternately, the LSC-2 step switch can be left on AUTO and the ALS stepped to the next chamber, as long as the ALS's chamber indicator light, before the one that is to be purged, is on. Simply turn the LAST SAMPLE knob one notch. When the autosampler has finished purging the sample, it will wait in Desorb Ready for a "GO" from the mass spectrometer.

10.2 Loading samples on the LSC-2000: After the ALS 2016 has been loaded with a sample or a batch of samples, set the chambers to be run on the LSC control panel. Press F2 (ALS) and program the starting and stopping positions by pressing ENTER, then the starting chamber number, and ENTER again. Press the -> key to set the stopping position. Press ENTER, the number of the last chamber to be purged, and then ENTER again. Press EXIT, then press START to start the autosampler cycle. To run a single sample, set both the starting and stopping positions to the chamber where the sample is loaded. When the autosampler has finished purging the sample, it will wait in Desorb Ready for a "GO" from the mass spectrometer.

10.3 Writing a Sequence

10.3.1 Run the program BEDIT (or BAMON,BA,SYSTEM NO. for single sample mode, in this mode no sequence name is needed) from the FMGR prompt, then enter a sequence name and hit enter. Sequence files follow the naming scheme:

IMMDD[P] e.g., C0116P

Where:
I = Instrument ID, i.e. B, C, D, F.
MM = Month, e.g. 01, 02, etc.
DD = Day, e.g. 01, 02, etc.
P = Suffix added for p.m. shift.

The Sequence File header is displayed, and here enter the MS Tune File name and the cartridge assignments for writing data to disc. Hit enter and a sample form will appear. Enter the data file name, the sample number, amount of sample used, ID file, procedure file, and any information that is important during the data reduction step, such as "LIMS data entry" or "Ext. Raw Data". Any LCS, MS, or check standards entered must have their standard log book book number listed in the miscellaneous field (e.g., MSVOA417-1CS).

10.3.2 The data files follow the naming scheme:

>i[T, S, or x]xxx e.g., >CT345

Where:
i = Instrument ID, i.e. B, C, D, F.
T = BFB Tune shot
S = Check Standard
[x]xxx = Number increased by one with each shot.

After all the information has been keyed in, hit the enter key. After all the samples to be run have been entered, hit F7, "CREATE/REPLACE", to save the sequence file to disk.

10.4 Procedure Files

10.4.1 The procedure files produce the customized reports. The main report procedure file is RVOAS. This file can be tailored to user needs (long or short reports, change cut off points for QDEL hits, or only printing a cover sheet). The procedure file can print a cover sheet, a diagnostic report, QDEL low hits, and print an extended report.

Report procedure file format:

TRF,RVOAS,>DATAFILE,^QUANT,DIL,QCFILE

10.4.2 The procedure file QCUPD is used to print a summary report for LCS/LCD and MS/MSD pairs. This procedure file also creates a QCFILE that is used to print the QC summary on each report.

QC Summary procedure file format:

TRF,QCUPD,>LCS,^LCS,^LCD,QCFILE NAME

Generally the QCFILE NAME convention is ABNNNN where:

A = M for MS/MSD, L for LCS/LCD
B = Matrix: S for soil, L for liquid, and X for extraction.
NNNN = Date, e.g. Jan 14 is 0114.

Instrument D is an exception and uses the convention ANNNNB.

10.5 Starting Batch Data Acquisition

10.5.1 Set up the GC/MS system with the sample sequence file with:

BAMON,BA,SYSTEM NO.,SEQUENCE FILE NAME

Then start the batch acquisition with:

BAMON,GO,SYSTEM NO.

The set point file is down loaded to the GC, and once all temperatures have been reached, it will be ready. The GC/MS will wait for the Tekmar autosampler to be ready just like the Tekmar will wait for the GC/MS. Once the Tekmar steps to DESORB READY, the GC/MS reaches all its set points, and the data system signals it is ready, the run will start and the system will run through the sequence and only stop by operator request or error.

10.6 Evaluating the Data

10.6.1 When the shift has completed, run the user program IAREA to print out a tabulation of all the internal standards' retention times and areas. The format of the user program is:

IAREA,^STD,^1ST SAMPLE,NO. OF SAMPLES

10.6.2 Review the internal standard retention times. No internal standard retention time should vary by more than 30 seconds from the daily standard. If this occurs, the chromatographic system should be checked and corrections made as necessary. Affected samples will be reanalyzed.

10.6.3 Review the internal standard areas. The areas should not vary by more than a factor of two (-50% to +100%). If the areas do vary by more than a factor of two, IAREA will flag the area and the analyst should check to see if the peak has been correctly integrated. If the area is outside the limits, the system should be checked and corrected if necessary. The sample will be reanalyzed. If, upon verification that the instrument is operating properly, the areas are still outside of the limits, submit both analyses with the data package and document the actions taken. If a sample has one or two internal standard areas that lie outside the limits, it is usually considered an acceptable analysis. The internal standard areas of all QC samples must pass.

10.6.4 Verify that the sample was analyzed at the proper dilution. If any sample contains target compounds that are outside the range of the calibration curve (over 400 ppb), the sample should be diluted by the appropriate factor and reanalyzed. Any sample that has been diluted should contain levels of compounds (target or nontarget) that are high enough to justify the dilution.

10.6.5 The analyst should also check surrogate recoveries to verify that all surrogate recoveries fall within the limits determined in the laboratory. The sample must be reanalyzed if any of the three surrogates fail. If the sample is reanalyzed and the surrogates fail again, sample matrix interference can be given as the cause.

If the analyst loading the instrument notices a sample fails during the shift, that analyst should schedule that sample for a rerun by entering it into the Rerun Log Book.

10.7 Tentatively Identified Compounds (TIC)

10.7.1 A library search or a Tentatively Identified Compound (TIC) report is performed only by specific client request. A TIC usually adds to the cost of the analysis. To perform a TIC, first put the quant file back to its original state (the report procedure QDEL's all low hits) by typing "QDEL,^DATAFILENAME,Q" at the FMGR prompt. Then type "QDEL,^DATAFILENAME,E" to edit the quant file manually. Delete all false positive hits so those peaks can be searched. Also delete all extremely low level hits. The small peaks will not by searched anyway because a peak's area has to be at least 10% of the area of the nearest internal standard. After the QDEL is complete start the search by typing:

TRF,TIC,>DATAFILENAME

10.7.2 When the search is complete reduce the report by separating the sheets, putting the TIC cover sheet on top, and evaluating the spectra. Call any compounds that look like good matches.

10.7.3 An unknown peak cannot be given a specific name with only its spectra. A retention time would also need to be matched, which could only be done by analyzing a standard of the unknown. Therefore, TIC's are usually only identified by a generalized name, for example, branched hydrocarbon. It is better to give a more general name if the unknown spectrum does not strikingly match the library spectrum. Report "Hydrocarbon" as opposed to "Branched Hydrocarbon" or "Alkyl Naphthalene" for example. Fill out the TIC data sheet.

10.8 Assembling the Report

10.8.1 All data is reduced by shift. All the data for each 12-hour tune shift is placed in its own labeled shift folder. Inside a reduced shift folder will be, from top to bottom:

1.) Completed Data Package Checklist
2.) Copy of Completed Instrument Shift Log
3.) I.S. Area Summary Report
4.) BFB Tune Report
5.) Continuing Calibration Report
6.) Raw Data from the Standard Run
7.) Reduced LCS/LCD and/or MS/MSD Data
8.) Raw data from unused runs

10.8.2 On top of the folder will be, from top to bottom:

1.) Sample reports for all successful shots from that shift.
2.) Blank sample reports.

10.8.3 Each sample report contains, from front to back:

1.) Cover Sheet
2.) QC Summaries
3.) TIC Summary (if any)
4.) Diagnostic Report
5.) Quant Report
6.) Chromatograph
7.) Spectra
8.) Library Search (if any)

10.8.4 All QC data (LCS/LCD and/or MS/MSD) is entered into LIMS on the VAX computer system. LIMS assigns batch numbers to the LCS/LCD pairs. The Enseco sample ID numbers are used for the MS/MSD batch numbers. If an MS/MSD batch number is already taken, add an A, or B, etc., to the end of the number until a new batch number is created. LIMS produces a print out of the LCS/LCD of MS/MSD data that has been entered. These hardcopies of the QC data are filed in a binder. The headers in the GC/MS Matrix Spike Log Book must be filled out. This log book tracks the number of samples using the MS/MSD pair.

10.8.5 On the cover sheet should be a batch number for the LCS/LCD data and the MS/MSD data. The cover sheet should be

initialed and dated at the top. Any hits in the blank should be written in the "Blank" column. All target compounds detected in the sample should be verified by retention time and spectrum. Make sure the sample was quantified against the current response factors by reviewing the R.F. column of the Diagnostic Report.

10.8.6 The QC Summaries are included on a per client job basis. For example, if there are four samples from the same client job, only one of their reduced reports needs to have a QC Summary.

10.8.7 When the data package seems completed, compare it to the Data Package Checklist. This list is also a good tutor for anyone new to what an Enseco GC/MS data package needs. Many special circumstances are quickly described using a footnote. To document any deviations from the method and its acceptance criteria, an anomaly report must be filed with any affected shifts.

10.8.8 Any samples that need to be rerun must be entered into the Rerun Log Book. A rerun log book entry contains the Enseco sample ID number, original dilution, shift in which the original dilution was analyzed, and a suggested rerun dilution. Also put an asterisk in the rerun column of the Sample Log Book.

10.8.9 Once the shift folder has been completed the completion date is noted in the Sample Log Book and then it is passed on to the GC/MS supervisor or a GC/MS data reviewer for a Level II review. After the data is reviewed, each sample cover sheet and any QC summaries are xeroxed and put into the job folders that are filed in the GC/MS laboratory. Once all the samples from a job are completed and copies of the reports are in the job folders, the job is ready to go to Data Management.

10.8.10 After the desired data has been xeroxed, the shift folder is filed in filing cabinets in the GC/MS laboratory. Data for approximately the last eight months is stored there for future reference. After eight months the data is boxed and stored in the Data Reduction room.

10.9 Archiving Data to Tape

10.9.1 Once every few weeks it is necessary to tape data off the system because the disks on the computer system fill up. The tapes used to archive data are 600 ft. 16 track cartridge tapes. From the FMGR prompt type CI and then from the CI prompt type TF. Use a "?" for explanation of commands and options. This puts you into the Tape Filer Utility. Set defaults with the DE command, for example:

DE,,9,KVAY

Then start a group of copy commands by typing "GR", then the copy commands of the form:

CO,SOURCE,DESTINATION

The destination parameter is left blank because the 9 in the DE command sets the destination to LU 9, the tape unit. After all the copy commands have been entered, end the group of copy commands with "EG", and then the taping starts.

10.9.2 A much easier method for taping data is to edit the procedure file "TFBKUP", placing file masks of the files you want to copy on the lines starting with the CO command. Then at the TF prompt simply type, TR,TFBKUP, and the procedure file does the rest for you. When using TFBKUP, make sure the A option in the DE command line is set the way you want it. "A" appears in the DE command line if you want to append to a previously used tape. Take the "A" option out if the tape is new.

10.9.3 A print out of the tape's directory must be made once the tape is full. The tapes for volatile analysis raw data are labeled using the date the data was taped and using the naming scheme:

A-1-xx e.g., A-1-83

where XX equals the sequential tape number. Place the print out of the directory in the binder marked "Raw Data Backup".

11. **QUALITY CONTROL**: The laboratory must, on an on going basis, demonstrate through the analysis of quality control check standards that the operation of the measurement system is in control. These QC samples consist of the

following: method blanks, LCS/LCD, MS/MSD, surrogates, internal standards, and check standards (see SOP # M-EQA-002).

11.1 BFB and Calibration: All acceptance criteria must be met for the BFB spectrum, initial, and continuing calibration before samples may be analyzed. The acceptance criteria and corrective action requirements were discussed previously in this document.

11.2 RB H2O: A water reagent blank is analyzed every tune shift and must demonstrate that interferences in the GC/MS system are in control.

11.3 LCS/LCD pairs: Duplicate laboratory control samples are analyzed for every 20 completed samples per sample per instrument. The spiking level for all LCS/LCD pairs is 50 ppb. Control limits are listed in Appendix A, Table 3.

11.4 MS/MSD pairs: Matrix spike and matrix spike duplicate pairs are analyzed for every 20 completed samples per matrix. The spiking level for all MS/MSD pairs is 50 ppb. Control limits are listed in Appendix A, Table 3.

11.5 SCS: A surrogate control sample is analyzed with every analytical lot. This sample serves as the method blank. An analytical lot for volatile organics is defined as samples analyzed within a twelve hour period. For samples extracted in methanol prior to analysis, an analytical lot is defined as those samples prepared at the same time.

11.6 Surrogates Spiked into Samples: Surrogate compounds are required to be spiked into all samples and QC samples for this method. The surrogate spiking level is 50 ppb. All surrogate recoveries for the reagent blank, QC samples, and samples must fall within the limits determined by the laboratory. The surrogates may lie outside the limits for a client sample, but it must be due to sample matrix effects. Control limits are listed in Appendix A, Table 3.

11.7 Data Acceptability: Is based upon the results of the Laboratory Control Samples unless otherwise negotiated with the client. QC data must fall within established control limits in order for the laboratory to be considered "in control" when samples from that QC lot were analyzed.

11.8 Corrective Action: When an out of control event is noted, corrective action is required. Corrective actions may include, but are not

limited to the following:

1. validation of analytical standards
2. inspection of instrument operational settings that affect linearity and sensitivity
3. repreparation and reanalysis of samples
4. inspection of sample data for matrix effects.

11.9 Control Limits: Control limits will be determined as described in SOP No.: M-EQA-002. Current historical limits generated by the laboratory will be available through LIMS and are also listed below in Appendix A, Table 3.

11.10 Method performance: A Method Detection Limit (MDL) study is performed to determine the lowest concentration the GC/MS system can detect with a 99% confidence that the value is non-zero. It is achieved by analyzing seven replicate spikes, each containing all target compounds of interest, at a concentration near the reporting limit, e.g. 5 ppb to 10 ppb. The MDL is calculated from the standard deviation of the replicate concentrations.

12. CALCULATIONS

12.1 Calculations required to verify automated data reduction

12.1.1 Response Factors

$$RF = \frac{(Ax)(Cis)}{(Ais)(Cx)}$$

Where: Ax = Area of the characteristic ion for the compound to be measured.
Ais = Area of the characteristic ion for the specific internal standard.
Cis = Concentration of the internal standard (ng/ul).
Cx = Concentration of the compound in ng/ul.

12.1.2 Average response factor

$$RFave = (RF20 + RF50 + RF100 + RF200 + RF400)/5$$

Where: RFx = Response factor of a compound in each of the calibration levels.

12.1.3 Percent Relative Standard Deviation

$$\%RSD = \frac{(SD)}{RFave} \times 100$$

Where: RSD = Relative Standard Deviation
RFave = Mean of initial response factors (per compound)
SD = Standard Deviation of initial response factors (per compound)

$$\text{Where: } SD = \sum_{i=1}^{N} \frac{(xi - x)^2}{N-1}$$

12.1.4 Percent Difference from average response factor

$$\% \text{ Difference} = \frac{RFi - RFc}{RFi} \times 100$$

Where: RFi = Average response factor from initial calibration.
RFc = Response factor from current calibration check standard.

12.1.5 Percent Recovery

$$\text{Matrix Spike Percent Recovery} = \frac{SSR - SR}{SA} \times 100$$

Where: SSR = Spike Sample Results
SR = Sample Result
SA = Spike Added from spiking mix

12.1.6 Relative Percent Difference

$$RPD = \frac{D1 - D2}{(D1 + D2)/2} \times 100$$

Where: RPD = Relative Percent Difference
D1 = First Sample Value
D2 = Second Sample Value (duplicate)

12.1.7 Medium Level Soil Concentration (dry weight)

$$\text{Concentration ug/Kg} = \frac{(Ax)(Is)(Vt)}{(Ais)(RF)(Vi)(Ws)(D)}$$

Where: Ax,Is,Ais,RF = Same as given for water above
Vt = Volume of total extract (ul) (use 10,000 ul or a factor of this when dilutions are made)
Vi = Volume of extract added for purging (ul)
D = (100 - % moisture)/100
Ws = Weight of sample extracted (grams)

12.1.8 Medium Level Soil Concentration (wet weight)

$$\text{Concentration ug/Kg} = \frac{(Ax)(Is)(Vt)}{(Ais)(RF)(Vi)(Ws)}$$

Where: Ax,Is,Ais,RF,Vt,Vt = Same as given for soil dry weight above.

12.1.9 Low Level Soil Concentration (dry weight)

$$\text{Concentration ug/Kg} = \frac{(Ax)(Is)(Vt)}{(Ais)(RF)(Vi)(Ws)(D)}$$

Where: Ax,Is,Ais,RF = Same as given for water, above
D = (100 - % moisture)/100
Ws = Weight of sample purged (grams)

12.1.10 Low Level Soil Concentration (wet weight)

$$\text{Concentration ug/Kg} = \frac{(Ax)(Is)}{(Ais)(RF)(Ws)}$$

Where: Ax,Is,Ais,RF = Same as given for water, above
Ws = Weight of sample purged (grams)

13. REPORTING REQUIREMENTS

13.1 Units: Solid and sludge samples will be reported in ug/kg on a wet weight basis, unless requested otherwise by the client. Samples that need methanol extraction will be reported in mg/kg.

13.2 Reporting limits: See Appendix A, Table 1. Reporting limits will be adjusted according to sample dilution.

13.3 Significant figures: All data will be reported with two significant figures.

13.4 LIMS data entry: All successful LCS/LCD pairs must be entered into LIMS under Spike Quality Control. (At the LIMSMENU choose PROJECT/ DATA MAINTENANCE then choose DCS). Solid LCS/LCD data is entered into the 8260-S category, and the medium level LCS/LCD data is entered into the 8260M-S category.

13.5 Footnotes: For most unusual circumstances that should be brought to the client's attention, there exists a footnote to describe the situation. A footnote symbol will be on the report near the item that needs annotation. A copy of the footnote list is found in Appendix A, Table 4

14. REFERENCES

14.1 Method Source: Method 8240, SW-846 Third Edition, USEPA, Office of Solid Waste and Emergency Response, Washington, DC 20460, September 1986.

14.2 Deviations from Source Methods

14.2.1 Deviations from the specified criteria for initial and continuing calibration are allowed, provided the rationale is documented on an anomaly report.

14.2.2 An internal QA/QC program has been adopted by Enseco, Inc. This is described in Enseco's "Quality Assurance Program Plan for Environmental Chemical Monitoring." Specific elements of the QC program are described in SOP NO. M-EQA-002: "Internal QC Checks--Laboratory Performance QC." The laboratory control samples generated in this program are used to monitor method performance. Matrix spikes are performed at the request of the client.

14.2.3 The medium level method for soil referred to in this SOP is equivalent to the high level method described in method 8240. The only exception is that this SOP uses a 5 g sample compared to the 4 g sample recommended in method 8240.

APPENDIX A

Table 1. 8260 Target Analyte List

Compound name	Concentration in Std (ppb)		Quant Ion	Reporting Limit (ppb)	
	Soil	Liquid	(m/z)	Liquid	Soil
Pentafluorobenzene (IS)	50	10	168	1.0	N/A
Bromoethane-d3	50	10	111	1.0	N/A
Dichlorodifluoromethane	50	10	85	1.0	20
Chloromethane	50	10	50	1.0	10
Bromomethane	50	10	94	1.0	10
Vinyl Chloride	50	10	62	1.0	10
Chloroethane	50	10	64	1.0	10
Methylene Chloride	50	10	84	1.0	5
Trichlorofluoromethane	50	10	101	1.0	10
1,1-Dichloroethene	50	10	96	1.0	5
trans-1,2-Dichloroethene	50	10	96	1.0	5
cis-1,2-Dichloroethene	50	10	96	1.0	5
1,1-Dichloroethane	50	10	63	1.0	5
2,2-Dichloropropane	50	10	77	1.0	5
Bromochloromethane	50	10	128	1.0	5
1,1,1-Trichloroethane	50	10	97	1.0	5
Chloroform	50	10	83	1.0	5
1,4-Difluorobenzene (IS)	50	10	114	N/A	N/A
1,2-Dichloroethane-d4 (SURR)	50	10	65	N/A	N/A
1,1-Dichloropropene	50	10	75	1.0	5
1,2-Dichloroethane	50	10	62	1.0	5
Dibromomethane	50	10	174	1.0	5
cis-1,3-Dichloropropene	50	10	75	1.0	5
trans-1,3-Dichloropropene	50	10	75	1.0	5
Carbon Tetrachloride	50	10	117	1.0	5
Bromodichloromethane	50	10	83	1.0	5
1,2-Dichloropropane	50	10	63	1.0	5
Trichloroethene	50	10	130	1.0	5
Toluene	50	10	92	1.0	5
1,2-Dibromoethane	50	10	107	1.0	5
1,1,2-Trichloroethane	50	10	97	1.0	5
Benzene	50	10	78	1.0	5
Toluene-d8 (SURR)	50	10	98	N/A	N/A

Compound name	Concentration in Std (ppb)		Quant Ion	Reporting Limit (ppb)	
	Soil	Liquid	(m/z)	Liquid	Soil
p-Bromofluorobenzene (SURR)	50	10	95	N/A	N/A
Chlorobenzene-d5 (IS)	50	10	117	N/A	N/A
1,3-Dichloropropane	50	10	76	1.0	5
Tetrachloroethene	50	10	164	1.0	5
Dibromochloromethane	50	10	129	1.0	5
1,1,1,2-Tetrachloroethane	50	10	131	1.0	5
Chlorobenzene	50	10	112	1.0	5
Ethylbenzene	50	10	106	1.0	5
m,p-Xylenes	100	20	106	1.0	5
o-Xylene	50	10	106	1.0	5
Styrene	50	10	104	1.0	5
Bromoform	50	10	173	1.0	5
1,4-Dichlorobenzene-d4 (IS)	50	10	152	N/A	N/A
Isopropylbenzene	50	10	105	1.0	5
1,1,2,2-Tetrachloroethane	50	10	83	1.0	5
Bromobenzene	50	10	156	1.0	5
1,2,3-Trichloropropane	50	10	75	1.0	5
2-Chlorotoluene	50	10	126	1.0	5
n-Propylbenzene	50	10	120	1.0	5
1,3,5-Trimethylbenzene	50	10	105	1.0	5
4-Chlorotoluene	50	10	91	1.0	5
tert-Butylbenzene	50	10	119	1.0	5
1,2,4-Trimethylbenzene	50	10	105	1.0	5
sec-Butylbenzene	50	10	105	1.0	5
p-Isopropyltoluene	50	10	119	1.0	5
1,3-Dichlorobenzene	50	10	146	1.0	5
1,4-Dichlorobenzene	50	10	146	1.0	5
n-Butylbenzene	50	10	91	1.0	5
1,2-Dichlorobenzene	50	10	146	1.0	5
1,2,4-Trichlorobenzene	50	10	180	1.0	5
1,2-Dibromo-3-Chloropropane	50	10	75	1.0	5
Hexachlorobutadiene	50	10	225	1.0	5
Napthalene	50	10	128	1.0	5
1,2,3-Trichlorobenzene	50	10	180	1.0	5

Target compounds are listed under their assigned internal standard (IS).

Table 2. CCC and SPCC Criteria

Calibration Check Compounds

Initail Calibration: The percent relative standard deviation, %RSD, for each compound listed below should be < 30.0%

Continuing Calibration: The percent difference, %D, from the average response factor determined in the initial calibration should be < 25.0% for each compound listed below.

Vinyl Chloride
1,1-Dichloroethene
Chloroform
1,2-Dichloropropane
Toluene
Ethylbenzene

System Performance Check Compounds

Initial Calibration: The average response factor for each compound listed below should be > 0.300 (0.250 for bromoform).

Continuing Calibration: The response factor for each compound listed below should be > 0.300 (0.250 for bromoform).

Chloromethane
1,1-Dichloroethane
Bromoform
1,1,2,2-Tetrachloroethane
Chlorobenzene

Table 3. Recovery and RPD Limits for 8260 and 8260-M

Surrogate Percent Recovery Limits *

Method	Spike Compound	Amount Spiked	Low Limit	High Limit	RPD
EPA 8260	Dibromofluorobenzene	50 ug/L	---	---	---
EPA 8260	Toluene-d8	50 ug/L	---	---	---
EPA 8260	Bromofluorobenzene	50 ug/L	---	---	---
EPA 8260-M	Dibromofluorobenzene	2.5 mg/Kg	---	---	---
EPA 8260-M	Toluene-d8	2.5 mg/Kg	---	---	---
EPA 8260-M	Bromofluorobenzene	2.5 mg/Kg	---	---	---
	Laboratory Control Sample Limits				
EPA 8260	1,1-Dichloroethene	50 ug/L	49%	133%	15
EPA 8260	Benzene	50 ug/L	79%	118%	14
EPA 8260	Chlorobenzene	50 ug/L	74%	129%	14
EPA 8260	Toluene	50 ug/L	75%	118%	14
EPA 8260	Trichloroethene	50 ug/L	76%	128%	15
EPA 8260-M	1,1-Dichloroethene	2.5 mg/Kg	44%	135%	18
EPA 8260-M	Benzene	2.5 mg/Kg	72%	126%	16
EPA 8260-M	Chlorobenzene	2.5 mg/Kg	74%	130%	14
EPA 8260-M	Toluene	2.5 mg/Kg	71%	123%	16
EPA 8260-M	Trichloroethene	2.5 mg/Kg	75%	132%	16

* See the supervisor or QA officer for the control limits

Table 3. Recovery and RPD Limits for 8260 and 8260-M

Matrix Spike Recovery Limits

Method	Spike Compound	Amount Spiked	Low Limit	High Limit	RPD
EPA 8260	1,1-Dichloroethene	50 ug/L	46%	138%	44
EPA 8260	Benzene	50 ug/L	46%	139%	44
EPA 8260	Chlorobenzene	50 ug/L	46%	140%	43
EPA 8260	Toluene	50 ug/L	46%	140%	43
EPA 8260	Trichloroethene	50 ug/L	47%	141%	43
EPA 8260-M	1,1-Dichloroethene	2.5 mg/Kg	54%	134%	25
EPA 8260-M	Benzene	2.5 mg/Kg	62%	126%	24
EPA 8260-M	Chlorobenzene	2.5 mg/Kg	67%	124%	22
EPA 8260-M	Toluene	2.5 mg/Kg	66%	126%	22
EPA 8260-M	Trichloroethene	2.5 mg/Kg	67%	124%	21

Table 4. Footnotes Legend

Footnote	Description
A	Aldol condensation product.
a	See narrative.
B	Compound is also detected in the blank.
b	Sample vial contained headspace before processing was initiated.
C	Analyte confirmed by GC/MS.
c	Value is outside of limits possibly due to sample matrix interference.
D	Compound quantitated at a secondary dilution.
d	Quality Control parameter outside of acceptance limits for this result. Reanalysis was not possible due to insufficient sample remaining. See narrative.
E	Concentration exceeds calibration range. Value is estimated.
e	&RESULT SUMMARY
F	Reported value estimated due to an interference.
f	Holding time was exceeded for analysis or processing. See narrative.
G	Reporting Limit elevated due to sample matrix interference.
g	Benzo(b) and Benzo(k) quantitated as an isomeric pair.
H	Surrogate not detected because of required sample dilution.
h	Reporting limit changed due to high background in the preparation blank.
I	Surrogate not detected because of required sample dilution.
i	Sample chromatographic pattern is not identical to the standard pattern used to calibrate the gas chromatograph.
J	Result is detected below the reporting limit or is an estimated concentration.
j	Analyte not recovery corrected. Toxaphane and Chlordane are multicomponent analytes, and therefore, interfere with the analysis of the single component analytes.
K	Identified by mass spectrum only; quantitation based on 1:1 response with internal standard.
k	Modified for soil analysis.
L	These components are not separable using this method and are therefore quantitated together.
l	Methylene chloride levels less than 5 times the reporting limit do not receive second column confirmation.
M	Primary result.
m	Analyte associated with sample processing and analysis in the lab environment. An acceptable blank must contain < 3 times the reporting limit of this analyte for this method.
N	Spiked sample recovery not within limits.
n	Spiked analyte out of matrix spike acceptance limits; refer to lab control sample results.
O	Preparation date exceeded holding time due to repreparation for QA reasons.
o	Reporting limit varies due to high level of analyte present in sample.
P	Analysis date exceeded holding time due to reanalysis for QA reasons.
p	Reporting limit was raised due to a dilution necessitated by initial post-digestion spike recovery of less than 40%.