APPENDIX C

6712

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYTICAL SERVICES

CERTIFICATE OF ANALYSIS

IT Corporation
5301 Central N.E., Suite 700
Albuquerque, NM 87108
ATTN: Barb Matz

November 30, 1990

Job Number: ITNA 47061

P.O. Number: 301215.03.04

This is the Certificate of Analysis for the following samples:

Client Project ID:	LANL ER
Date Received by Lab:	11/06/90
Number of Samples:	Thirteen (13)
Sample Type:	Water - eleven (11), Trip Blank - two (2)

I. Introduction

On 11/06/90, eleven (11) water samples and two (2) trip blanks arrived at the ITAS-Knoxville, Tennessee, laboratory from the IT-Albuquerque, New Mexico, office in support of the LANL ER project. The list of analytical tests performed, as well as date of receipt and analysis, can be found in the attached report.

II. Analytical Results/Methodology

The analytical results for this report are presented by analytical test. Each set of data will include sample identification information and the analytical results. Please note that all data are blank corrected, i.e., if any compound is found in the corresponding laboratory blank, it is subtracted from the analytical result before it is reported.

The samples were analyzed for Appendix IX dioxins at the ITAS Special Analysis Laboratory, Knoxville, Tennessee. A copy of their report is included.

The samples were analyzed for Appendix IX organophosphorus pesticides at the ITAS-San Jose, California, laboratory.

The samples were analyzed for Appendix IX volatile organic compounds by gas chromatography/mass spectroscopy (GC/MS) based on EPA SW-846 method 8240.

Reviewed and Approved:

Alyce Moore

Alyce Moore
Laboratory Manager

II. Analytical Results/Methodology (continued)

The samples were analyzed for Appendix IX semivolatile organic compounds by gas chromatography/mass spectroscopy (GC/MS) based on EPA SW-846 method 8270.

The samples were analyzed for Appendix IX organochlorine pesticides, PCBs and herbicides by gas chromatography/electron capture detection (GC/ECD) based on EPA SW-846 methods 8080 and 8150.

The samples were analyzed for Appendix IX metals by cold vapor atomic absorption spectroscopy (CVAA) and inductively coupled plasma spectroscopy (ICP) based on EPA SW-846 methods 7470, 3010 and 6010.

The samples were analyzed for total cyanide by manual distillation/colorimetric determination using EPA SW-846 method 9010.

The samples were analyzed for sulfide by iodometric titration based on EPA SW-846 method 9030.

III. Quality Control

The volatiles analyses were performed on 11/07 and 11/08/90 by purge and trap with a J&W DB-624 megabore column on a Finnigan OWA GC/MS/DS. The semivolatiles analyses were performed on 11/14/90 by direct injection of sample extract on a Restek RTX-5 capillary column on a Finnigan 4500 GC/MS/DS. Both volatiles and semivolatiles runs went well. Standardization was performed for all analytes, except that volatiles pyridine, isobutanol, and dioxane were evaluated based on earlier studies with standards on the same column type and conditions. These compounds have been seen to carry over and may cause false positives if the standards are run with the samples. There were no problems seen in final review of the data.

The pesticide/PCB analyses were performed from 11/26 to 11/28/90 using a mixed phase (SP2250/2401) column on the Varian 3740B instrument and a 3% OV-1 column on the Varian 3740A instrument. All water samples required treatment for sulfur interference; this was performed on 11/26/90. Sample LA04.5C exhibited low surrogate recovery. Sample APC02 had sample matrix interferences which resulted in an elevated detection limit for beta-BHC. No other problems were encountered.

The samples were analyzed for herbicides on 11/20/90. No problems were encountered.

The samples were digested on 11/20/90 for ICP. The samples for mercury analysis were prepared just prior to analysis. The CVAA analysis for mercury was performed on 11/12/90; the remaining metals were analyzed by ICP on 11/21/90. All run QC was acceptable.

The samples were analyzed for sulfide on 11/08/90 and for cyanide on 11/13/90. No problems were encountered in either analysis.

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IT Corporation
November 30, 1990

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LANL ER

Job Number: ITNA 47061

APPENDIX IX VOLATILE ORGANIC ANALYSIS

Results in µg/liter (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 1
Lab Sample ID: EB1107

Compound		Compound	
acetone	10 U	1,2-dichloropropane	5 U
acetonitrile	100 U	cis-1,3-dichloropropene	5 U
acrolein	10 U	trans-1,3-dichloropropene	5 U
acrylonitrile	10 U	1,4-dioxane	1,000 U
benzene	5 U	ethyl benzene	5 U
bromodichloromethane	5 U	ethyl cyanide	100 U
bromoform	5 U	ethyl methacrylate	10 U
bromomethane	10 U	2-hexanone	10 U
2-butanone	10 U	iodomethane	5 U
carbon disulfide	5 U	isobutyl alcohol	2,000 U
carbon tetrachloride	5 U	methacrylonitrile	10 U
chlorobenzene	5 U	methyl methacrylate	10 U
chloroethane	10 U	4-methyl-2-pentanone	10 U
3-chloro-1-propene	5 U	methylene chloride	2 J
chloroform	1 J	pyridine	20,000 U
chloromethane	10 U	styrene	5 U
chloroprene	5 U	1,1,1,2-tetrachloroethane	5 U
1,2-dibromo-3-chloropropane	10 U	1,1,2,2-tetrachloroethane	5 U
dibromochloromethane	5 U	tetrachloroethene	5 U
1,2-dibromoethane	5 U	toluene	5 U
dibromomethane	5 U	1,1,1-trichloroethane	5 U
trans-1,4-dichloro-2-butene	20 U	1,1,2-trichloroethane	5 U
dichlorodifluoromethane	20 U	trichloroethene	5 U
1,1-dichloroethane	5 U	trichlorofluoromethane	5 U
1,2-dichloroethane	5 U	1,2,3-trichloropropane	20 U
1,1-dichloroethene	5 U	vinyl acetate	10 U
trans-1,2-dichloroethene	5 U	vinyl chloride	10 U
		xylenes (total)	5 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date Analyzed: 11/07/90
Dilution Factor: 1

This method blank applies to the following samples: APC01, APC011, APC02, LA011, LA03A, LA04.5C, MC04B, MC06B and MC07A.

IT Corporation
November 30, 1990

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LANL ER

Job Number: ITNA 47061

APPENDIX IX VOLATILE ORGANIC ANALYSIS

Results in µg/liter (ppb)

Sample Matrix: Water

Client Sample ID: APC01
Lab Sample ID: PP1457

Compound		Compound	
acetone	10 U	1,2-dichloropropane	5 U
acetonitrile	100 U	cis-1,3-dichloropropene	5 U
acrolein	10 U	trans-1,3-dichloropropene	5 U
acrylonitrile	10 U	1,4-dioxane	1,000 U
benzene	5 U	ethyl benzene	5 U
bromodichloromethane	5 U	ethyl cyanide	100 U
bromoform	5 U	ethyl methacrylate	10 U
bromomethane	10 U	2-hexanone	10 U
2-butanone	10 U	iodomethane	5 U
carbon disulfide	5 U	isobutyl alcohol	2,000 U
carbon tetrachloride	5 U	methacrylonitrile	10 U
chlorobenzene	5 U	methyl methacrylate	10 U
chloroethane	10 U	4-methyl-2-pentanone	10 U
3-chloro-1-propene	5 U	methylene chloride	5 U
chloroform	5 U	pyridine	20,000 U
chloromethane	10 U	styrene	5 U
chloroprene	5 U	1,1,1,2-tetrachloroethane	5 U
1,2-dibromo-3-chloropropane	10 U	1,1,2,2-tetrachloroethane	5 U
dibromochloromethane	5 U	tetrachloroethene	5 U
1,2-dibromoethane	5 U	toluene	5 U
dibromomethane	5 U	1,1,1-trichloroethane	5 U
trans-1,4-dichloro-2-butene	20 U	1,1,2-trichloroethane	5 U
dichlorodifluoromethane	20 U	trichloroethene	5 U
1,1-dichloroethane	5 U	trichlorofluoromethane	5 U
1,2-dichloroethane	5 U	1,2,3-trichloropropane	20 U
1,1-dichloroethene	5 U	vinyl acetate	10 U
trans-1,2-dichloroethene	5 U	vinyl chloride	10 U
		xylenes (total)	5 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date Analyzed: 11/07/90
Dilution Factor: 1

IT Corporation
November 30, 1990

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LANL ER

Job Number: ITNA 47061

APPENDIX IX VOLATILE ORGANIC ANALYSIS

Results in µg/liter (ppb)

Sample Matrix: Water

Client Sample ID: APC02
Lab Sample ID: PP1458

Compound		Compound	
acetone	10 U	1,2-dichloropropane	5 U
acetonitrile	100 U	cis-1,3-dichloropropene	5 U
acrolein	10 U	trans-1,3-dichloropropene	5 U
acrylonitrile	10 U	1,4-dioxane	1,000 U
benzene	74	ethyl benzene	85
bromodichloromethane	5 U	ethyl cyanide	100 U
bromoform	5 U	ethyl methacrylate	10 U
bromomethane	10 U	2-hexanone	67
2-butanone	53	iodomethane	5 U
carbon disulfide	5 U	isobutyl alcohol	2,000 U
carbon tetrachloride	100	methacrylonitrile	10 U
chlorobenzene	81	methyl methacrylate	10 U
chloroethane	10 U	4-methyl-2-pentanone	10 U
3-chloro-1-propene	5 U	methylene chloride	5 U
chloroform	5 U	pyridine	20,000 U
chloromethane	10 U	styrene	5 U
chloroprene	5 U	1,1,1,2-tetrachloroethane	5 U
1,2-dibromo-3-chloropropane	10 U	1,1,2,2-tetrachloroethane	5 U
dibromochloromethane	5 U	tetrachloroethene	83
1,2-dibromoethane	5 U	toluene	86
dibromomethane	5 U	1,1,1-trichloroethane	97
trans-1,4-dichloro-2-butene	20 U	1,1,2-trichloroethane	110
dichlorodifluoromethane	20 U	trichloroethene	86
1,1-dichloroethane	69	trichlorofluoromethane	5 U
1,2-dichloroethane	90	1,2,3-trichloropropane	20 U
1,1-dichloroethene	5 U	vinyl acetate	10 U
trans-1,2-dichloroethene	5 U	vinyl chloride	10 U
		xylenes (total)	5 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date Analyzed: 11/07/90
Dilution Factor: 1

IT Corporation
November 30, 1990

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LANL ER

Job Number: ITNA 47061

APPENDIX IX VOLATILE ORGANIC ANALYSIS

Results in µg/liter (ppb)

Sample Matrix: Water

Client Sample ID: APC011
Lab Sample ID: PP1459

Compound		Compound	
acetone	10 U	1,2-dichloropropane	5 U
acetonitrile	100 U	cis-1,3-dichloropropene	5 U
acrolein	10 U	trans-1,3-dichloropropene	5 U
acrylonitrile	10 U	1,4-dioxane	1,000 U
benzene	5 U	ethyl benzene	5 U
bromodichloromethane	5 U	ethyl cyanide	100 U
bromoform	5 U	ethyl methacrylate	10 U
bromomethane	10 U	2-hexanone	10 U
2-butanone	10 U	iodomethane	5 U
carbon disulfide	5 U	isobutyl alcohol	2,000 U
carbon tetrachloride	5 U	methacrylonitrile	10 U
chlorobenzene	5 U	methyl methacrylate	10 U
chloroethane	10 U	4-methyl-2-pentanone	10 U
3-chloro-1-propene	5 U	methylene chloride	5 U
chloroform	5 U	pyridine	20,000 U
chloromethane	10 U	styrene	5 U
chloroprene	5 U	1,1,1,2-tetrachloroethane	5 U
1,2-dibromo-3-chloropropane	10 U	1,1,2,2-tetrachloroethane	5 U
dibromochloromethane	5 U	tetrachloroethene	5 U
1,2-dibromoethane	5 U	toluene	5 U
dibromomethane	5 U	1,1,1-trichloroethane	5 U
trans-1,4-dichloro-2-butene	20 U	1,1,2-trichloroethane	5 U
dichlorodifluoromethane	20 U	trichloroethene	5 U
1,1-dichloroethane	5 U	trichlorofluoromethane	5 U
1,2-dichloroethane	5 U	1,2,3-trichloropropane	20 U
1,1-dichloroethene	5 U	vinyl acetate	10 U
trans-1,2-dichloroethene	5 U	vinyl chloride	10 U
		xylenes (total)	5 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date Analyzed: 11/07/90
Dilution Factor: 1

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November 30, 1990

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LANL ER

Job Number: ITNA 47061

APPENDIX IX VOLATILE ORGANIC ANALYSIS

Results in µg/liter (ppb)

Sample Matrix: Water

Client Sample ID: LA03A
Lab Sample ID: PP1460

Compound		Compound	
acetone	10 U	1,2-dichloropropane	5 U
acetonitrile	100 U	cis-1,3-dichloropropene	5 U
acrolein	10 U	trans-1,3-dichloropropene	5 U
acrylonitrile	10 U	1,4-dioxane	1,000 U
benzene	5 U	ethyl benzene	5 U
bromodichloromethane	5 U	ethyl cyanide	100 U
bromoform	5 U	ethyl methacrylate	10 U
bromomethane	10 U	2-hexanone	10 U
2-butanone	10 U	iodomethane	5 U
carbon disulfide	5 U	isobutyl alcohol	2,000 U
carbon tetrachloride	5 U	methacrylonitrile	10 U
chlorobenzene	5 U	methyl methacrylate	10 U
chloroethane	10 U	4-methyl-2-pentanone	10 U
3-chloro-1-propene	5 U	methylene chloride	5 U
chloroform	5 U	pyridine	20,000 U
chloromethane	10 U	styrene	5 U
chloroprene	5 U	1,1,1,2-tetrachloroethane	5 U
1,2-dibromo-3-chloropropane	10 U	1,1,2,2-tetrachloroethane	5 U
dibromochloromethane	5 U	tetrachloroethene	5 U
1,2-dibromoethane	5 U	toluene	5 U
dibromomethane	5 U	1,1,1-trichloroethane	5 U
trans-1,4-dichloro-2-butene	20 U	1,1,2-trichloroethane	5 U
dichlorodifluoromethane	20 U	trichloroethene	5 U
1,1-dichloroethane	5 U	trichlorofluoromethane	5 U
1,2-dichloroethane	5 U	1,2,3-trichloropropane	20 U
1,1-dichloroethene	5 U	vinyl acetate	10 U
trans-1,2-dichloroethene	5 U	vinyl chloride	10 U
		xylenes (total)	5 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date Analyzed: 11/07/90
Dilution Factor: 1

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IT Corporation
November 30, 1990

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LANL ER

Job Number: ITNA 47061

APPENDIX IX VOLATILE ORGANIC ANALYSIS

Results in µg/liter (ppb)

Sample Matrix: Water

Client Sample ID: LA04.5C
Lab Sample ID: PP1461

Compound		Compound	
acetone	10 U	1,2-dichloropropane	5 U
acetonitrile	100 U	cis-1,3-dichloropropene	5 U
acrolein	10 U	trans-1,3-dichloropropene	5 U
acrylonitrile	10 U	1,4-dioxane	1,000 U
benzene	5 U	ethyl benzene	5 U
bromodichloromethane	5 U	ethyl cyanide	100 U
bromoform	5 U	ethyl methacrylate	10 U
bromomethane	10 U	2-hexanone	10 U
2-butanone	10 U	iodomethane	5 U
carbon disulfide	5 U	isobutyl alcohol	2,000 U
carbon tetrachloride	5 U	methacrylonitrile	10 U
chlorobenzene	5 U	methyl methacrylate	10 U
chloroethane	10 U	4-methyl-2-pentanone	10 U
3-chloro-1-propene	5 U	methylene chloride	5 U
chloroform	5 U	pyridine	20,000 U
chloromethane	10 U	styrene	5 U
chloroprene	5 U	1,1,1,2-tetrachloroethane	5 U
1,2-dibromo-3-chloropropane	10 U	1,1,2,2-tetrachloroethane	5 U
dibromochloromethane	5 U	tetrachloroethene	5 U
1,2-dibromoethane	5 U	toluene	5 U
dibromomethane	5 U	1,1,1-trichloroethane	5 U
trans-1,4-dichloro-2-butene	20 U	1,1,2-trichloroethane	5 U
dichlorodifluoromethane	20 U	trichloroethene	5 U
1,1-dichloroethane	5 U	trichlorofluoromethane	5 U
1,2-dichloroethane	5 U	1,2,3-trichloropropane	20 U
1,1-dichloroethene	5 U	vinyl acetate	10 U
trans-1,2-dichloroethene	5 U	vinyl chloride	10 U
		xylenes (total)	5 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date Analyzed: 11/07/90
Dilution Factor: 1

IT Corporation
November 30, 1990

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LANL ER

Job Number: ITNA 47061

APPENDIX IX VOLATILE ORGANIC ANALYSIS

Results in µg/liter (ppb)

Sample Matrix: Water

Client Sample ID: LA011
Lab Sample ID: PP1462

Compound		Compound	
acetone	10 U	1,2-dichloropropane	5 U
acetonitrile	100 U	cis-1,3-dichloropropene	5 U
acrolein	10 U	trans-1,3-dichloropropene	5 U
acrylonitrile	10 U	1,4-dioxane	1,000 U
benzene	5 U	ethyl benzene	5 U
bromodichloromethane	5 U	ethyl cyanide	100 U
bromoform	5 U	ethyl methacrylate	10 U
bromomethane	10 U	2-hexanone	10 U
2-butanone	10 U	iodomethane	5 U
carbon disulfide	5 U	isobutyl alcohol	2,000 U
carbon tetrachloride	5 U	methacrylonitrile	10 U
chlorobenzene	5 U	methyl methacrylate	10 U
chloroethane	10 U	4-methyl-2-pentanone	10 U
3-chloro-1-propene	5 U	methylene chloride	5 U
chloroform	5 U	pyridine	20,000 U
chloromethane	10 U	styrene	5 U
chloroprene	5 U	1,1,1,2-tetrachloroethane	5 U
1,2-dibromo-3-chloropropane	10 U	1,1,2,2-tetrachloroethane	5 U
dibromochloromethane	5 U	tetrachloroethene	5 U
1,2-dibromoethane	5 U	toluene	5 U
dibromomethane	5 U	1,1,1-trichloroethane	5 U
trans-1,4-dichloro-2-butene	20 U	1,1,2-trichloroethane	5 U
dichlorodifluoromethane	20 U	trichloroethene	5 U
1,1-dichloroethane	5 U	trichlorofluoromethane	5 U
1,2-dichloroethane	5 U	1,2,3-trichloropropane	20 U
1,1-dichloroethene	5 U	vinyl acetate	10 U
trans-1,2-dichloroethene	5 U	vinyl chloride	10 U
		xylenes (total)	5 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date Analyzed: 11/07/90
Dilution Factor: 1

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IT Corporation
November 30, 1990

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LANL ER

Job Number: ITNA 47061

APPENDIX IX VOLATILE ORGANIC ANALYSIS

Results in µg/liter (ppb)

Sample Matrix: Water

Client Sample ID: MC04B
Lab Sample ID: PP1463

Compound		Compound	
acetone	10 U	1,2-dichloropropane	5 U
acetonitrile	100 U	cis-1,3-dichloropropene	5 U
acrolein	10 U	trans-1,3-dichloropropene	5 U
acrylonitrile	10 U	1,4-dioxane	1,000 U
benzene	5 U	ethyl benzene	5 U
bromodichloromethane	5 U	ethyl cyanide	100 U
bromoform	5 U	ethyl methacrylate	10 U
bromomethane	10 U	2-hexanone	10 U
2-butanone	10 U	iodomethane	5 U
carbon disulfide	5 U	isobutyl alcohol	2,000 U
carbon tetrachloride	5 U	methacrylonitrile	10 U
chlorobenzene	5 U	methyl methacrylate	10 U
chloroethane	10 U	4-methyl-2-pentanone	10 U
3-chloro-1-propene	5 U	methylene chloride	5 U
chloroform	5 U	pyridine	20,000 U
chloromethane	10 U	styrene	5 U
chloroprene	5 U	1,1,1,2-tetrachloroethane	5 U
1,2-dibromo-3-chloropropane	10 U	1,1,2,2-tetrachloroethane	5 U
dibromochloromethane	5 U	tetrachloroethene	5 U
1,2-dibromoethane	5 U	toluene	5 U
dibromomethane	5 U	1,1,1-trichloroethane	5 U
trans-1,4-dichloro-2-butene	20 U	1,1,2-trichloroethane	5 U
dichlorodifluoromethane	20 U	trichloroethene	5 U
1,1-dichloroethane	5 U	trichlorofluoromethane	5 U
1,2-dichloroethane	5 U	1,2,3-trichloropropane	20 U
1,1-dichloroethene	5 U	vinyl acetate	10 U
trans-1,2-dichloroethene	5 U	vinyl chloride	10 U
		xylenes (total)	5 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date Analyzed: 11/07/90
Dilution Factor: 1

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IT Corporation
November 30, 1990

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LANL ER

Job Number: ITNA 47061

APPENDIX IX VOLATILE ORGANIC ANALYSIS

Results in µg/liter (ppb)

Sample Matrix: Water

Client Sample ID: MC06B
Lab Sample ID: PP1464

Compound		Compound	
acetone	10 U	1,2-dichloropropane	5 U
acetonitrile	100 U	cis-1,3-dichloropropene	5 U
acrolein	10 U	trans-1,3-dichloropropene	5 U
acrylonitrile	10 U	1,4-dioxane	1,000 U
benzene	5 U	ethyl benzene	5 U
bromodichloromethane	5 U	ethyl cyanide	100 U
bromoform	5 U	ethyl methacrylate	10 U
bromomethane	10 U	2-hexanone	10 U
2-butanone	10 U	iodomethane	5 U
carbon disulfide	5 U	isobutyl alcohol	2,000 U
carbon tetrachloride	5 U	methacrylonitrile	10 U
chlorobenzene	5 U	methyl methacrylate	10 U
chloroethane	10 U	4-methyl-2-pentanone	10 U
3-chloro-1-propene	5 U	methylene chloride	5 U
chloroform	5 U	pyridine	20,000 U
chloromethane	10 U	styrene	5 U
chloroprene	5 U	1,1,1,2-tetrachloroethane	5 U
1,2-dibromo-3-chloropropane	10 U	1,1,2,2-tetrachloroethane	5 U
dibromochloromethane	5 U	tetrachloroethene	5 U
1,2-dibromoethane	5 U	toluene	5 U
dibromomethane	5 U	1,1,1-trichloroethane	5 U
trans-1,4-dichloro-2-butene	20 U	1,1,2-trichloroethane	5 U
dichlorodifluoromethane	20 U	trichloroethene	5 U
1,1-dichloroethane	5 U	trichlorofluoromethane	5 U
1,2-dichloroethane	5 U	1,2,3-trichloropropane	20 U
1,1-dichloroethene	5 U	vinyl acetate	10 U
trans-1,2-dichloroethene	5 U	vinyl chloride	10 U
		xylenes (total)	5 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date Analyzed: 11/07/90
Dilution Factor: 1

IT Corporation
November 30, 1990

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LANL ER

Job Number: ITNA 47061

APPENDIX IX VOLATILE ORGANIC ANALYSIS

Results in µg/liter (ppb)

Sample Matrix: Water

Client Sample ID: MC07A
Lab Sample ID: PP1465

Compound		Compound	
acetone	10 U	1,2-dichloropropane	5 U
acetonitrile	100 U	cis-1,3-dichloropropene	5 U
acrolein	10 U	trans-1,3-dichloropropene	5 U
acrylonitrile	10 U	1,4-dioxane	1,000 U
benzene	5 U	ethyl benzene	5 U
bromodichloromethane	5 U	ethyl cyanide	100 U
bromoform	5 U	ethyl methacrylate	10 U
bromomethane	10 U	2-hexanone	10 U
2-butanone	10 U	iodomethane	5 U
carbon disulfide	5 U	isobutyl alcohol	2,000 U
carbon tetrachloride	5 U	methacrylonitrile	10 U
chlorobenzene	5 U	methyl methacrylate	10 U
chloroethane	10 U	4-methyl-2-pentanone	10 U
3-chloro-1-propene	5 U	methylene chloride	5 U
chloroform	5 U	pyridine	20,000 U
chloromethane	10 U	styrene	5 U
chloroprene	5 U	1,1,1,2-tetrachloroethane	5 U
1,2-dibromo-3-chloropropane	10 U	1,1,2,2-tetrachloroethane	5 U
dibromochloromethane	5 U	tetrachloroethene	5 U
1,2-dibromoethane	5 U	toluene	5 U
dibromomethane	5 U	1,1,1-trichloroethane	5 U
trans-1,4-dichloro-2-butene	20 U	1,1,2-trichloroethane	5 U
dichlorodifluoromethane	20 U	trichloroethene	5 U
1,1-dichloroethane	5 U	trichlorofluoromethane	5 U
1,2-dichloroethane	5 U	1,2,3-trichloropropane	20 U
1,1-dichloroethene	5 U	vinyl acetate	10 U
trans-1,2-dichloroethene	5 U	vinyl chloride	10 U
		xylenes (total)	5 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date Analyzed: 11/07/90
Dilution Factor: 1

IT Corporation
November 30, 1990

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LANL ER

Job Number: ITNA 47061

APPENDIX IX VOLATILE ORGANIC ANALYSIS

Results in µg/liter (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 2
Lab Sample ID: EB1108

Compound		Compound	
acetone	10 U	1,2-dichloropropane	5 U
acetonitrile	100 U	cis-1,3-dichloropropene	5 U
acrolein	10 U	trans-1,3-dichloropropene	5 U
acrylonitrile	10 U	1,4-dioxane	1,000 U
benzene	5 U	ethyl benzene	5 U
bromodichloromethane	5 U	ethyl cyanide	100 U
bromoform	5 U	ethyl methacrylate	10 U
bromomethane	10 U	2-hexanone	10 U
2-butanone	10 U	iodomethane	5 U
carbon disulfide	5 U	isobutyl alcohol	2,000 U
carbon tetrachloride	5 U	methacrylonitrile	10 U
chlorobenzene	5 U	methyl methacrylate	10 U
chloroethane	10 U	4-methyl-2-pentanone	10 U
3-chloro-1-propene	5 U	methylene chloride	5 U
chloroform	5 U	pyridine	20,000 U
chloromethane	10 U	styrene	5 U
chloroprene	5 U	1,1,1,2-tetrachloroethane	5 U
1,2-dibromo-3-chloropropane	10 U	1,1,2,2-tetrachloroethane	5 U
dibromochloromethane	5 U	tetrachloroethene	5 U
1,2-dibromoethane	5 U	toluene	5 U
dibromomethane	5 U	1,1,1-trichloroethane	5 U
trans-1,4-dichloro-2-butene	20 U	1,1,2-trichloroethane	5 U
dichlorodifluoromethane	20 U	trichloroethene	5 U
1,1-dichloroethane	5 U	trichlorofluoromethane	5 U
1,2-dichloroethane	5 U	1,2,3-trichloropropane	20 U
1,1-dichloroethene	5 U	vinyl acetate	10 U
trans-1,2-dichloroethene	5 U	vinyl chloride	10 U
		xylenes (total)	5 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date Analyzed: 11/08/90
Dilution Factor: 1

This method blank applies to the following samples: APCO-TB, MC010, MC011 and MCO-TB.

IT Corporation
November 30, 1990

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LANL ER

Job Number: ITNA 47061

APPENDIX IX VOLATILE ORGANIC ANALYSIS

Results in µg/liter (ppb)

Sample Matrix: Water

Client Sample ID: APCO-TB
Lab Sample ID: PP1468

Compound		Compound	
acetone	10 U	1,2-dichloropropane	5 U
acetonitrile	100 U	cis-1,3-dichloropropene	5 U
acrolein	10 U	trans-1,3-dichloropropene	5 U
acrylonitrile	10 U	1,4-dioxane	1,000 U
benzene	5 U	ethyl benzene	5 U
bromodichloromethane	5 U	ethyl cyanide	100 U
bromoform	5 U	ethyl methacrylate	10 U
bromomethane	10 U	2-hexanone	10 U
2-butanone	10 U	iodomethane	5 U
carbon disulfide	5 U	isobutyl alcohol	2,000 U
carbon tetrachloride	5 U	methacrylonitrile	10 U
chlorobenzene	5 U	methyl methacrylate	10 U
chloroethane	10 U	4-methyl-2-pentanone	10 U
3-chloro-1-propene	5 U	methylene chloride	5 U
chloroform	5 U	pyridine	20,000 U
chloromethane	10 U	styrene	5 U
chloroprene	5 U	1,1,1,2-tetrachloroethane	5 U
1,2-dibromo-3-chloropropane	10 U	1,1,2,2-tetrachloroethane	5 U
dibromochloromethane	5 U	tetrachloroethene	5 U
1,2-dibromoethane	5 U	toluene	5 U
dibromomethane	5 U	1,1,1-trichloroethane	5 U
trans-1,4-dichloro-2-butene	20 U	1,1,2-trichloroethane	5 U
dichlorodifluoromethane	20 U	trichloroethene	5 U
1,1-dichloroethane	5 U	trichlorofluoromethane	5 U
1,2-dichloroethane	5 U	1,2,3-trichloropropane	20 U
1,1-dichloroethene	5 U	vinyl acetate	10 U
trans-1,2-dichloroethene	5 U	vinyl chloride	10 U
		xylenes (total)	5 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date Analyzed: 11/08/90
Dilution Factor: 1

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IT Corporation
November 30, 1990

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LANL ER

Job Number: ITNA 47061

APPENDIX IX VOLATILE ORGANIC ANALYSIS

Results in µg/liter (ppb)

Sample Matrix: Water

Client Sample ID: MCO-TB
Lab Sample ID: PP1469

Compound		Compound	
acetone	10 U	1,2-dichloropropane	5 U
acetonitrile	100 U	cis-1,3-dichloropropene	5 U
acrolein	10 U	trans-1,3-dichloropropene	5 U
acrylonitrile	10 U	1,4-dioxane	1,000 U
benzene	5 U	ethyl benzene	5 U
bromodichloromethane	5 U	ethyl cyanide	100 U
bromoform	5 U	ethyl methacrylate	10 U
bromomethane	10 U	2-hexanone	10 U
2-butanone	10 U	iodomethane	5 U
carbon disulfide	5 U	isobutyl alcohol	2,000 U
carbon tetrachloride	5 U	methacrylonitrile	10 U
chlorobenzene	5 U	methyl methacrylate	10 U
chloroethane	10 U	4-methyl-2-pentanone	10 U
3-chloro-1-propene	5 U	methylene chloride	5 U
chloroform	5 U	pyridine	20,000 U
chloromethane	10 U	styrene	5 U
chloroprene	5 U	1,1,1,2-tetrachloroethane	5 U
1,2-dibromo-3-chloropropane	10 U	1,1,2,2-tetrachloroethane	5 U
dibromochloromethane	5 U	tetrachloroethene	5 U
1,2-dibromoethane	5 U	toluene	5 U
dibromomethane	5 U	1,1,1-trichloroethane	5 U
trans-1,4-dichloro-2-butene	20 U	1,1,2-trichloroethane	5 U
dichlorodifluoromethane	20 U	trichloroethene	5 U
1,1-dichloroethane	5 U	trichlorofluoromethane	5 U
1,2-dichloroethane	5 U	1,2,3-trichloropropane	20 U
1,1-dichloroethene	5 U	vinyl acetate	10 U
trans-1,2-dichloroethene	5 U	vinyl chloride	10 U
		xylenes (total)	5 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date Analyzed: 11/08/90
Dilution Factor: 1

IT Corporation
November 30, 1990

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LANL ER

Job Number: ITNA 47061

APPENDIX IX VOLATILE ORGANIC ANALYSIS

Results in µg/liter (ppb)

Sample Matrix: Water

Client Sample ID: MC010
Lab Sample ID: PP1466

Compound		Compound	
acetone	10 U	1,2-dichloropropane	5 U
acetonitrile	100 U	cis-1,3-dichloropropene	5 U
acrolein	10 U	trans-1,3-dichloropropene	5 U
acrylonitrile	10 U	1,4-dioxane	1,000 U
benzene	5 U	ethyl benzene	5 U
bromodichloromethane	5 U	ethyl cyanide	100 U
bromoform	5 U	ethyl methacrylate	10 U
bromomethane	10 U	2-hexanone	10 U
2-butanone	10 U	iodomethane	5 U
carbon disulfide	5 U	isobutyl alcohol	2,000 U
carbon tetrachloride	5 U	methacrylonitrile	10 U
chlorobenzene	5 U	methyl methacrylate	10 U
chloroethane	10 U	4-methyl-2-pentanone	10 U
3-chloro-1-propene	5 U	methylene chloride	5 U
chloroform	5 U	pyridine	20,000 U
chloromethane	10 U	styrene	5 U
chloroprene	5 U	1,1,1,2-tetrachloroethane	5 U
1,2-dibromo-3-chloropropane	10 U	1,1,2,2-tetrachloroethane	5 U
dibromochloromethane	5 U	tetrachloroethene	5 U
1,2-dibromoethane	5 U	toluene	5 U
dibromomethane	5 U	1,1,1-trichloroethane	5 U
trans-1,4-dichloro-2-butene	20 U	1,1,2-trichloroethane	5 U
dichlorodifluoromethane	20 U	trichloroethene	5 U
1,1-dichloroethane	5 U	trichlorofluoromethane	5 U
1,2-dichloroethane	5 U	1,2,3-trichloropropane	20 U
1,1-dichloroethene	5 U	vinyl acetate	10 U
trans-1,2-dichloroethene	5 U	vinyl chloride	10 U
		xylenes (total)	5 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date Analyzed: 11/08/90
Dilution Factor: 1

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IT Corporation
November 30, 1990

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LANL ER

Job Number: ITNA 47061

APPENDIX IX VOLATILE ORGANIC ANALYSIS

Results in µg/liter (ppb)

Sample Matrix: Water

Client Sample ID: MC011
Lab Sample ID: PP1467

Compound		Compound	
acetone	10 U	1,2-dichloropropane	5 U
acetonitrile	100 U	cis-1,3-dichloropropene	5 U
acrolein	10 U	trans-1,3-dichloropropene	5 U
acrylonitrile	10 U	1,4-dioxane	1,000 U
benzene	5 U	ethyl benzene	5 U
bromodichloromethane	5 U	ethyl cyanide	100 U
bromoform	5 U	ethyl methacrylate	10 U
bromomethane	10 U	2-hexanone	10 U
2-butanone	10 U	iodomethane	5 U
carbon disulfide	5 U	isobutyl alcohol	2,000 U
carbon tetrachloride	5 U	methacrylonitrile	10 U
chlorobenzene	5 U	methyl methacrylate	10 U
chloroethane	10 U	4-methyl-2-pentanone	10 U
3-chloro-1-propene	5 U	methylene chloride	5 U
chloroform	5 U	pyridine	20,000 U
chloromethane	10 U	styrene	5 U
chloroprene	5 U	1,1,1,2-tetrachloroethane	5 U
1,2-dibromo-3-chloropropane	10 U	1,1,2,2-tetrachloroethane	5 U
dibromochloromethane	5 U	tetrachloroethene	5 U
1,2-dibromoethane	5 U	toluene	5 U
dibromomethane	5 U	1,1,1-trichloroethane	5 U
trans-1,4-dichloro-2-butene	20 U	1,1,2-trichloroethane	5 U
dichlorodifluoromethane	20 U	trichloroethene	5 U
1,1-dichloroethane	5 U	trichlorofluoromethane	5 U
1,2-dichloroethane	5 U	1,2,3-trichloropropane	20 U
1,1-dichloroethene	5 U	vinyl acetate	10 U
trans-1,2-dichloroethene	5 U	vinyl chloride	10 U
		xylenes (total)	5 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date Analyzed: 11/08/90
Dilution Factor: 1

WATER SURROGATE PERCENT RECOVERY SUMMARY

	VOLATILE		
Sample No.	Toluene-D8 (88-110%)*	BFB (86-115%)*	1,2 Dichloroethane-D4 (76-114%)*
APC01	102	110	92
APC011	107	106	92
APC02	98	99	94
APC0-TB	99	104	97
LA011	94	101	84
LA03A	103	110	90
LA04.5C	98	108	84
MC010	94	100	94
MC011	98	105	93
MC04B	96	103	85
MC06B	100	101	85
MC07A	93	97	85
MC0-TB	98	104	93
Method Blank 1	98	101	94
Method Blank 2	93	99	94

* - Values in parenthesis represent USEPA contract required QC limits.

APPENDIX IX SEMIVOLATILE ANALYSIS

Results in µg/liter (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 1
Lab Sample ID: BLA1935

Compound		Compound	
phenol	10 U	bis(2-chloroethoxy)methane	10 U
bis(2-chloroethyl)ether	10 U	2,4-dichlorophenol	10 U
2-chlorophenol	10 U	1,2,4-trichlorobenzene	10 U
1,3-dichlorobenzene	10 U	naphthalene	10 U
1,4-dichlorobenzene	10 U	4-chloroaniline	10 U
benzyl alcohol	10 U	hexachlorobutadiene	10 U
1,2-dichlorobenzene	10 U	4-chloro-3-methylphenol	10 U
2-methylphenol	10 U	2-methylnaphthalene	10 U
bis(2-chloroisopropyl)ether	10 U	hexachlorocyclopentadiene	10 U
4-methylphenol	10 U	2,4,6-trichlorophenol	10 U
n-nitroso-di-n-propylamine	10 U	2,4,5-trichlorophenol	50 U
hexachloroethane	10 U	2-chloronaphthalene	10 U
nitrobenzene	10 U	2-nitroaniline	50 U
isophorone	10 U	dimethyl phthalate	10 U
2-nitrophenol	10 U	acenaphthylene	10 U
2,4-dimethylphenol	10 U	2,6-dinitrotoluene	10 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date Extracted: 11/07/90
Date Analyzed: 11/14/90
Dilution Factor: 1

This method blank applies to the following samples: APC01, APC02, LA03A, LA04.5C and MC04B.

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APPENDIX IX SEMIVOLATILE ANALYSIS (continued)

Results in µg/liter (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 1
Lab Sample ID: BLA1935

Compound		Compound	
3-nitroaniline	50 U	anthracene	10 U
acenaphthene	10 U	di-n-butylphthalate	10 U
2,4-dinitrophenol	50 U	fluoranthene	10 U
4-nitrophenol	50 U	pyrene	10 U
dibenzofuran	10 U	butylbenzylphthalate	10 U
2,4-dinitrotoluene	10 U	3,3'-dichlorobenzidine	20 U
diethylphthalate	10 U	benzo(a)anthracene	10 U
4-chlorophenyl-phenylether	10 U	chrysene	10 U
fluorene	10 U	bis(2-ethylhexyl)phthalate	10 U
4-nitroaniline	50 U	di-n-octylphthalate	10 U
4,6-dinitro-2-methylphenol	50 U	benzo(b)fluoranthene	10 U
n-nitrosodiphenylamine[1]	10 U	benzo(k)fluoranthene	10 U
4-bromophenyl-phenylether	10 U	benzo(a)pyrene	10 U
hexachlorobenzene	10 U	indeno(1,2,3-cd)pyrene	10 U
pentachlorophenol	50 U	dibenzo(a,h)anthracene	10 U
phenanthrene	10 U	benzo(g,h,i)perylene	10 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
1 - Detected as diphenylamine.

Date Extracted: 11/07/90
Date Analyzed: 11/14/90
Dilution Factor: 1

APPENDIX IX SEMIVOLATILE ANALYSIS (continued)

Results in µg/liter (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 1
Lab Sample ID: BLA1935

n-nitrosodimethylamine	10 U	m-dinitrobenzene	10 U
2-picoline	70 U	pentachlorobenzene	20 U
n-nitrosomethylethylamine	10 U	2-naphthylamine	170 U
methyl methanesulfonate	10 U	1-naphthylamine	120 U
n-nitrosodiethylamine	10 U	2,3,4,6-tetrachlorophenol	10 U
ethyl methanesulfonate	10 U	5-nitro-o-toluidine	20 U
aniline	50 U	diphenylamine	10 U
pentachloroethane	20 U	tetraethyl dithiopyropho(2)	10 U
3-methylphenol	10 U	sym-trinitrobenzene	10 U
n-nitrosopyrrolidine	10 U	phenacetin	10 U
acetophenone	10 U	diallate	10 U
n-nitrosomorpholine	10 U	4-aminobiphenyl	50 U
o-toluidine	10 U	pronamide	30 U
n-nitrosopiperidine	10 U	pentachloronitrobenzene	20 U
o,o,o-triethylphosphorot(1)	10 U	dinoseb	20 U
2,6-dichlorophenol	10 U	4-nitroquinoline-1-oxide	10 U
hexachloropropene	20 U	methapyrilene	40 U
a,a-dimethylphenethylamine	10 U	aramite	10 U
n-nitrosodi-n-butylamine	20 U	p-(dimethylamino)azobenzene	30 U
p-phenylenediamine	50 U	3,3'-dimethylbenzidine	80 U
safrole	10 U	2-acetylaminofluorene	10 U
1,2,4,5-tetrachlorobenzene	10 U	7,12-dimethylbenz(a)anth(3)	20 U
isosafrole	10 U	hexachlorophene	50 U
1,4-naphthoquinone	10 U	3-methylcholanthrene	30 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
1 - o,o,o-triethylphosphorothioate
2 - tetraethyl dithiopyrophosphate
3 - 7,12-dimethylbenz(a)anthracene

Date Extracted: 11/07/90
Date Analyzed: 11/14/90
Dilution Factor: 1

APPENDIX IX SEMIVOLATILE ANALYSIS

Results in µg/liter (ppb)

Sample Matrix: Water

Client Sample ID: APC01
Lab Sample ID: PP1470

Compound		Compound	
phenol	10 U	bis(2-chloroethoxy)methane	10 U
bis(2-chloroethyl)ether	10 U	2,4-dichlorophenol	10 U
2-chlorophenol	10 U	1,2,4-trichlorobenzene	10 U
1,3-dichlorobenzene	10 U	naphthalene	10 U
1,4-dichlorobenzene	10 U	4-chloroaniline	10 U
benzyl alcohol	10 U	hexachlorobutadiene	10 U
1,2-dichlorobenzene	10 U	4-chloro-3-methylphenol	10 U
2-methylphenol	10 U	2-methylnaphthalene	10 U
bis(2-chloroisopropyl)ether	10 U	hexachlorocyclopentadiene	10 U
4-methylphenol	10 U	2,4,6-trichlorophenol	10 U
n-nitroso-di-n-propylamine	10 U	2,4,5-trichlorophenol	50 U
hexachloroethane	10 U	2-chloronaphthalene	10 U
nitrobenzene	10 U	2-nitroaniline	50 U
isophorone	10 U	dimethyl phthalate	10 U
2-nitrophenol	10 U	acenaphthylene	10 U
2,4-dimethylphenol	10 U	2,6-dinitrotoluene	10 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date Extracted: 11/07/90
Date Analyzed: 11/14/90
Dilution Factor: 1

APPENDIX IX SEMIVOLATILE ANALYSIS (continued)

Results in µg/liter (ppb)

Sample Matrix: Water

Client Sample ID: APC01
Lab Sample ID: PP1470

Compound		Compound	
3-nitroaniline	50 U	anthracene	10 U
acenaphthene	10 U	di-n-butylphthalate	10 U
2,4-dinitrophenol	50 U	fluoranthene	10 U
4-nitrophenol	50 U	pyrene	10 U
dibenzofuran	10 U	butylbenzylphthalate	10 U
2,4-dinitrotoluene	10 U	3,3'-dichlorobenzidine	20 U
diethylphthalate	10 U	benzo(a)anthracene	10 U
4-chlorophenyl-phenylether	10 U	chrysene	10 U
fluorene	10 U	bis(2-ethylhexyl)phthalate	10 U
4-nitroaniline	50 U	di-n-octylphthalate	10 U
4,6-dinitro-2-methylphenol	50 U	benzo(b)fluoranthene	10 U
n-nitrosodiphenylamine[1]	10 U	benzo(k)fluoranthene	10 U
4-bromophenyl-phenylether	10 U	benzo(a)pyrene	10 U
hexachlorobenzene	10 U	indeno(1,2,3-cd)pyrene	10 U
pentachlorophenol	50 U	dibenzo(a,h)anthracene	10 U
phenanthrene	10 U	benzo(g,h,i)perylene	10 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
1 - Detected as diphenylamine.

Date Extracted: 11/07/90
Date Analyzed: 11/14/90
Dilution Factor: 1

APPENDIX IX SEMIVOLATILE ANALYSIS (continued)

Results in µg/liter (ppb)

Sample Matrix: Water

Client Sample ID: APC01
Lab Sample ID: PP1470

n-nitrosodimethylamine	10 U	m-dinitrobenzene	10 U
2-picoline	70 U	pentachlorobenzene	20 U
n-nitrosomethylethylamine	10 U	2-naphthylamine	170 U
methyl methanesulfonate	10 U	1-naphthylamine	120 U
n-nitrosodiethylamine	10 U	2,3,4,6-tetrachlorophenol	10 U
ethyl methanesulfonate	10 U	5-nitro-o-toluidine	20 U
aniline	50 U	diphenylamine	10 U
pentachloroethane	20 U	tetraethyl dithiopyropho(2)	10 U
3-methylphenol	10 U	sym-trinitrobenzene	10 U
n-nitrosopyrrolidine	10 U	phenacetin	10 U
acetophenone	10 U	diallate	10 U
n-nitrosomorpholine	10 U	4-aminobiphenyl	50 U
o-toluidine	10 U	pronamide	30 U
n-nitrosopiperidine	10 U	pentachloronitrobenzene	20 U
o,o,o-triethylphosphorot(1)	10 U	dinoseb	20 U
2,6-dichlorophenol	10 U	4-nitroquinoline-1-oxide	10 U
hexachloropropene	20 U	methapyrilene	40 U
a,a-dimethylphenethylamine	10 U	aramite	10 U
n-nitrosodi-n-butylamine	20 U	p-(dimethylamino)azobenzene	30 U
p-phenylenediamine	50 U	3,3'-dimethylbenzidine	80 U
safrole	10 U	2-acetylaminofluorene	10 U
1,2,4,5-tetrachlorobenzene	10 U	7,12-dimethylbenz(a)anth(3)	20 U
isosafrole	10 U	hexachlorophene	50 U
1,4-naphthoquinone	10 U	3-methylcholanthrene	30 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
1 - o,o,o-triethylphosphorothioate
2 - tetraethyl dithiopyrophosphate
3 - 7,12-dimethylbenz(a)anthracene

Date Extracted: 11/07/90
Date Analyzed: 11/14/90
Dilution Factor: 1

IT Corporation
November 30, 1990

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LANL ER

Job Number: ITNA 47061

APPENDIX IX SEMIVOLATILE ANALYSIS

Results in µg/liter (ppb)

Sample Matrix: Water

Client Sample ID: APC02
Lab Sample ID: PP1471

Compound		Compound	
phenol	10 U	bis(2-chloroethoxy)methane	10 U
bis(2-chloroethyl)ether	10 U	2,4-dichlorophenol	10 U
2-chlorophenol	10 U	1,2,4-trichlorobenzene	10 U
1,3-dichlorobenzene	10 U	naphthalene	10 U
1,4-dichlorobenzene	10 U	4-chloroaniline	10 U
benzyl alcohol	10 U	hexachlorobutadiene	10 U
1,2-dichlorobenzene	10 U	4-chloro-3-methylphenol	10 U
2-methylphenol	10 U	2-methylnaphthalene	10 U
bis(2-chloroisopropyl)ether	10 U	hexachlorocyclopentadiene	10 U
4-methylphenol	10 U	2,4,6-trichlorophenol	10 U
n-nitroso-di-n-propylamine	10 U	2,4,5-trichlorophenol	50 U
hexachloroethane	10 U	2-chloronaphthalene	10 U
nitrobenzene	10 U	2-nitroaniline	50 U
isophorone	10 U	dimethyl phthalate	10 U
2-nitrophenol	10 U	acenaphthylene	10 U
2,4-dimethylphenol	10 U	2,6-dinitrotoluene	10 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date Extracted: 11/07/90
Date Analyzed: 11/14/90
Dilution Factor: 1

APPENDIX IX SEMIVOLATILE ANALYSIS (continued)

Results in µg/liter (ppb)

Sample Matrix: Water

Client Sample ID: APC02
Lab Sample ID: PP1471

Compound		Compound	
3-nitroaniline	50 U	anthracene	10 U
acenaphthene	10 U	di-n-butylphthalate	10 U
2,4-dinitrophenol	50 U	fluoranthene	10 U
4-nitrophenol	50 U	pyrene	10 U
dibenzofuran	10 U	butylbenzylphthalate	10 U
2,4-dinitrotoluene	10 U	3,3'-dichlorobenzidine	20 U
diethylphthalate	10 U	benzo(a)anthracene	10 U
4-chlorophenyl-phenylether	10 U	chrysene	10 U
fluorene	10 U	bis(2-ethylhexyl)phthalate	10 U
4-nitroaniline	50 U	di-n-octylphthalate	10 U
4,6-dinitro-2-methylphenol	50 U	benzo(b)fluoranthene	10 U
n-nitrosodiphenylamine[1]	10 U	benzo(k)fluoranthene	10 U
4-bromophenyl-phenylether	10 U	benzo(a)pyrene	10 U
hexachlorobenzene	10 U	indeno(1,2,3-cd)pyrene	10 U
pentachlorophenol	50 U	dibenzo(a,h)anthracene	10 U
phenanthrene	10 U	benzo(g,h,i)perylene	10 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
1 - Detected as diphenylamine.

Date Extracted: 11/07/90
Date Analyzed: 11/14/90
Dilution Factor: 1

APPENDIX IX SEMIVOLATILE ANALYSIS (continued)

Results in µg/liter (ppb)

Sample Matrix: Water

Client Sample ID: APC02
Lab Sample ID: PP1471

n-nitrosodimethylamine	10 U	m-dinitrobenzene	10 U
2-picoline	70 U	pentachlorobenzene	20 U
n-nitrosomethylethylamine	10 U	2-naphthylamine	170 U
methyl methanesulfonate	10 U	1-naphthylamine	120 U
n-nitrosodiethylamine	10 U	2,3,4,6-tetrachlorophenol	10 U
ethyl methanesulfonate	10 U	5-nitro-o-toluidine	20 U
aniline	50 U	diphenylamine	10 U
pentachloroethane	20 U	tetraethyl dithiopyropho(2)	10 U
3-methylphenol	10 U	sym-trinitrobenzene	10 U
n-nitrosopyrrolidine	10 U	phenacetin	10 U
acetophenone	10 U	diallate	10 U
n-nitrosomorpholine	10 U	4-aminobiphenyl	50 U
o-toluidine	10 U	pronamide	30 U
n-nitrosopiperidine	10 U	pentachloronitrobenzene	20 U
o,o,o-triethylphosphorot(1)	10 U	dinoseb	20 U
2,6-dichlorophenol	10 U	4-nitroquinoline-1-oxide	10 U
hexachloropropene	20 U	methapyrilene	40 U
a,a-dimethylphenethylamine	10 U	aramite	10 U
n-nitrosodi-n-butylamine	20 U	p-(dimethylamino)azobenzene	30 U
p-phenylenediamine	50 U	3,3'-dimethylbenzidine	80 U
safrole	10 U	2-acetylaminofluorene	10 U
1,2,4,5-tetrachlorobenzene	10 U	7,12-dimethylbenz(a)anth(3)	20 U
isosafrole	10 U	hexachlorophene	50 U
1,4-naphthoquinone	10 U	3-methylcholanthrene	30 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
1 - o,o,o-triethylphosphorothioate
2 - tetraethyl dithiopyrophosphate
3 - 7,12-dimethylbenz(a)anthracene

Date Extracted: 11/07/90
Date Analyzed: 11/14/90
Dilution Factor: 1

APPENDIX IX SEMIVOLATILE ANALYSIS

Results in µg/liter (ppb)

Sample Matrix: Water

Client Sample ID: LA03A
Lab Sample ID: PP1472

Compound		Compound	
phenol	10 U	bis(2-chloroethoxy)methane	10 U
bis(2-chloroethyl)ether	10 U	2,4-dichlorophenol	10 U
2-chlorophenol	10 U	1,2,4-trichlorobenzene	10 U
1,3-dichlorobenzene	10 U	naphthalene	10 U
1,4-dichlorobenzene	10 U	4-chloroaniline	10 U
benzyl alcohol	10 U	hexachlorobutadiene	10 U
1,2-dichlorobenzene	10 U	4-chloro-3-methylphenol	10 U
2-methylphenol	10 U	2-methylnaphthalene	10 U
bis(2-chloroisopropyl)ether	10 U	hexachlorocyclopentadiene	10 U
4-methylphenol	10 U	2,4,6-trichlorophenol	10 U
n-nitroso-di-n-propylamine	10 U	2,4,5-trichlorophenol	50 U
hexachloroethane	10 U	2-chloronaphthalene	10 U
nitrobenzene	10 U	2-nitroaniline	50 U
isophorone	10 U	dimethyl phthalate	10 U
2-nitrophenol	10 U	acenaphthylene	10 U
2,4-dimethylphenol	10 U	2,6-dinitrotoluene	10 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date Extracted: 11/07/90
Date Analyzed: 11/14/90
Dilution Factor: 1

APPENDIX IX SEMIVOLATILE ANALYSIS (continued)

Results in µg/liter (ppb)

Sample Matrix: Water

Client Sample ID: LA03A
Lab Sample ID: PP1472

Compound		Compound	
3-nitroaniline	50 U	anthracene	10 U
acenaphthene	10 U	di-n-butylphthalate	10 U
2,4-dinitrophenol	50 U	fluoranthene	10 U
4-nitrophenol	50 U	pyrene	10 U
dibenzofuran	10 U	butylbenzylphthalate	10 U
2,4-dinitrotoluene	10 U	3,3'-dichlorobenzidine	20 U
diethylphthalate	10 U	benzo(a)anthracene	10 U
4-chlorophenyl-phenylether	10 U	chrysene	10 U
fluorene	10 U	bis(2-ethylhexyl)phthalate	10 U
4-nitroaniline	50 U	di-n-octylphthalate	10 U
4,6-dinitro-2-methylphenol	50 U	benzo(b)fluoranthene	10 U
n-nitrosodiphenylamine[1]	10 U	benzo(k)fluoranthene	10 U
4-bromophenyl-phenylether	10 U	benzo(a)pyrene	10 U
hexachlorobenzene	10 U	indeno(1,2,3-cd)pyrene	10 U
pentachlorophenol	50 U	dibenzo(a,h)anthracene	10 U
phenanthrene	10 U	benzo(g,h,i)perylene	10 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
1 - Detected as diphenylamine.

Date Extracted: 11/07/90
Date Analyzed: 11/14/90
Dilution Factor: 1

APPENDIX IX SEMIVOLATILE ANALYSIS (continued)

Results in µg/liter (ppb)

Sample Matrix: Water

Client Sample ID: LA03A
Lab Sample ID: PP1472

n-nitrosodimethylamine	10 U	m-dinitrobenzene	10 U
2-picoline	70 U	pentachlorobenzene	20 U
n-nitrosomethylethylamine	10 U	2-naphthylamine	170 U
methyl methanesulfonate	10 U	1-naphthylamine	120 U
n-nitrosodiethylamine	10 U	2,3,4,6-tetrachlorophenol	10 U
ethyl methanesulfonate	10 U	5-nitro-o-toluidine	20 U
aniline	50 U	diphenylamine	10 U
pentachloroethane	20 U	tetraethyl dithiopyropho(2)	10 U
3-methylphenol	10 U	sym-trinitrobenzene	10 U
n-nitrosopyrrolidine	10 U	phenacetin	10 U
acetophenone	10 U	diallate	10 U
n-nitrosomorpholine	10 U	4-aminobiphenyl	50 U
o-toluidine	10 U	pronamide	30 U
n-nitrosopiperidine	10 U	pentachloronitrobenzene	20 U
o,o,o-triethylphosphorot(1)	10 U	dinoseb	20 U
2,6-dichlorophenol	10 U	4-nitroquinoline-1-oxide	10 U
hexachloropropene	20 U	methapyrilene	40 U
a,a-dimethylphenethylamine	10 U	aramite	10 U
n-nitrosodi-n-butylamine	20 U	p-(dimethylamino)azobenzene	30 U
p-phenylenediamine	50 U	3,3'-dimethylbenzidine	80 U
safrole	10 U	2-acetylaminofluorene	10 U
1,2,4,5-tetrachlorobenzene	10 U	7,12-dimethylbenz(a)anth(3)	20 U
isosafrole	10 U	hexachlorophene	50 U
1,4-naphthoquinone	10 U	3-methylcholanthrene	30 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
1 - o,o,o-triethylphosphorothioate
2 - tetraethyl dithiopyrophosphate
3 - 7,12-dimethylbenz(a)anthracene

Date Extracted: 11/07/90
Date Analyzed: 11/14/90
Dilution Factor: 1

APPENDIX IX SEMIVOLATILE ANALYSIS

Results in µg/liter (ppb)

Sample Matrix: Water

Client Sample ID: LA04.5C
Lab Sample ID: PP1473

Compound		Compound	
phenol	10 U	bis(2-chloroethoxy)methane	10 U
bis(2-chloroethyl)ether	10 U	2,4-dichlorophenol	10 U
2-chlorophenol	10 U	1,2,4-trichlorobenzene	10 U
1,3-dichlorobenzene	10 U	naphthalene	10 U
1,4-dichlorobenzene	10 U	4-chloroaniline	10 U
benzyl alcohol	10 U	hexachlorobutadiene	10 U
1,2-dichlorobenzene	10 U	4-chloro-3-methylphenol	10 U
2-methylphenol	10 U	2-methylnaphthalene	10 U
bis(2-chloroisopropyl)ether	10 U	hexachlorocyclopentadiene	10 U
4-methylphenol	10 U	2,4,6-trichlorophenol	10 U
n-nitroso-di-n-propylamine	10 U	2,4,5-trichlorophenol	50 U
hexachloroethane	10 U	2-chloronaphthalene	10 U
nitrobenzene	10 U	2-nitroaniline	50 U
isophorone	10 U	dimethyl phthalate	10 U
2-nitrophenol	10 U	acenaphthylene	10 U
2,4-dimethylphenol	10 U	2,6-dinitrotoluene	10 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date Extracted: 11/07/90
Date Analyzed: 11/14/90
Dilution Factor: 1

APPENDIX IX SEMIVOLATILE ANALYSIS (continued)

Results in µg/liter (ppb)

Sample Matrix: Water

Client Sample ID: LA04.5C
Lab Sample ID: PP1473

Compound		Compound	
3-nitroaniline	50 U	anthracene	10 U
acenaphthene	10 U	di-n-butylphthalate	10 U
2,4-dinitrophenol	50 U	fluoranthene	10 U
4-nitrophenol	50 U	pyrene	10 U
dibenzofuran	10 U	butylbenzylphthalate	10 U
2,4-dinitrotoluene	10 U	3,3'-dichlorobenzidine	20 U
diethylphthalate	10 U	benzo(a)anthracene	10 U
4-chlorophenyl-phenylether	10 U	chrysene	10 U
fluorene	10 U	bis(2-ethylhexyl)phthalate	10 U
4-nitroaniline	50 U	di-n-octylphthalate	10 U
4,6-dinitro-2-methylphenol	50 U	benzo(b)fluoranthene	10 U
n-nitrosodiphenylamine[1]	10 U	benzo(k)fluoranthene	10 U
4-bromophenyl-phenylether	10 U	benzo(a)pyrene	10 U
hexachlorobenzene	10 U	indeno(1,2,3-cd)pyrene	10 U
pentachlorophenol	50 U	dibenzo(a,h)anthracene	10 U
phenanthrene	10 U	benzo(g,h,i)perylene	10 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
1 - Detected as diphenylamine.

Date Extracted: 11/07/90
Date Analyzed: 11/14/90
Dilution Factor: 1

APPENDIX IX SEMIVOLATILE ANALYSIS (continued)

Results in µg/liter (ppb)

Sample Matrix: Water

Client Sample ID: LA04.5C
Lab Sample ID: PP1473

n-nitrosodimethylamine	10 U	m-dinitrobenzene	10 U
2-picoline	70 U	pentachlorobenzene	20 U
n-nitrosomethylethylamine	10 U	2-naphthylamine	170 U
methyl methanesulfonate	10 U	1-naphthylamine	120 U
n-nitrosodiethylamine	10 U	2,3,4,6-tetrachlorophenol	10 U
ethyl methanesulfonate	10 U	5-nitro-o-toluidine	20 U
aniline	50 U	diphenylamine	10 U
pentachloroethane	20 U	tetraethyl dithiopyropho(2)	10 U
3-methylphenol	10 U	sym-trinitrobenzene	10 U
n-nitrosopyrrolidine	10 U	phenacetin	10 U
acetophenone	10 U	diallate	10 U
n-nitrosomorpholine	10 U	4-aminobiphenyl	50 U
o-toluidine	10 U	pronamide	30 U
n-nitrosopiperidine	10 U	pentachloronitrobenzene	20 U
o,o,o-triethylphosphorot(1)	10 U	dinoseb	20 U
2,6-dichlorophenol	10 U	4-nitroquinoline-1-oxide	10 U
hexachloropropene	20 U	methapyrilene	40 U
a,a-dimethylphenethylamine	10 U	aramite	10 U
n-nitrosodi-n-butylamine	20 U	p-(dimethylamino)azobenzene	30 U
p-phenylenediamine	50 U	3,3'-dimethylbenzidine	80 U
safrole	10 U	2-acetylaminofluorene	10 U
1,2,4,5-tetrachlorobenzene	10 U	7,12-dimethylbenz(a)anth(3)	20 U
isosafrole	10 U	hexachlorophene	50 U
1,4-naphthoquinone	10 U	3-methylcholanthrene	30 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
1 - o,o,o-triethylphosphorothioate
2 - tetraethyl dithiopyrophosphate
3 - 7,12-dimethylbenz(a)anthracene

Date Extracted: 11/07/90
Date Analyzed: 11/14/90
Dilution Factor: 1

APPENDIX IX SEMIVOLATILE ANALYSIS

Results in µg/liter (ppb)

Sample Matrix: Water

Client Sample ID: MC04B
Lab Sample ID: PP1474

Compound		Compound	
phenol	10 U	bis(2-chloroethoxy)methane	10 U
bis(2-chloroethyl)ether	10 U	2,4-dichlorophenol	10 U
2-chlorophenol	10 U	1,2,4-trichlorobenzene	10 U
1,3-dichlorobenzene	10 U	naphthalene	10 U
1,4-dichlorobenzene	10 U	4-chloroaniline	10 U
benzyl alcohol	10 U	hexachlorobutadiene	10 U
1,2-dichlorobenzene	10 U	4-chloro-3-methylphenol	10 U
2-methylphenol	10 U	2-methylnaphthalene	10 U
bis(2-chloroisopropyl)ether	10 U	hexachlorocyclopentadiene	10 U
4-methylphenol	10 U	2,4,6-trichlorophenol	10 U
n-nitroso-di-n-propylamine	10 U	2,4,5-trichlorophenol	50 U
hexachloroethane	10 U	2-chloronaphthalene	10 U
nitrobenzene	10 U	2-nitroaniline	50 U
isophorone	10 U	dimethyl phthalate	10 U
2-nitrophenol	10 U	acenaphthylene	10 U
2,4-dimethylphenol	10 U	2,6-dinitrotoluene	10 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date Extracted: 11/07/90
Date Analyzed: 11/14/90
Dilution Factor: 1

APPENDIX IX SEMIVOLATILE ANALYSIS (continued)

Results in µg/liter (ppb)

Sample Matrix: Water

Client Sample ID: MC04B
Lab Sample ID: PP1474

Compound		Compound	
3-nitroaniline	50 U	anthracene	10 U
acenaphthene	10 U	di-n-butylphthalate	10 U
2,4-dinitrophenol	50 U	fluoranthene	10 U
4-nitrophenol	50 U	pyrene	10 U
dibenzofuran	10 U	butylbenzylphthalate	10 U
2,4-dinitrotoluene	10 U	3,3'-dichlorobenzidine	20 U
diethylphthalate	10 U	benzo(a)anthracene	10 U
4-chlorophenyl-phenylether	10 U	chrysene	10 U
fluorene	10 U	bis(2-ethylhexyl)phthalate	10 U
4-nitroaniline	50 U	di-n-octylphthalate	10 U
4,6-dinitro-2-methylphenol	50 U	benzo(b)fluoranthene	10 U
n-nitrosodiphenylamine[1]	10 U	benzo(k)fluoranthene	10 U
4-bromophenyl-phenylether	10 U	benzo(a)pyrene	10 U
hexachlorobenzene	10 U	indeno(1,2,3-cd)pyrene	10 U
pentachlorophenol	50 U	dibenzo(a,h)anthracene	10 U
phenanthrene	10 U	benzo(g,h,i)perylene	10 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
1 - Detected as diphenylamine.

Date Extracted: 11/07/90
Date Analyzed: 11/14/90
Dilution Factor: 1

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APPENDIX IX SEMIVOLATILE ANALYSIS (continued)

Results in µg/liter (ppb)

Sample Matrix: Water

Client Sample ID: MC04B
Lab Sample ID: PP1474

n-nitrosodimethylamine	10	U	m-dinitrobenzene	10	U
2-picoline	70	U	pentachlorobenzene	20	U
n-nitrosomethylethylamine	10	U	2-naphthylamine	170	U
methyl methanesulfonate	10	U	1-naphthylamine	120	U
n-nitrosodiethylamine	10	U	2,3,4,6-tetrachlorophenol	10	U
ethyl methanesulfonate	10	U	5-nitro-o-toluidine	20	U
aniline	50	U	diphenylamine	10	U
pentachloroethane	20	U	tetraethyl dithiopyropho(2)	10	U
3-methylphenol	10	U	sym-trinitrobenzene	10	U
n-nitrosopyrrolidine	10	U	phenacetin	10	U
acetophenone	10	U	diallate	10	U
n-nitrosomorpholine	3	J	4-aminobiphenyl	50	U
o-toluidine	10	U	pronamide	30	U
n-nitrosopiperidine	10	U	pentachloronitrobenzene	20	U
o,o,o-triethylphosphorot(1)	10	U	dinoseb	20	U
2,6-dichlorophenol	10	U	4-nitroquinoline-1-oxide	10	U
hexachloropropene	20	U	methapyrilene	40	U
a,a-dimethylphenethylamine	10	U	aramite	10	U
n-nitrosodi-n-butylamine	20	U	p-(dimethylamino)azobenzene	30	U
p-phenylenediamine	50	U	3,3'-dimethylbenzidine	80	U
safrole	10	U	2-acetylaminofluorene	10	U
1,2,4,5-tetrachlorobenzene	10	U	7,12-dimethylbenz(a)anth(3)	20	U
isosafrole	10	U	hexachlorophene	50	U
1,4-naphthoquinone	10	U	3-methylcholanthrene	30	U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
1 - o,o,o-triethylphosphorothioate
2 - tetraethyl dithiopyrophosphate
3 - 7,12-dimethylbenz(a)anthracene

Date Extracted: 11/07/90
Date Analyzed: 11/14/90
Dilution Factor: 1

APPENDIX IX SEMIVOLATILE ANALYSIS

Results in µg/liter (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 2
Lab Sample ID: BLA1940

Compound		Compound	
phenol	10 U	bis(2-chloroethoxy)methane	10 U
bis(2-chloroethyl)ether	10 U	2,4-dichlorophenol	10 U
2-chlorophenol	10 U	1,2,4-trichlorobenzene	10 U
1,3-dichlorobenzene	10 U	naphthalene	10 U
1,4-dichlorobenzene	10 U	4-chloroaniline	10 U
benzyl alcohol	10 U	hexachlorobutadiene	10 U
1,2-dichlorobenzene	10 U	4-chloro-3-methylphenol	10 U
2-methylphenol	10 U	2-methylnaphthalene	10 U
bis(2-chloroisopropyl)ether	10 U	hexachlorocyclopentadiene	10 U
4-methylphenol	10 U	2,4,6-trichlorophenol	10 U
n-nitroso-di-n-propylamine	10 U	2,4,5-trichlorophenol	50 U
hexachloroethane	10 U	2-chloronaphthalene	10 U
nitrobenzene	10 U	2-nitroaniline	50 U
isophorone	10 U	dimethyl phthalate	10 U
2-nitrophenol	10 U	acenaphthylene	10 U
2,4-dimethylphenol	10 U	2,6-dinitrotoluene	10 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date Extracted: 11/08/90
Date Analyzed: 11/14/90
Dilution Factor: 1

This method blank applies to the following samples: MC010, MC06B and MC07A.

APPENDIX IX SEMIVOLATILE ANALYSIS (continued)

Results in µg/liter (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 2
Lab Sample ID: BLA1940

Compound		Compound	
3-nitroaniline	50 U	anthracene	10 U
acenaphthene	10 U	di-n-butylphthalate	10 U
2,4-dinitrophenol	50 U	fluoranthene	10 U
4-nitrophenol	50 U	pyrene	10 U
dibenzofuran	10 U	butylbenzylphthalate	10 U
2,4-dinitrotoluene	10 U	3,3'-dichlorobenzidine	20 U
diethylphthalate	10 U	benzo(a)anthracene	10 U
4-chlorophenyl-phenylether	10 U	chrysene	10 U
fluorene	10 U	bis(2-ethylhexyl)phthalate	10 U
4-nitroaniline	50 U	di-n-octylphthalate	10 U
4,6-dinitro-2-methylphenol	50 U	benzo(b)fluoranthene	10 U
n-nitrosodiphenylamine[1]	10 U	benzo(k)fluoranthene	10 U
4-bromophenyl-phenylether	10 U	benzo(a)pyrene	10 U
hexachlorobenzene	10 U	indeno(1,2,3-cd)pyrene	10 U
pentachlorophenol	50 U	dibenzo(a,h)anthracene	10 U
phenanthrene	10 U	benzo(g,h,i)perylene	10 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
1 - Detected as diphenylamine.

Date Extracted: 11/08/90
Date Analyzed: 11/14/90
Dilution Factor: 1

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APPENDIX IX SEMIVOLATILE ANALYSIS (continued)

Results in µg/liter (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 2
Lab Sample ID: BLA1940

n-nitrosodimethylamine	10 U	m-dinitrobenzene	10 U
2-picoline	70 U	pentachlorobenzene	20 U
n-nitrosomethylethylamine	10 U	2-naphthylamine	170 U
methyl methanesulfonate	10 U	1-naphthylamine	120 U
n-nitrosodiethylamine	10 U	2,3,4,6-tetrachlorophenol	10 U
ethyl methanesulfonate	10 U	5-nitro-o-toluidine	20 U
aniline	50 U	diphenylamine	10 U
pentachloroethane	20 U	tetraethyl dithiopyropho(2)	10 U
3-methylphenol	10 U	sym-trinitrobenzene	10 U
n-nitrosopyrrolidine	10 U	phenacetin	10 U
acetophenone	10 U	diallate	10 U
n-nitrosomorpholine	10 U	4-aminobiphenyl	50 U
o-toluidine	10 U	pronamide	30 U
n-nitrosopiperidine	10 U	pentachloronitrobenzene	20 U
o,o,o-triethylphosphorot(1)	10 U	dinoseb	20 U
2,6-dichlorophenol	10 U	4-nitroquinoline-1-oxide	10 U
hexachloropropene	20 U	methapyrilene	40 U
a,a-dimethylphenethylamine	10 U	aramite	10 U
n-nitrosodi-n-butylamine	20 U	p-(dimethylamino)azobenzene	30 U
p-phenylenediamine	50 U	3,3'-dimethylbenzidine	80 U
safrole	10 U	2-acetylaminofluorene	10 U
1,2,4,5-tetrachlorobenzene	10 U	7,12-dimethylbenz(a)anth(3)	20 U
isosafrole	10 U	hexachlorophene	50 U
1,4-naphthoquinone	10 U	3-methylcholanthrene	30 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
1 - o,o,o-triethylphosphorothioate
2 - tetraethyl dithiopyrophosphate
3 - 7,12-dimethylbenz(a)anthracene

Date Extracted: 11/08/90
Date Analyzed: 11/14/90
Dilution Factor: 1

APPENDIX IX SEMIVOLATILE ANALYSIS

Results in µg/liter (ppb)

Sample Matrix: Water

Client Sample ID: MC06B
Lab Sample ID: PP1606

Compound		Compound	
phenol	10 U	bis(2-chloroethoxy)methane	10 U
bis(2-chloroethyl)ether	10 U	2,4-dichlorophenol	10 U
2-chlorophenol	10 U	1,2,4-trichlorobenzene	10 U
1,3-dichlorobenzene	10 U	naphthalene	10 U
1,4-dichlorobenzene	10 U	4-chloroaniline	10 U
benzyl alcohol	10 U	hexachlorobutadiene	10 U
1,2-dichlorobenzene	10 U	4-chloro-3-methylphenol	10 U
2-methylphenol	10 U	2-methylnaphthalene	10 U
bis(2-chloroisopropyl)ether	10 U	hexachlorocyclopentadiene	10 U
4-methylphenol	10 U	2,4,6-trichlorophenol	10 U
n-nitroso-di-n-propylamine	10 U	2,4,5-trichlorophenol	50 U
hexachloroethane	10 U	2-chloronaphthalene	10 U
nitrobenzene	10 U	2-nitroaniline	50 U
isophorone	10 U	dimethyl phthalate	10 U
2-nitrophenol	10 U	acenaphthylene	10 U
2,4-dimethylphenol	10 U	2,6-dinitrotoluene	10 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date Extracted: 11/08/90
Date Analyzed: 11/14/90
Dilution Factor: 1

APPENDIX IX SEMIVOLATILE ANALYSIS (continued)

Results in µg/liter (ppb)

Sample Matrix: Water

Client Sample ID: MC06B
Lab Sample ID: PP1606

Compound		Compound	
3-nitroaniline	50 U	anthracene	10 U
acenaphthene	10 U	di-n-butylphthalate	10 U
2,4-dinitrophenol	50 U	fluoranthene	10 U
4-nitrophenol	50 U	pyrene	10 U
dibenzofuran	10 U	butylbenzylphthalate	10 U
2,4-dinitrotoluene	10 U	3,3'-dichlorobenzidine	20 U
diethylphthalate	10 U	benzo(a)anthracene	10 U
4-chlorophenyl-phenylether	10 U	chrysene	10 U
fluorene	10 U	bis(2-ethylhexyl)phthalate	10 U
4-nitroaniline	50 U	di-n-octylphthalate	10 U
4,6-dinitro-2-methylphenol	50 U	benzo(b)fluoranthene	10 U
n-nitrosodiphenylamine[1]	10 U	benzo(k)fluoranthene	10 U
4-bromophenyl-phenylether	10 U	benzo(a)pyrene	10 U
hexachlorobenzene	10 U	indeno(1,2,3-cd)pyrene	10 U
pentachlorophenol	50 U	dibenzo(a,h)anthracene	10 U
phenanthrene	10 U	benzo(g,h,i)perylene	10 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
1 - Detected as diphenylamine.

Date Extracted: 11/08/90
Date Analyzed: 11/14/90
Dilution Factor: 1

APPENDIX IX SEMIVOLATILE ANALYSIS (continued)

Results in µg/liter (ppb)

Sample Matrix: Water

Client Sample ID: MC06B
Lab Sample ID: PP1606

n-nitrosodimethylamine	10	U	m-dinitrobenzene	10	U
2-picoline	70	U	pentachlorobenzene	20	U
n-nitrosomethylethylamine	10	U	2-naphthylamine	170	U
methyl methanesulfonate	10	U	1-naphthylamine	120	U
n-nitrosodiethylamine	10	U	2,3,4,6-tetrachlorophenol	10	U
ethyl methanesulfonate	10	U	5-nitro-o-toluidine	20	U
aniline	50	U	diphenylamine	10	U
pentachloroethane	20	U	tetraethyl dithiopyropho(2)	10	U
3-methylphenol	10	U	sym-trinitrobenzene	10	U
n-nitrosopyrrolidine	10	U	phenacetin	10	U
acetophenone	10	U	diallate	10	U
n-nitrosomorpholine	2	J	4-aminobiphenyl	50	U
o-toluidine	10	U	pronamide	30	U
n-nitrosopiperidine	10	U	pentachloronitrobenzene	20	U
o,o,o-triethylphosphorot(1)	10	U	dinoseb	20	U
2,6-dichlorophenol	10	U	4-nitroquinoline-1-oxide	10	U
hexachloropropene	20	U	methapyrilene	40	U
a,a-dimethylphenethylamine	10	U	aramite	10	U
n-nitrosodi-n-butylamine	20	U	p-(dimethylamino)azobenzene	30	U
p-phenylenediamine	50	U	3,3'-dimethylbenzidine	80	U
safrole	10	U	2-acetylaminofluorene	10	U
1,2,4,5-tetrachlorobenzene	10	U	7,12-dimethylbenz(a)anth(3)	20	U
isosafrole	10	U	hexachlorophene	50	U
1,4-naphthoquinone	10	U	3-methylcholanthrene	30	U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
1 - o,o,o-triethylphosphorothioate
2 - tetraethyl dithiopyrophosphate
3 - 7,12-dimethylbenz(a)anthracene

Date Extracted: 11/08/90
Date Analyzed: 11/14/90
Dilution Factor: 1

IT Corporation
November 30, 1990

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LANL ER

Job Number: ITNA 47061

APPENDIX IX SEMIVOLATILE ANALYSIS

Results in µg/liter (ppb)

Sample Matrix: Water

Client Sample ID: MC07A
Lab Sample ID: PP1607

Compound		Compound	
phenol	10 U	bis(2-chloroethoxy)methane	10 U
bis(2-chloroethyl)ether	10 U	2,4-dichlorophenol	10 U
2-chlorophenol	10 U	1,2,4-trichlorobenzene	10 U
1,3-dichlorobenzene	10 U	naphthalene	10 U
1,4-dichlorobenzene	10 U	4-chloroaniline	10 U
benzyl alcohol	10 U	hexachlorobutadiene	10 U
1,2-dichlorobenzene	10 U	4-chloro-3-methylphenol	10 U
2-methylphenol	10 U	2-methylnaphthalene	10 U
bis(2-chloroisopropyl)ether	10 U	hexachlorocyclopentadiene	10 U
4-methylphenol	10 U	2,4,6-trichlorophenol	10 U
n-nitroso-di-n-propylamine	10 U	2,4,5-trichlorophenol	50 U
hexachloroethane	10 U	2-chloronaphthalene	10 U
nitrobenzene	10 U	2-nitroaniline	50 U
isophorone	10 U	dimethyl phthalate	10 U
2-nitrophenol	10 U	acenaphthylene	10 U
2,4-dimethylphenol	10 U	2,6-dinitrotoluene	10 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date Extracted: 11/08/90
Date Analyzed: 11/14/90
Dilution Factor: 1

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APPENDIX IX SEMIVOLATILE ANALYSIS (continued)

Results in µg/liter (ppb)

Sample Matrix: Water

Client Sample ID: MC07A
Lab Sample ID: PP1607

Compound		Compound	
3-nitroaniline	50 U	anthracene	10 U
acenaphthene	10 U	di-n-butylphthalate	10 U
2,4-dinitrophenol	50 U	fluoranthene	10 U
4-nitrophenol	50 U	pyrene	10 U
dibenzofuran	10 U	butylbenzylphthalate	10 U
2,4-dinitrotoluene	10 U	3,3'-dichlorobenzidine	20 U
diethylphthalate	10 U	benzo(a)anthracene	10 U
4-chlorophenyl-phenylether	10 U	chrysene	10 U
fluorene	10 U	bis(2-ethylhexyl)phthalate	10 U
4-nitroaniline	50 U	di-n-octylphthalate	10 U
4,6-dinitro-2-methylphenol	50 U	benzo(b)fluoranthene	10 U
n-nitrosodiphenylamine[1]	10 U	benzo(k)fluoranthene	10 U
4-bromophenyl-phenylether	10 U	benzo(a)pyrene	10 U
hexachlorobenzene	10 U	indeno(1,2,3-cd)pyrene	10 U
pentachlorophenol	50 U	dibenzo(a,h)anthracene	10 U
phenanthrene	10 U	benzo(g,h,i)perylene	10 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
1 - Detected as diphenylamine.

Date Extracted: 11/08/90
Date Analyzed: 11/14/90
Dilution Factor: 1

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APPENDIX IX SEMIVOLATILE ANALYSIS (continued)

Results in µg/liter (ppb)

Sample Matrix: Water

Client Sample ID: MC07A
Lab Sample ID: PP1607

n-nitrosodimethylamine	10 U	m-dinitrobenzene	10 U
2-picoline	70 U	pentachlorobenzene	20 U
n-nitrosomethylethylamine	10 U	2-naphthylamine	170 U
methyl methanesulfonate	10 U	1-naphthylamine	120 U
n-nitrosodiethylamine	10 U	2,3,4,6-tetrachlorophenol	10 U
ethyl methanesulfonate	10 U	5-nitro-o-toluidine	20 U
aniline	50 U	diphenylamine	10 U
pentachloroethane	20 U	tetraethyl dithiopyropho(2)	10 U
3-methylphenol	10 U	sym-trinitrobenzene	10 U
n-nitrosopyrrolidine	10 U	phenacetin	10 U
acetophenone	10 U	diallate	10 U
n-nitrosomorpholine	10 U	4-aminobiphenyl	50 U
o-toluidine	10 U	pronamide	30 U
n-nitrosopiperidine	10 U	pentachloronitrobenzene	20 U
o,o,o-triethylphosphorot(1)	10 U	dinoseb	20 U
2,6-dichlorophenol	10 U	4-nitroquinoline-1-oxide	10 U
hexachloropropene	20 U	methapyrilene	40 U
a,a-dimethylphenethylamine	10 U	aramite	10 U
n-nitrosodi-n-butylamine	20 U	p-(dimethylamino)azobenzene	30 U
p-phenylenediamine	50 U	3,3'-dimethylbenzidine	80 U
safrole	10 U	2-acetylaminofluorene	10 U
1,2,4,5-tetrachlorobenzene	10 U	7,12-dimethylbenz(a)anth(3)	20 U
isosafrole	10 U	hexachlorophene	50 U
1,4-naphthoquinone	10 U	3-methylcholanthrene	30 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
1 - o,o,o-triethylphosphorothioate
2 - tetraethyl dithiopyrophosphate
3 - 7,12-dimethylbenz(a)anthracene

Date Extracted: 11/08/90
Date Analyzed: 11/14/90
Dilution Factor: 1

APPENDIX IX SEMIVOLATILE ANALYSIS

Results in µg/liter (ppb)

Sample Matrix: Water

Client Sample ID: MC010
Lab Sample ID: PP1608

Compound		Compound	
phenol	10 U	bis(2-chloroethoxy)methane	10 U
bis(2-chloroethyl)ether	10 U	2,4-dichlorophenol	10 U
2-chlorophenol	10 U	1,2,4-trichlorobenzene	10 U
1,3-dichlorobenzene	10 U	naphthalene	10 U
1,4-dichlorobenzene	10 U	4-chloroaniline	10 U
benzyl alcohol	10 U	hexachlorobutadiene	10 U
1,2-dichlorobenzene	10 U	4-chloro-3-methylphenol	10 U
2-methylphenol	10 U	2-methylnaphthalene	10 U
bis(2-chloroisopropyl)ether	10 U	hexachlorocyclopentadiene	10 U
4-methylphenol	10 U	2,4,6-trichlorophenol	10 U
n-nitroso-di-n-propylamine	10 U	2,4,5-trichlorophenol	50 U
hexachloroethane	10 U	2-chloronaphthalene	10 U
nitrobenzene	10 U	2-nitroaniline	50 U
isophorone	10 U	dimethyl phthalate	10 U
2-nitrophenol	10 U	acenaphthylene	10 U
2,4-dimethylphenol	10 U	2,6-dinitrotoluene	10 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date Extracted: 11/08/90
Date Analyzed: 11/14/90
Dilution Factor: 1

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APPENDIX IX SEMIVOLATILE ANALYSIS (continued)

Results in µg/liter (ppb)

Sample Matrix: Water

Client Sample ID: MC010
Lab Sample ID: PP1608

Compound		Compound	
3-nitroaniline	50 U	anthracene	10 U
acenaphthene	10 U	di-n-butylphthalate	10 U
2,4-dinitrophenol	50 U	fluoranthene	10 U
4-nitrophenol	50 U	pyrene	10 U
dibenzofuran	10 U	butylbenzylphthalate	10 U
2,4-dinitrotoluene	10 U	3,3'-dichlorobenzidine	20 U
diethylphthalate	10 U	benzo(a)anthracene	10 U
4-chlorophenyl-phenylether	10 U	chrysene	10 U
fluorene	10 U	bis(2-ethylhexyl)phthalate	10 U
4-nitroaniline	50 U	di-n-octylphthalate	10 U
4,6-dinitro-2-methylphenol	50 U	benzo(b)fluoranthene	10 U
n-nitrosodiphenylamine[1]	10 U	benzo(k)fluoranthene	10 U
4-bromophenyl-phenylether	10 U	benzo(a)pyrene	10 U
hexachlorobenzene	10 U	indeno(1,2,3-cd)pyrene	10 U
pentachlorophenol	50 U	dibenzo(a,h)anthracene	10 U
phenanthrene	10 U	benzo(g,h,i)perylene	10 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
1 - Detected as diphenylamine.

Date Extracted: 11/08/90
Date Analyzed: 11/14/90
Dilution Factor: 1

APPENDIX IX SEMIVOLATILE ANALYSIS (continued)

Results in µg/liter (ppb)

Sample Matrix: Water

Client Sample ID: MC010
Lab Sample ID: PP1608

n-nitrosodimethylamine	10 U	m-dinitrobenzene	10 U
2-picoline	70 U	pentachlorobenzene	20 U
n-nitrosomethylethylamine	10 U	2-naphthylamine	170 U
methyl methanesulfonate	10 U	1-naphthylamine	120 U
n-nitrosodiethylamine	10 U	2,3,4,6-tetrachlorophenol	10 U
ethyl methanesulfonate	10 U	5-nitro-o-toluidine	20 U
aniline	50 U	diphenylamine	10 U
pentachloroethane	20 U	tetraethyl dithiopyropho(2)	10 U
3-methylphenol	10 U	sym-trinitrobenzene	10 U
n-nitrosopyrrolidine	10 U	phenacetin	10 U
acetophenone	10 U	diallate	10 U
n-nitrosomorpholine	10 U	4-aminobiphenyl	50 U
o-toluidine	10 U	pronamide	30 U
n-nitrosopiperidine	10 U	pentachloronitrobenzene	20 U
o,o,o-triethylphosphorot(1)	10 U	dinoseb	20 U
2,6-dichlorophenol	10 U	4-nitroquinoline-1-oxide	10 U
hexachloropropene	20 U	methapyrilene	40 U
a,a-dimethylphenethylamine	10 U	aramite	10 U
n-nitrosodi-n-butylamine	20 U	p-(dimethylamino)azobenzene	30 U
p-phenylenediamine	50 U	3,3'-dimethylbenzidine	80 U
safrole	10 U	2-acetylaminofluorene	10 U
1,2,4,5-tetrachlorobenzene	10 U	7,12-dimethylbenz(a)anth(3)	20 U
isosafrole	10 U	hexachlorophene	50 U
1,4-naphthoquinone	10 U	3-methylcholanthrene	30 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
1 - o,o,o-triethylphosphorothioate
2 - tetraethyl dithiopyrophosphate
3 - 7,12-dimethylbenz(a)anthracene

Date Extracted: 11/08/90
Date Analyzed: 11/14/90
Dilution Factor: 1

WATER SURROGATE PERCENT RECOVERY SUMMARY

	SEMI-VOLATILE					
Sample No.	Nitro-Benzene-D5 (35-114%)*	2-Fluoro-Biphenyl (43-116%)*	Terphenyl-D14 (33-141%)*	Phenol-D5 (10-94%)*	2-Fluoro-Phenol (21-100%)*	2,4,6 Tribromo-Phenol (10-123%)*
APC01	91	78	88	25	43	72
APC02	91	83	106	28	51	83
LA03A	102	85	90	32	56	79
LA04.5C	94	79	93	34	56	76
MC010	100	82	92	29	45	77
MC04B	98	78	97	28	47	77
MC06B	94	81	92	28	49	71
MC07A	100	85	89	23	47	78
Method Blank 1	82	69	83	27	49	72
Method Blank 2	100	87	108	28	44	85

* - Values in parenthesis represent USEPA contract required QC limits.

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IT Corporation
November 30, 1990

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LANL ER

Job Number: ITNA 47061

APPENDIX IX ORGANOCHLORINE PESTICIDES

Results in µg/liter (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 1
Lab Sample ID: BLA1941

Compound			Compound		
α-BHC	0.050	U	methoxychlor	0.50	U
β-BHC	0.050	U	chlordane	0.50	U
δ-BHC	0.050	U	toxaphene	1.0	U
γ-BHC (lindane)	0.050	U	Aroclor 1016	0.50	U
heptachlor	0.050	U	Aroclor 1221	0.50	U
aldrin	0.050	U	Aroclor 1232	0.50	U
heptachlor epoxide	0.050	U	Aroclor 1242	0.50	U
endosulfan I	0.050	U	Aroclor 1248	0.50	U
dieldrin	0.10	U	Aroclor 1254	1.0	U
4,4'-DDE	0.10	U	Aroclor 1260	1.0	U
endrin	0.10	U	endrin aldehyde	0.10	U
endosulfan II	0.10	U	isodrin	0.050	U
4,4'-DDD	0.10	U	kepone	0.10	U
endosulfan sulfate	0.10	U	chlorobenzilate	0.50	U
4,4'-DDT	0.10	U			

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

Date Extracted: 11/08/90
Date Analyzed: 11/26/90
Dilution Factor: 1

This method blank applies to the following samples: MC010, MC06B and MC07A.

IT Corporation
November 30, 1990

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LANL ER

Job Number: ITNA 47061

APPENDIX IX ORGANOCHLORINE PESTICIDES

Results in µg/liter (ppb)

Sample Matrix: Water

Client Sample ID: MC06B
Lab Sample ID: PP1606

Compound			Compound		
α-BHC	0.050	U	methoxychlor	0.50	U
β-BHC	0.050	U	chlordane	0.50	U
δ-BHC	0.050	U	toxaphene	1.0	U
γ-BHC (lindane)	0.050	U	Aroclor 1016	0.50	U
heptachlor	0.050	U	Aroclor 1221	0.50	U
aldrin	0.050	U	Aroclor 1232	0.50	U
heptachlor epoxide	0.050	U	Aroclor 1242	0.50	U
endosulfan I	0.050	U	Aroclor 1248	0.50	U
dieldrin	0.10	U	Aroclor 1254	1.0	U
4,4'-DDE	0.10	U	Aroclor 1260	1.0	U
endrin	0.10	U	endrin aldehyde	0.10	U
endosulfan II	0.10	U	isodrin	0.050	U
4,4'-DDD	0.10	U	kepone	0.10	U
endosulfan sulfate	0.10	U	chlorobenzilate	0.50	U
4,4'-DDT	0.10	U			

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

Date Extracted: 11/08/90
Date Analyzed: 11/26/90
Dilution Factor: 1

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IT Corporation
November 30, 1990

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LANL ER

Job Number: ITNA 47061

APPENDIX IX ORGANOCHLORINE PESTICIDES

Results in µg/liter (ppb)

Sample Matrix: Water

Client Sample ID: MC07A
Lab Sample ID: PP1607

Compound			Compound		
α-BHC	0.050	U	methoxychlor	0.50	U
β-BHC	0.050	U	chlordane	0.50	U
δ-BHC	0.050	U	toxaphene	1.0	U
γ-BHC (lindane)	0.050	U	Aroclor 1016	0.50	U
heptachlor	0.050	U	Aroclor 1221	0.50	U
aldrin	0.050	U	Aroclor 1232	0.50	U
heptachlor epoxide	0.050	U	Aroclor 1242	0.50	U
endosulfan I	0.050	U	Aroclor 1248	0.50	U
dieldrin	0.10	U	Aroclor 1254	1.0	U
4,4'-DDE	0.10	U	Aroclor 1260	1.0	U
endrin	0.10	U	endrin aldehyde	0.10	U
endosulfan II	0.10	U	isodrin	0.050	U
4,4'-DDD	0.10	U	kepone	0.10	U
endosulfan sulfate	0.10	U	chlorobenzilate	0.50	U
4,4'-DDT	0.10	U			

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

Date Extracted: 11/08/90
Date Analyzed: 11/26/90
Dilution Factor: 1

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IT Corporation
November 30, 1990

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LANL ER

Job Number: ITNA 47061

APPENDIX IX ORGANOCHLORINE PESTICIDES

Results in µg/liter (ppb)

Sample Matrix: Water

Client Sample ID: MC010
Lab Sample ID: PP1608

Compound			Compound		
α-BHC	0.050	U	methoxychlor	0.50	U
β-BHC	0.050	U	chlordane	0.50	U
δ-BHC	0.050	U	toxaphene	1.0	U
γ-BHC (lindane)	0.050	U	Aroclor 1016	0.50	U
heptachlor	0.050	U	Aroclor 1221	0.50	U
aldrin	0.050	U	Aroclor 1232	0.50	U
heptachlor epoxide	0.050	U	Aroclor 1242	0.50	U
endosulfan I	0.050	U	Aroclor 1248	0.50	U
dieldrin	0.10	U	Aroclor 1254	1.0	U
4,4'-DDE	0.10	U	Aroclor 1260	1.0	U
endrin	0.10	U	endrin aldehyde	0.10	U
endosulfan II	0.10	U	isodrin	0.050	U
4,4'-DDD	0.10	U	kepone	0.10	U
endosulfan sulfate	0.10	U	chlorobenzilate	0.50	U
4,4'-DDT	0.10	U			

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

Date Extracted: 11/08/90
Date Analyzed: 11/26/90
Dilution Factor: 1

IT Corporation
November 30, 1990

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LANL ER

Job Number: ITNA 47061

APPENDIX IX ORGANOCHLORINE PESTICIDES

Results in µg/liter (ppb)

Sample Matrix: Water

Client Sample ID: Method Blank 2
Lab Sample ID: BLA1936

Compound			Compound		
α-BHC	0.050	U	methoxychlor	0.50	U
β-BHC	0.050	U	chlordane	0.50	U
δ-BHC	0.050	U	toxaphene	1.0	U
γ-BHC (lindane)	0.050	U	Aroclor 1016	0.50	U
heptachlor	0.050	U	Aroclor 1221	0.50	U
aldrin	0.050	U	Aroclor 1232	0.50	U
heptachlor epoxide	0.050	U	Aroclor 1242	0.50	U
endosulfan I	0.050	U	Aroclor 1248	0.50	U
dieldrin	0.10	U	Aroclor 1254	1.0	U
4,4'-DDE	0.10	U	Aroclor 1260	1.0	U
endrin	0.10	U	endrin aldehyde	0.10	U
endosulfan II	0.10	U	isodrin	0.050	U
4,4'-DDD	0.10	U	kepone	0.10	U
endosulfan sulfate	0.10	U	chlorobenzilate	0.50	U
4,4'-DDT	0.10	U			

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

Date Extracted: 11/07/90
Date Analyzed: 11/26/90
Dilution Factor: 1

This method blank applies to the following samples: APC01, APC02, APC02 DL, LA03A, LA04.5C and MC04B.

DL = Dilution

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November 30, 1990

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LANL ER

Job Number: ITNA 47061

APPENDIX IX ORGANOCHLORINE PESTICIDES

Results in µg/liter (ppb)

Sample Matrix: Water

Client Sample ID: APC01
Lab Sample ID: PP1470

Compound			Compound		
α-BHC	0.050	U	methoxychlor	0.50	U
β-BHC	0.050	U	chlordane	0.50	U
δ-BHC	0.050	U	toxaphene	1.0	U
γ BHC (lindane)	0.050	U	Aroclor 1016	0.50	U
heptachlor	0.050	U	Aroclor 1221	0.50	U
aldrin	0.050	U	Aroclor 1232	0.50	U
heptachlor epoxide	0.050	U	Aroclor 1242	0.50	U
endosulfan I	0.050	U	Aroclor 1248	0.50	U
dieldrin	0.10	U	Aroclor 1254	1.0	U
4,4'-DDE	0.10	U	Aroclor 1260	1.0	U
endrin	0.10	U	endrin aldehyde	0.10	U
endosulfan II	0.10	U	isodrin	0.050	U
4,4'-DDD	0.10	U	kepone	0.10	U
endosulfan sulfate	0.10	U	chlorobenzilate	0.50	U
4,4'-DDT	0.10	U			

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

Date Extracted: 11/07/90
Date Analyzed: 11/26/90
Dilution Factor: 1

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IT Corporation
November 30, 1990

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LANL ER

Job Number: ITNA 47061

APPENDIX IX ORGANOCHLORINE PESTICIDES

Results in µg/liter (ppb)

Sample Matrix: Water

Client Sample ID: APC02
Lab Sample ID: PP1471

Compound		Compound	
α-BHC	0.25 U	methoxychlor	1.0 J
β-BHC	2.5 UD	chlordane	2.5 U
δ-BHC	0.25 U	toxaphene	5.0 U
γ-BHC (lindane)	0.25 U	Aroclor 1016	2.5 U
heptachlor	0.25 U	Aroclor 1221	2.5 U
aldrin	0.25 U	Aroclor 1232	2.5 U
heptachlor epoxide	0.25 U	Aroclor 1242	2.5 U
endosulfan I	0.25 U	Aroclor 1248	2.5 U
dieldrin	0.50 U	Aroclor 1254	5.0 U
4,4'-DDE	0.50 U	Aroclor 1260	5.0 U
endrin	0.51	endrin aldehyde	0.50 U
endosulfan II	0.50 U	isodrin	0.25 U
4,4'-DDD	0.37 J	kepone	0.50 U
endosulfan sulfate	0.50 U	chlorobenzilate	2.5 U
4,4'-DDT	0.18 J		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
D - Compound analyzed at a secondary dilution factor.
J - Indicates an estimated value less than the detection limit.

Date Extracted: 11/07/90
Date Analyzed: 11/27/90
Dilution Factor: 5

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IT Corporation
November 30, 1990

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LANL ER

Job Number: ITNA 47061

APPENDIX IX ORGANOCHLORINE PESTICIDES

Results in µg/liter (ppb)

Sample Matrix: Water

Client Sample ID: LA03A
Lab Sample ID: PP1472

Compound			Compound		
α-BHC	0.050	U	methoxychlor	0.50	U
β-BHC	0.050	U	chlordane	0.50	U
δ-BHC	0.050	U	toxaphene	1.0	U
γ-BHC (lindane)	0.050	U	Aroclor 1016	0.50	U
heptachlor	0.050	U	Aroclor 1221	0.50	U
aldrin	0.050	U	Aroclor 1232	0.50	U
heptachlor epoxide	0.050	U	Aroclor 1242	0.50	U
endosulfan I	0.050	U	Aroclor 1248	0.50	U
dieldrin	0.10	U	Aroclor 1254	1.0	U
4,4'-DDE	0.10	U	Aroclor 1260	1.0	U
endrin	0.10	U	endrin aldehyde	0.10	U
endosulfan II	0.10	U	isodrin	0.050	U
4,4'-DDD	0.10	U	kepone	0.10	U
endosulfan sulfate	0.10	U	chlorobenzilate	0.50	U
4,4'-DDT	0.10	U			

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

Date Extracted: 11/07/90
Date Analyzed: 11/27/90
Dilution Factor: 1

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IT Corporation
November 30, 1990

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LANL ER

Job Number: ITNA 47061

APPENDIX IX ORGANOCHLORINE PESTICIDES

Results in µg/liter (ppb)

Sample Matrix: Water

Client Sample ID: LA04.5C
Lab Sample ID: PP1473

Compound			Compound		
α-BHC	0.050	U	methoxychlor	0.50	U
β-BHC	0.050	U	chlordane	0.50	U
δ-BHC	0.050	U	toxaphene	1.0	U
γ-BHC (lindane)	0.050	U	Aroclor 1016	0.50	U
heptachlor	0.050	U	Aroclor 1221	0.50	U
aldrin	0.050	U	Aroclor 1232	0.50	U
heptachlor epoxide	0.050	U	Aroclor 1242	0.50	U
endosulfan I	0.050	U	Aroclor 1248	0.50	U
dieldrin	0.10	U	Aroclor 1254	1.0	U
4,4'-DDE	0.10	U	Aroclor 1260	1.0	U
endrin	0.10	U	endrin aldehyde	0.10	U
endosulfan II	0.10	U	isodrin	0.050	U
4,4'-DDD	0.10	U	kepone	0.10	U
endosulfan sulfate	0.10	U	chlorobenzilate	0.50	U
4,4'-DDT	0.10	U			

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

Date Extracted: 11/07/90
Date Analyzed: 11/26/90
Dilution Factor: 1

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IT Corporation
November 30, 1990

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LANL ER

Job Number: ITNA 47061

APPENDIX IX ORGANOCHLORINE PESTICIDES

Results in µg/liter (ppb)

Sample Matrix: Water

Client Sample ID: MC04B
Lab Sample ID: PP1474

Compound			Compound		
α-BHC	0.050	U	methoxychlor	0.50	U
β-BHC	0.050	U	chlordane	0.50	U
δ-BHC	0.050	U	toxaphene	1.0	U
γ-BHC (lindane)	0.050	U	Aroclor 1016	0.50	U
heptachlor	0.050	U	Aroclor 1221	0.50	U
aldrin	0.050	U	Aroclor 1232	0.50	U
heptachlor epoxide	0.050	U	Aroclor 1242	0.50	U
endosulfan I	0.050	U	Aroclor 1248	0.50	U
dieldrin	0.10	U	Aroclor 1254	1.0	U
4,4'-DDE	0.10	U	Aroclor 1260	1.0	U
endrin	0.10	U	endrin aldehyde	0.10	U
endosulfan II	0.10	U	isodrin	0.050	U
4,4'-DDD	0.10	U	kepone	0.10	U
endosulfan sulfate	0.10	U	chlorobenzilate	0.50	U
4,4'-DDT	0.10	U			

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

Date Extracted: 11/07/90
Date Analyzed: 11/26/90
Dilution Factor: 1

WATER SURROGATE PERCENT RECOVERY SUMMARY

Sample No.	PESTICIDE Dibutylchlorendate (24-154%)*
Method Blank 1	121
Method Blank 2	121
APC01	50
APC02	121
APC02 DL	0 D
LA03A	75
LA04.5C	23 **
MC010	73
MC04B	87
MC06B	76
MC07A	60

* - Values in parenthesis represent USEPA advisory QC limits.
** - Values outside of contract required QC limits.
D - Surrogates diluted out.
DL - Dilution.

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IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LANL ER

Job Number: ITNA 47061

APPENDIX IX HERBICIDE ANALYSIS

Results in mg/liter (ppm)

Sample Matrix: Water

Client Sample ID: Lab Sample ID:	Method Blank BLA1944
2,4-D	0.0002 U
silvex	0.0001 U
2,4,5-T	0.0001 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

Date Extracted: 11/08/90
Date Analyzed: 11/20/90

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November 30, 1990

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LANL ER

Job Number: ITNA 47061

APPENDIX IX HERBICIDE ANALYSIS

Results in mg/liter (ppm)

Sample Matrix: Water

Client Sample ID:	APC01	APC02	LA03A	LA04.5C
Lab Sample ID:	PP1470	PP1471	PP1472	PP1473
2,4-D	0.0002 U	0.0002 U	0.0002 U	0.0002 U
silvex	0.0001 U	0.0001 U	0.0001 U	0.0001 U
2,4,5-T	0.0001 U	0.0001 U	0.0001 U	0.0001 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

Date Extracted: 11/08/90
Date Analyzed: 11/20/90

IT Corporation
November 30, 1990

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LANL ER

Job Number: ITNA 47061

APPENDIX IX HERBICIDE ANALYSIS

Results in mg/liter (ppm)

Sample Matrix: Water

Client Sample ID:	MC04B	MC06B	MC07A	MC010
Lab Sample ID:	PP1474	PP1606	PP1607	PP1608
2,4-D	0.0002 U	0.0002 U	0.0002 U	0.0002 U
silvex	0.0001 U	0.0001 U	0.0001 U	0.0001 U
2,4,5-T	0.0001 U	0.0001 U	0.0001 U	0.0001 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

Date Extracted: 11/08/90
Date Analyzed: 11/20/90

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November 30, 1990

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LANL ER

Job Number: ITNA 47061

APPENDIX IX METALS ANALYSIS

Results in mg/liter (ppm)

Sample Matrix: Water

Client Sample ID:	Method Blank
Lab Sample ID:	PBWC3811
antimony	0.03 U
arsenic	0.04 U
barium	0.002 U
beryllium	0.001 U
cadmium	0.005 U
chromium	0.01 U
cobalt	0.02 U
copper	0.01 U
lead	0.03 U
mercury	NR
nickel	0.02 U
selenium	0.06 U
silver	0.005 U
thallium	0.04 U
tin	0.02 U
vanadium	0.01 U
zinc	0.017

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
NR - Not required.

Date Digested: 11/20/90
Date Analyzed: 11/21/90 (ICP), 11/12/90 (CVAA)

IT Corporation
November 30, 1990

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LANL ER

Job Number: ITNA 47061

APPENDIX IX METALS ANALYSIS

Results in mg/liter (ppm)

Sample Matrix: Water

Client Sample ID:	APC01	APC02	LA03A	LA04.5C
Lab Sample ID:	PP1475	PP1476	PP1477	PP1478
antimony	0.03 U	0.03 U	0.03 U	0.03 U
arsenic	0.04 U	0.04 U	0.04 U	0.04 U
barium	0.97	5.6	0.18	0.095
beryllium	0.004	0.001 U	0.002	0.001 U
cadmium	0.005 U	0.83	0.005 U	0.005 U
chromium	0.03	1.1	0.02	0.01
cobalt	0.04	0.02 U	0.02 U	0.02 U
copper	0.12	0.03	0.03	0.03
lead	0.08	0.74	0.04	0.03 U
mercury	0.001 U	0.001 U	0.001 U	0.001 U
nickel	0.05	0.02 U	0.02 U	0.02 U
selenium	0.06 U	0.06 U	0.06 U	0.06 U
silver	0.005 U	1.4	0.005 U	0.005 U
thallium	0.04 U	0.04 U	0.04 U	0.04 U
tin	0.02 U	0.02 U	0.02 U	0.02 U
vanadium	0.07	0.01 U	0.01	0.01 U
zinc	0.20	0.054	0.054	0.052

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

Date Digested: 11/20/90
Date Analyzed: 11/21/90 (ICP), 11/12/90 (CVAA)

IT Corporation
November 30, 1990

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LANL ER

Job Number: ITNA 47061

APPENDIX IX METALS ANALYSIS

Results in mg/liter (ppm)

Sample Matrix: Water

Client Sample ID:	MC04B	MC06B	MC07A	MC010
Lab Sample ID:	PP1479	PP1609	PP1610	PP1611
antimony	0.03 U	0.03 U	0.03 U	0.03 U
arsenic	0.04 U	0.04 U	0.04 U	0.04 U
barium	0.19	0.69	0.42	0.67
beryllium	0.001 U	0.004	0.003	0.004
cadmium	0.005 U	0.005 U	0.005 U	0.005 U
chromium	0.01 U	0.03	0.02	0.03
cobalt	0.02 U	0.02 U	0.02 U	0.02 U
copper	0.01	0.03	0.03	0.03
lead	0.03 U	0.07	0.05	0.07
mercury	0.001 U	0.001 U	0.001 U	0.001 U
nickel	0.02 U	0.02 U	0.03	0.02 U
selenium	0.06 U	0.06 U	0.06 U	0.06 U
silver	0.005 U	0.005 U	0.005 U	0.005 U
thallium	0.04 U	0.04 U	0.04 U	0.04 U
tin	0.02 U	0.02 U	0.02 U	0.02 U
vanadium	0.01 U	0.03	0.04	0.03
zinc	0.081	0.15	0.10	0.17

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

Date Digested: 11/20/90
Date Analyzed: 11/21/90 (ICP), 11/12/90 (CVAA)

IT Corporation
November 30, 1990

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: LANL ER

Job Number: ITNA 47061

CYANIDE ANALYSIS

Results in mg/liter (ppm)

Sample Matrix: Water

Client Sample ID	Lab Sample ID	Result
Method Blank	P1737	0.01 U
APC01	PP1480	0.01 U
APC02	PP1481	0.33
LA03A	PP1482	0.01 U
LA04.5C	PP1483	0.01 U
MC04B	PP1484	0.01
MC06B	PP1612	0.01 U
MC07A	PP1613	0.01 U
MC010	PP1614	0.01 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

Date Analyzed: 11/13/90

IT Corporation
November 30, 1990

Client Project ID: LANL ER

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Job Number: ITNA 47061

SULFIDE ANALYSIS

Results in mg/liter (ppm)

Sample Matrix: Water

Client Sample ID	Lab Sample ID	Result
Method Blank	P1719	0.2 U
APC01	PP1485	1.6
APC02	PP1486	0.2 U
LA03A	PP1487	2.8
LA04.5C	PP1488	2.2
MC04B	PP1489	2.0
MC06B	PP1615	1.0
MC07A	PP1616	1.6
MC010	PP1617	2.0

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

Date Analyzed: 11/08/90

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ANALYTICAL SERVICES

CERTIFICATE OF ANALYSIS

Date: 12/11/90

IT Analytical Services
5815 Middlebrook Pike
Knoxville, TN 37921
Mary Tyler

Work Order: T0-11-076 P.O. Number: 486000.02

This is the Certificate of Analysis for the following samples:

Client Work ID: 301215.07.02 Los Alamos, CORRECTED REPORT
Date Received: 11/07/90
Number of Samples: 6
Sample Type: aqueous

TABLE OF CONTENTS FOR ANALYTICAL RESULTS

PAGES	LABORATORY #	SAMPLE IDENTIFICATION
2	T0-11-076-01	PP1473 LA04.5C
3	T0-11-076-02	PP1470 APC01
4	T0-11-076-03	PP1474 MC04B
5	T0-11-076-04	PP1471 APC02
6	T0-11-076-05	PP1606 MC06B
7	T0-11-076-06	PP1608 MC010

Reviewed and Approved:

David A. Pichette
Project Manager

IT ANALYTICAL SERVICES
SAN JOSE, CA

Company: IT Analytical Services, CORRECTED REPORT
Date: 12/11/90
Client Work ID: 301215.07.02 Los Alamos

Work Order: TO-11-076

TEST NAME: **EPA 8140**

SAMPLE ID: **PP1473 LA04.5C**
SAMPLE DATE: **11/02/90**
LAB SAMPLE ID: **T011076-01**
SAMPLE MATRIX: **aqueous**
RECEIPT CONDITION: **Cool**
EXTRACTION DATE: **11/09/90**
ANALYSIS DATE: **11/20/90**

RESULTS in Micrograms per Liter

PARAMETER	DETECTION LIMIT	DETECTED
Dimethoate	1.	None
Disulfoton	0.5	None
Famphur	1.5	None
Parathion ethyl	1.	None
Parathion methyl	1.	None
Phorate	1.	None
Sulfotepp	0.5	None
Thionazin	0.5	None
0,0,0-Triethylphosphorothioate	0.25	None

IT ANALYTICAL SERVICES
SAN JOSE, CA

Company: IT Analytical Services, CORRECTED REPORT
Date: 12/11/90
Client Work ID: 301215.07.02 Los Alamos

Work Order: TO-11-076

TEST NAME: **EPA 8140**

SAMPLE ID: **PP1470 APC01**
SAMPLE DATE: **11/02/90**
LAB SAMPLE ID: **T011076-02**
SAMPLE MATRIX: **aqueous**
RECEIPT CONDITION: **Cool**
EXTRACTION DATE: **11/09/90**
ANALYSIS DATE: **11/20/90**

RESULTS in Micrograms per Liter

PARAMETER	DETECTION LIMIT	DETECTED
Dimethoate	1.	None
Disulfoton	0.5	None
Famphur	1.5	None
Parathion ethyl	1.	None
Parathion methyl	1.	None
Phorate	1.	None
Sulfotepp	0.5	None
Thionazin	0.5	None
0,0,0-Triethylphosphorothioate	0.25	None

IT ANALYTICAL SERVICES
SAN JOSE, CA

Company: IT Analytical Services, CORRECTED REPORT
Date: 12/11/90
Client Work ID: 301215.07.02 Los Alamos

Work Order: TO-11-076

TEST NAME: **EPA 8140**

SAMPLE ID: **PP1474 MC04B**
SAMPLE DATE: **11/02/90**
LAB SAMPLE ID: **T011076-03**
SAMPLE MATRIX: **aqueous**
RECEIPT CONDITION: **Cool**
EXTRACTION DATE: **11/09/90**
ANALYSIS DATE: **11/20/90**

RESULTS in Micrograms per Liter

PARAMETER	DETECTION LIMIT	DETECTED
Dimethoate	1.	None
Disulfoton	0.5	None
Famphur	1.5	None
Parathion ethyl	1.	None
Parathion methyl	1.	None
Phorate	1.	None
Sulfotepp	0.5	None
Thionazin	0.5	None
0,0,0-Triethylphosphorothioate	0.25	None

IT ANALYTICAL SERVICES
SAN JOSE, CA

Company: IT Analytical Services, CORRECTED REPORT
Date: 12/11/90
Client Work ID: 301215.07.02 Los Alamos

Work Order: TO-11-076

TEST NAME: **EPA 8140**

SAMPLE ID: **PP1471 APC02**
SAMPLE DATE: **11/02/90**
LAB SAMPLE ID: **T011076-04**
SAMPLE MATRIX: **aqueous**
RECEIPT CONDITION: **Cool**
EXTRACTION DATE: **11/09/90**
ANALYSIS DATE: **11/20/90**

RESULTS in Micrograms per Liter

PARAMETER	DETECTION LIMIT	DETECTED
Dimethoate	1.	None
Disulfoton	0.5	None
Famphur	1.5	None
Parathion ethyl	1.	None
Parathion methyl	1.	None
Phorate	1.	None
Sulfotepp	0.5	None
Thionazin	0.5	None
0,0,0-Triethylphosphorothioate	0.25	None

IT ANALYTICAL SERVICES
SAN JOSE, CA

Company: IT Analytical Services, CORRECTED REPORT
Date: 12/11/90
Client Work ID: 301215.07.02 Los Alamos

Work Order: T0-11-076

TEST NAME: **EPA 8140**

SAMPLE ID: **PP1606 MC06B**
SAMPLE DATE: **11/01/90**
LAB SAMPLE ID: **T011076-05**
SAMPLE MATRIX: **aqueous**
RECEIPT CONDITION: **Cool**
EXTRACTION DATE: **11/09/90**
ANALYSIS DATE: **11/20/90**

RESULTS in Micrograms per Liter

PARAMETER	DETECTION LIMIT	DETECTED
Dimethoate	1.	None
Disulfoton	0.5	None
Famphur	1.5	None
Parathion ethyl	1.	None
Parathion methyl	1.	None
Phorate	1.	None
Sulfotepp	0.5	None
Thionazin	0.5	None
0,0,0-Triethylphosphorothioate	0.25	None

IT ANALYTICAL SERVICES
SAN JOSE, CA

Company: IT Analytical Services, CORRECTED REPORT
Date: 12/11/90
Client Work ID: 301215.07.02 Los Alamos

Work Order: T0-11-076

TEST NAME: **EPA 8140**

SAMPLE ID: **PP1608 MC010**
SAMPLE DATE: **11/01/90**
LAB SAMPLE ID: **T011076-06**
SAMPLE MATRIX: **aqueous**
RECEIPT CONDITION: **Cool**
EXTRACTION DATE: **11/09/90**
ANALYSIS DATE: **11/20/90**

RESULTS in Micrograms per Liter

PARAMETER	DETECTION LIMIT	DETECTED
Dimethoate	1.	None
Disulfoton	0.5	None
Famphur	1.5	None
Parathion ethyl	1.	None
Parathion methyl	1.	None
Phorate	1.	None
Sulfotepp	0.5	None
Thionazin	0.5	None
0,0,0-Trithylphosphorothioate	0.25	None

IT ANALYTICAL SERVICES
SAN JOSE, CA

Company: IT Analytical Services, CORRECTED REPORT
Date: 12/11/90
Client Work ID: 301215.07.02 Los Alamos

Work Order: TO-11-076

TEST CODE **8140** TEST NAME **EPA 8140**

The method of analysis for organophosphorus pesticides is taken from E.P.A. Methods 614, 622 and 8140. The samples are extracted with solvent and concentrated. Final detection is by gas chromatography using a flameless alkali salt nitrogren-phosphorus detector.

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYTICAL SERVICES

CERTIFICATE OF ANALYSIS

Date: 12/11/90

IT Analytical Services
5815 Middlebrook Pike
Knoxville, TN 37921
Mary Tyler

Work Order: T0-11-103 P.O. Number: 486000.02

This is the Certificate of Analysis for the following samples:

Client Work ID: 301215.07.02 Los Alamos, CORRECTED REPORT
Date Received: 11/09/90
Number of Samples: 2
Sample Type: aqueous

TABLE OF CONTENTS FOR ANALYTICAL RESULTS

PAGES	LABORATORY #	SAMPLE IDENTIFICATION
2	T0-11-103-01	PP1472 LA03A
3	T0-11-103-02	PP1607 MC07A

Reviewed and Approved:

David A. Pichette
Project Manager

American Council of Independent Laboratories
International Association of Environmental Testing Laboratories
American Association for Laboratory Accreditation

IT ANALYTICAL SERVICES
SAN JOSE, CA

Company: IT Analytical Services, CORRECTED REPORT
Date: 12/11/90
Client Work ID: 301215.07.02 Los Alamos

Work Order: T0-11-103

TEST NAME: **EPA 8140**

SAMPLE ID: **PP1472 LA03A**
SAMPLE DATE: **11/02/90**
LAB SAMPLE ID: **T011103-01**
SAMPLE MATRIX: **aqueous**
RECEIPT CONDITION: **Cool**
EXTRACTION DATE: **11/09/90**
ANALYSIS DATE: **11/21/90**

RESULTS in Micrograms per Liter

PARAMETER	DETECTION LIMIT	DETECTED
Dimethoate	1.	None
Disulfoton	0.5	None
Famphur	1.5	None
Parathion ethyl	1.	None
Parathion methyl	1.	None
Phorate	1.	None
Sulfotepp	0.5	None
Thionazin	0.5	None
0,0,0-Triethylphosphorothioate	0.25	None

IT ANALYTICAL SERVICES
SAN JOSE, CA

Company: IT Analytical Services, CORRECTED REPORT
Date: 12/11/90
Client Work ID: 301215.07.02 Los Alamos

Work Order: T0-11-103

TEST NAME: **EPA 8140**

SAMPLE ID: **PP1607 MC07A**
SAMPLE DATE: **11/01/90**
LAB SAMPLE ID: **T011103-02**
SAMPLE MATRIX: **aqueous**
RECEIPT CONDITION: **Cool**
EXTRACTION DATE: **11/09/90**
ANALYSIS DATE: **11/21/90**

RESULTS in Micrograms per Liter

PARAMETER	DETECTION LIMIT	DETECTED
Dimethoate	1.	None
Disulfoton	0.5	None
Famphur	1.5	None
Parathion ethyl	1.	None
Parathion methyl	1.	None
Phorate	1.	None
Sulfotepp	0.5	None
Thionazin	0.5	None
0,0,0-Triethylphosphorothioate	0.25	None

IT ANALYTICAL SERVICES
SAN JOSE, CA

Company: IT Analytical Services, CORRECTED REPORT
Date: 12/11/90
Client Work ID: 301215.07.02 Los Alamos

Work Order: TO-11-103

TEST CODE **8140** TEST NAME **EPA 8140**

The method of analysis for organophosphorus pesticides is taken from E.P.A. Methods 614, 622 and 8140. The samples are extracted with solvent and concentrated. Final detection is by gas chromatography using a flameless alkali salt nitrogren-phosphorus detector.

Results for organic chemical parameters in soils have been corrected for moisture content and are reported on a dry soil basis unless noted otherwise. Results for inorganic chemical parameters have not been corrected for moisture content.

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYTICAL SERVICES

CERTIFICATE OF ANALYSIS

Date: 12/11/90

IT Analytical Services
5815 Middlebrook Pike
Knoxville, TN 37921
Mary Tyler

Work Order: TO-12-018 P.O. Number: 486000.02

This is the Certificate of Analysis for the following samples:

Client Work ID: 301215.07.02 Los Alamos
Date Received: 12/04/90
Number of Samples: 1
Sample Type: aqueous

TABLE OF CONTENTS FOR ANALYTICAL RESULTS

PAGES	LABORATORY #	SAMPLE IDENTIFICATION
2	TO-12-018-01	PP3335 MC07A

Reviewed and Approved:

David A. Pichette
Project Manager

IT ANALYTICAL SERVICES
SAN JOSE, CA

Company: IT Analytical Services
Date: 12/11/90
Client Work ID: 301215.07.02 Los Alamos

Work Order: TO-12-018

TEST NAME: **EPA 614/8140**

SAMPLE ID: **PP3335 MC07A**
SAMPLE DATE: **11/30/90**
LAB SAMPLE ID: **T012018-01**
SAMPLE MATRIX: **aqueous**
RECEIPT CONDITION: **Cool**
EXTRACTION DATE: **12/05/90**
ANALYSIS DATE: **12/07/90**

RESULTS in Micrograms per Liter

PARAMETER	DETECTION LIMIT	DETECTED
Dimethoate	2.	None
Disulfoton	1.	None
Famphur	3.	None
Parathion ethyl	2.	None
Parathion methyl	2.	None
Phorate	1.	None
Sulfotepp	1.	None
Thionzain	1.	None
0,0,0-Triethylphosphorothioate	0.5	None

IT ANALYTICAL SERVICES
SAN JOSE, CA

Company: IT Analytical Services
Date: 12/11/90
Client Work ID: 301215.07.02 Los Alamos

Work Order: TO-12-018

TEST CODE **614** TEST NAME **EPA 614/8140**

The method of analysis for organophosphorus pesticides is taken from E.P.A. Methods 614 and 8140. The samples are extracted with solvent and concentrated. Final detection is by gas chromatography using a flameless alkali salt nitrogen-phosphorus detector.

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYTICAL SERVICES

CERTIFICATE OF ANALYSIS

Kelly Bitner
IT Corporation
5301 Central Avenue N.E.
Albuquerque, NM 87108

November 30, 1990

TDL PROJECT NUMBER: 482833

This is the Certificate of Analysis for the following samples:

Client Project ID:	301215.07.02 **(Los Alamos National Laboratory)**
Date Received by Lab:	November 7, 1990
Number of Samples:	Eight (8)
Sample Type:	Water

I. Introduction/Case Narrative

Eight (8) water samples were received November 7, 1990, for the analysis of Appendix IX dioxins and furans. This includes isomer specific 2,3,7,8-TCDD and total tetra through hexa (Cl_4-Cl_6) dioxin and furan homologs (See Appendix A, Cross Reference List and Appendix C, Chain-of-Custody and Request for Analysis records). The samples and blank were spiked with an internal standard mixture containing 50 ng each of ^{13}C-2,3,7,8-TCDD, ^{13}C-PeCDD, ^{13}C-PeCDF, ^{13}C-HxCDD and ^{13}C-HxCDF. The samples and blank were extracted and cleaned up using a modified version of the EPA reference method described in "RCRA SW-846, Method 8280," revised September, 1986. Extracts were analyzed by GC/MS operating in the selected ion monitoring mode for enhanced sensitivity.

The samples were labeled with the following:

MC07A	APC01
MC06B	LA03A
MC010	MC04B
LA04,5C	APC02

Reviewed and Approved:

Duane K. Root
Analytical Operations Manager
qhc-s\NM311

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II. Analytical Results/Methodology

SAMPLE PREPARATION

Approximately 1000 ml of each sample and 1000 ml distilled water (for the blank) were transferred into individual separatory funnels. The samples and blank were spiked with the internal standard mixture, and then triple-extracted with CH_2Cl_2. The resulting extracts were filtered into a KD flask and the volume reduced to approximately 1 ml.

SAMPLE CLEANUP

The samples and blank were cleaned up using dual column chromatography consisting of an acid-modified silica gel column followed by a neutral alumina column to aid in the removal of chemical interferences. Detailed descriptions of these cleanup techniques can be found in Option A of the U.S. Environmental Protection Agency, Region VII Protocol for "The Determination Of 2,3,7,8-TCDD In Soil And Sediment", revised September, 1983. Final extracts were concentrated to near dryness and raised to 50 µl with 25 ng ^{13}C-1,2,3,4-TCDD and 25 ng ^{13}C-1,2,3,7,8,9-HxCDD which were used as recovery standards.

GC/MS ANALYSIS

Isomer Specific TCDD - The sample extracts were analyzed using HRGC/LRMS scanning in the selected ion monitoring mode for enhanced sensitivity. The column used for this isomer specific analysis was a 60 m SP-2331 fused silica capillary column. Before acquisition of the sample data, a seven isomer performance mixture containing the six most closely eluting TCDD isomers was analyzed.

A five-point calibration plot was analyzed in triplicate. The mean response factors obtained from this fifteen-point calibration were used for all subsequent calculations. The shift standard, analyzed on the same day as the sample, produced a response factor within 10% of the fifteen-point curve for TCDD.

Total Dioxin and Furan - The samples and blank were analyzed for total dioxin and furan homologs from Cl_4-Cl_6. The analytical approach employed by ITAS for the determination of total dioxins and furans is considered semi-quantitative due to the lack of availability of all dioxin and furan isomer standards. The standard analyzed each shift consisted of:

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II. Analytical Results/Methodology (continued)

GC/MS ANALYSIS (continued)

Dioxins	**Dibenzofurans**
^{13}C-2,3,7,8-TCDD	^{13}C-2,3,7,8-TCDF
^{13}C-1,2,3,4-TCDD	^{13}C-1,2,3,7,8-PeCDF
^{13}C-1,2,3,7,8-PeCDD	^{13}C-1,2,3,4,7,8-HxCDF
^{13}C-1,2,3,6,7,8-HxCDD	2,3,7,8-TCDF
^{13}C-1,2,3,7,8,9-HxCDD	1,2,3,7,8-PeCDF
^{13}C-OCDD	2,3,4,7,8-PeCDF
2,3,7,8-TCDD	1,2,3,4,7,8-HxCDF
1,2,3,7,8-PeCDD	1,2,3,6,7,8-HxCDF
1,2,3,4,7,8-HxCDD	2,3,4,6,7,8-HxCDF
1,2,3,6,7,8-HxCDD	1,2,3,7,8,9-HxCDF
1,2,3,7,8,9-HxCDD	1,2,3,4,6,7,8-HpCDF
1,2,3,4,6,7,8-HpCDD	1,2,3,4,7,8,9-HpCDF
OCDD	OCDF

Response factors were calculated for each compound in the standard relative to its ^{13}C labeled homolog; the same response was assumed applicable to all isomers in each homologous group. A five-point calibration plot was analyzed in triplicate. The mean response factors obtained from this fifteen-point calibration were used for all subsequent calculations. The shift standard, analyzed on the same day as the samples, produced a response factor within 30% of the multipoint.

The extracts were analyzed using HRGC/LRMS scanning in the selected ion monitoring mode for enhanced sensitivity. The column used for the analysis was a 60 m DB-5 type fused silica capillary column.

GC/MS RESULTS

Isomer Specific TCDD - The results for the isomer specific analysis, shown in Appendix B, are reported in ppt (ng/L). A detection limit is calculated from 2.5 times the signal in the area of the elution of ^{13}C-TCDD whenever a sample contains no detectable 2,3,7,8-TCDD.

Totals - The results for the totals analysis, shown in Appendix B, are reported in ppt (ng/L) with the total amount of each homologous group calculated. When more than one isomer in a homologous group of dioxin or furan is found, all of the isomers are added together to produce a total homolog result. Detection limits are calculated from 2.5 times signal to noise when a "Not Detected" (ND) is reported. The detection limits are listed in parenthesis.

Kelly Bitner
Los Alamos National Laboratory
Date: November 30, 1990
Client Project ID: 301215.07.02 TDL Project No.: 482833

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III. Quality Control

Routine laboratory QA/QC was followed. Recoveries for the internal standards for each sample are presented with the sample analysis data.

APPENDIX A

Kelly Bitner
Los Alamos National Laboratory
Date: November 30, 1990
Client Project ID: 301215.07.02 TDL Project No.: 482833

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CROSS REFERENCE LIST

TDL SAMPLE NO.	ITAS SAMPLE NO.	CLIENT SAMPLE NO.	MATRIX
BB3058	PP1607	MC07A	Water
BB3059	PP1606	MC06B	Water
BB3060	PP1608	MC010	Water
BB3061	PP1473	LA04,5C	Water
BB3062	PP1470	APC01	Water
BB3063	PP1472	LA03A	Water
BB3064	PP1474	MC04B	Water
BB3065	PP1471	APC02	Water

APPENDIX B

Kelly Bitner
Los Alamos National Laboratory
Date: November 30, 1990
Client Project ID: 301215.07.02 TDL Project No.: 482833

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Dioxin/Furan Analysis - Modified Method 8280

Client Sample ID: MC07A (Water)
Sample Date: November 1, 1990
TDL Sample ID: BB3058
Extraction Date: November 8, 1990

Analyte	Conc. (ng/L)	Internal Standard	% Recovery
Isomer Specific Analysis Date: November 26, 1990			
2,3,7,8-TCDD	ND(0.99)	^{13}C-2,3,7,8-TCDD	82
Totals Analysis Date: November 26, 1990			
Dioxins			
Total TCDD	ND(0.15)	^{13}C-2,3,7,8-TCDD	75
Total PeCDD	ND(0.84)	^{13}C-1,2,3,7,8-PeCDD	85
Total HxCDD	ND(0.40)	^{13}C-1,2,3,6,7,8-HxCDD	90
Furans			
Total TCDF	ND(0.13)	^{13}C-2,3,7,8-TCDF	72
Total PeCDF	ND(0.14)	^{13}C-1,2,3,7,8-PeCDF	85
Total HxCDF	ND(0.22)	^{13}C-1,2,3,4,7,8-HxCDF	96

Kelly Bitner
Los Alamos National Laboratory
Date: November 30, 1990
Client Project ID: 301215.07.02 TDL Project No.: 482833

IT ANALYTICAL SERVICES
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Dioxin/Furan Analysis - Modified Method 8280

Client Sample ID: MC06B (Water)
Sample Date: November 1, 1990
TDL Sample ID: BB3059
Extraction Date: November 8, 1990

Analyte	Conc. (ng/L)	Internal Standard	% Recovery
Isomer Specific Analysis Date: November 26, 1990			
2,3,7,8-TCDD	ND(1.8)	^{13}C-2,3,7,8-TCDD	80
Totals Analysis Date: November 26, 1990			
Dioxins			
Total TCDD	ND(0.26)	^{13}C-2,3,7,8-TCDD	75
Total PeCDD	ND(0.88)	^{13}C-1,2,3,7,8-PeCDD	69
Total HxCDD	ND(0.95)	^{13}C-1,2,3,6,7,8-HxCDD	78
Furans			
Total TCDF	ND(0.13)	^{13}C-2,3,7,8-TCDF	73
Total PeCDF	ND(0.28)	^{13}C-1,2,3,7,8-PeCDF	74
Total HxCDF	ND(0.32)	^{13}C-1,2,3,4,7,8-HxCDF	88

Kelly Bitner
Los Alamos National Laboratory
Date: November 30, 1990
Client Project ID: 301215.07.02 TDL Project No.: 482833

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Dioxin/Furan Analysis - Modified Method 8280

Client Sample ID: MC010 (Water)
Sample Date: November 1, 1990
TDL Sample ID: BB3060
Extraction Date: November 8, 1990

Analyte	Conc. (ng/L)	Internal Standard	% Recovery
Isomer Specific Analysis Date: November 26, 1990			
2,3,7,8-TCDD	ND(0.62)	^{13}C-2,3,7,8-TCDD	101
Totals Analysis Date: November 26, 1990			
Dioxins			
Total TCDD	ND(0.11)	^{13}C-2,3,7,8-TCDD	90
Total PeCDD	ND(0.59)	^{13}C-1,2,3,7,8-PeCDD	93
Total HxCDD	ND(0.48)	^{13}C-1,2,3,6,7,8-HxCDD	96
Furans			
Total TCDF	ND(0.098)	^{13}C-2,3,7,8-TCDF	94
Total PeCDF	ND(0.22)	^{13}C-1,2,3,7,8-PeCDF	90
Total HxCDF	ND(0.18)	^{13}C-1,2,3,4,7,8-HxCDF	105

Kelly Bitner
Los Alamos National Laboratory
Date: November 30, 1990
Client Project ID: 301215.07.02 TDL Project No.: 482833

IT ANALYTICAL SERVICES
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Dioxin/Furan Analysis - Modified Method 8280

Client Sample ID: LA04,5C (Water)
Sample Date: November 2, 1990
TDL Sample ID: BB3061
Extraction Date: November 8, 1990

Analyte	Conc. (ng/L)	Internal Standard	% Recovery
Isomer Specific Analysis Date: November 26, 1990			
2,3,7,8-TCDD	ND(1.4)	^{13}C-2,3,7,8-TCDD	92
Totals Analysis Date: November 26, 1990			
Dioxins			
Total TCDD	ND(0.20)	^{13}C-2,3,7,8-TCDD	80
Total PeCDD	ND(0.65)	^{13}C-1,2,3,7,8-PeCDD	86
Total HxCDD	ND(0.92)	^{13}C-1,2,3,6,7,8-HxCDD	91
Furans			
Total TCDF	ND(0.11)	^{13}C-2,3,7,8-TCDF	81
Total PeCDF	ND(0.18)	^{13}C-1,2,3,7,8-PeCDF	85
Total HxCDF	ND(0.22)	^{13}C-1,2,3,4,7,8-HxCDF	105

Kelly Bitner
Los Alamos National Laboratory
Date: November 30, 1990
Client Project ID: 301215.07.02 TDL Project No.: 482833

IT ANALYTICAL SERVICES
304 DIRECTORS DRIVE
KNOXVILLE, TENNESSEE

Dioxin/Furan Analysis - Modified Method 8280

Client Sample ID: APC01 (Water)
Sample Date: November 2, 1990
TDL Sample ID: BB3062
Extraction Date: November 8, 1990

Analyte	Conc. (ng/L)	Internal Standard	% Recovery
Isomer Specific Analysis Date: November 26, 1990			
2,3,7,8-TCDD	ND(1.6)	^{13}C-2,3,7,8-TCDD	75
Totals Analysis Date: November 26, 1990			
Dioxins			
Total TCDD	ND(0.23)	^{13}C-2,3,7,8-TCDD	67
Total PeCDD	ND(0.60)	^{13}C-1,2,3,7,8-PeCDD	68
Total HxCDD	ND(0.49)	^{13}C-1,2,3,6,7,8-HxCDD	73
Furans			
Total TCDF	ND(0.14)	^{13}C-2,3,7,8-TCDF	65
Total PeCDF	ND(0.15)	^{13}C-1,2,3,7,8-PeCDF	72
Total HxCDF	ND(0.23)	^{13}C-1,2,3,4,7,8-HxCDF	84

Kelly Bitner
Los Alamos National Laboratory
Date: November 30, 1990
Client Project ID: 301215.07.02 TDL Project No.: 482833

IT ANALYTICAL SERVICES
304 DIRECTORS DRIVE
KNOXVILLE, TENNESSEE

Dioxin/Furan Analysis - Modified Method 8280

Client Sample ID: LA03A (Water)
Sample Date: November 2, 1990
TDL Sample ID: BB3063
Extraction Date: November 8, 1990

Analyte	Conc. (ng/L)	Internal Standard	% Recovery
Isomer Specific Analysis Date: November 26, 1990			
2,3,7,8-TCDD	ND(1.3)	^{13}C-2,3,7,8-TCDD	96
Totals Analysis Date: November 26, 1990			
Dioxins			
Total TCDD	ND(0.13)	^{13}C-2,3,7,8-TCDD	87
Total PeCDD	ND(0.71)	^{13}C-1,2,3,7,8-PeCDD	94
Total HxCDD	ND(0.51)	^{13}C-1,2,3,6,7,8-HxCDD	93
Furans			
Total TCDF	ND(0.11)	^{13}C-2,3,7,8-TCDF	93
Total PeCDF	ND(0.13)	^{13}C-1,2,3,7,8-PeCDF	90
Total HxCDF	ND(0.24)	^{13}C-1,2,3,4,7,8-HxCDF	99

Kelly Bitner
Los Alamos National Laboratory
Date: November 30, 1990
Client Project ID: 301215.07.02 TDL Project No.: 482833

IT ANALYTICAL SERVICES
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KNOXVILLE, TENNESSEE

Dioxin/Furan Analysis - Modified Method 8280

Client Sample ID: MC04B (Water)
Sample Date: November 2, 1990
TDL Sample ID: BB3064
Extraction Date: November 8, 1990

Analyte	Conc. (ng/L)	Internal Standard	% Recovery
Isomer Specific Analysis Date: November 26, 1990			
2,3,7,8-TCDD	ND(3.0)	^{13}C-2,3,7,8-TCDD	58
Totals Analysis Date: November 27, 1990			
Dioxins			
Total TCDD	ND(0.44)	^{13}C-2,3,7,8-TCDD	52
Total PeCDD	ND(1.1)	^{13}C-1,2,3,7,8-PeCDD	54
Total HxCDD	ND(1.1)	^{13}C-1,2,3,6,7,8-HxCDD	54
Furans			
Total TCDF	ND(0.17)	^{13}C-2,3,7,8-TCDF	56
Total PeCDF	ND(0.17)	^{13}C-1,2,3,7,8-PeCDF	51
Total HxCDF	ND(0.27)	^{13}C-1,2,3,4,7,8-HxCDF	56

Kelly Bitner
Los Alamos National Laboratory
Date: November 30, 1990
Client Project ID: 301215.07.02 TDL Project No.: 482833

IT ANALYTICAL SERVICES
304 DIRECTORS DRIVE
KNOXVILLE, TENNESSEE

Dioxin/Furan Analysis - Modified Method 8280

Client Sample ID: APC02 (Water)
Sample Date: November 1, 1990
TDL Sample ID: BB3065
Extraction Date: November 8, 1990

Analyte	Conc. (ng/L)	Internal Standard	% Recovery
Isomer Specific Analysis Date: November 26, 1990			
2,3,7,8-TCDD	ND(1.8)	^{13}C-2,3,7,8-TCDD	94
Totals Analysis Date: November 27, 1990			
Dioxins			
Total TCDD	ND(0.26)	^{13}C-2,3,7,8-TCDD	82
Total PeCDD	ND(0.51)	^{13}C-1,2,3,7,8-PeCDD	92
Total HxCDD	ND(0.35)	^{13}C-1,2,3,6,7,8-HxCDD	90
Furans			
Total TCDF	ND(0.11)	^{13}C-2,3,7,8-TCDF	90
Total PeCDF	ND(0.095)	^{13}C-1,2,3,7,8-PeCDF	86
Total HxCDF	ND(0.15)	^{13}C-1,2,3,4,7,8-HxCDF	92

Kelly Bitner
Los Alamos National Laboratory
Date: November 30, 1990
Client Project ID: 301215.07.02 TDL Project No.: 482833

IT ANALYTICAL SERVICES
304 DIRECTORS DRIVE
KNOXVILLE, TENNESSEE

Dioxin/Furan Analysis - Modified Method 8280

Client Sample ID: Method Blank (Water)
Sample Date: NA
TDL Sample ID: BLK1896
Extraction Date: November 8, 1990

Analyte	Conc. (ng/L)	Internal Standard	% Recovery
Isomer Specific Analysis Date: November 19, 1990			
2,3,7,8-TCDD	ND(1.3)	^{13}C-2,3,7,8-TCDD	84
Totals Analysis Date: November 26, 1990			
Dioxins			
Total TCDD	ND(0.53)	^{13}C-2,3,7,8-TCDD	89
Total PeCDD	ND(0.84)	^{13}C-1,2,3,7,8-PeCDD	92
Total HxCDD	ND(1.0)	^{13}C-1,2,3,6,7,8-HxCDD	94
Furans			
Total TCDF	ND(0.12)	^{13}C-2,3,7,8-TCDF	91
Total PeCDF	ND(0.14)	^{13}C-1,2,3,7,8-PeCDF	90
Total HxCDF	ND(0.25)	^{13}C-1,2,3,4,7,8-HxCDF	101

APPENDIX C

INTERNATIONAL TECHNOLOGY CORPORATION

CHAIN-OF-CUSTODY RECORD

R/A Control No. 2-1488

C/C Control No. 195496

PROJECT NAME/NUMBER ITNA 47061

LAB DESTINATION IT/TDL

SAMPLE TEAM MEMBERS

CARRIER/WAYBILL NO.

	Sample Number	Sample Location and Description	Date and Time Collected	Sample Type	Container Type	Condition on Receipt (Name and Date)	Disposal Record No.
103062	PP1470	APC01	11-2-90	water	1 liter	Cooler temp at 6°C.	
103065	PP1471	APC02	↓	↓	↓	Samples OK. MLW 11-6-90	
103063	PP1472	LA03A					
103061	PP1473	LA04.5C					
103064	PP1474	MC04B					
103059	PP1606	MC06B	11-1-90				
103058	PP1607	MC07A	↓				
103060	PP1608	MC010					

Special Instructions:

Possible Sample Hazards:

SIGNATURES: (Name, Company, Date and Time)

1. Relinquished By: Samples shipped from IT/MWL on 11/6/90 Sat 11-7-90
   Received By: Mark Wluppch, TDL, 11-6-90 1400
2. Relinquished By:
   Received By:
3. Relinquished By:
   Received by:
4. Relinquished By:
   Received By:

482833

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INTERNATIONAL TECHNOLOGY CORPORATION

REQUEST FOR ANALYSIS

R/A Control No. 231488
C/C Control No. 195496

PROJECT NAME: Los Alamos
PROJECT NUMBER: ITNA 47061
PROFIT CENTER NUMBER: 4620
PROJECT MANAGER:
BILL TO: ITAS

PURCHASE ORDER NO. 486000.09

DATE SAMPLES SHIPPED: 11-6-90
LAB DESTINATION: IT/TDL
LABORATORY CONTACT: Nancy Conrad
SEND LAB REPORT TO: IT Corp. Middlebrook Pike

DATE REPORT REQUIRED: normal
PROJECT CONTACT: Mary Tyler
PROJECT CONTACT PHONE NO. 588-6901

	Sample No.	Sample Type	Sample Volume	Preservative	Requested Testing Program	Special Instructions
BB3062	PP1470	Water	2l		App. IX Dioxins + Furans	
BB3065	PP1471	↓	↓			
BB3063	PP1472					
BB3061	PP1473					
BB3064	PP1474					
BB3059	PP1606					
BB3058	PP1607					
BB3060	PP1608					

TURNAROUND TIME REQUIRED: (Rush must be approved by the Laboratory Project Manager.)
Normal ✓ Rush _____ (Subject to rush surcharge.)

QC LEVEL: (Levels II and III subject to surcharge; project-specific requirements must be submitted to lab before beginning work.)
I _____ II _____ III _____ Project Specific _____

POSSIBLE HAZARD IDENTIFICATION: (Please indicate if sample(s) are hazardous materials and/or suspected to contain high levels of hazardous substances.)
Non-hazard _____ Flammable _____ Skin Irritant _____ Highly Toxic _____ Other _____ (Please Specify)

SAMPLE DISPOSAL: (Please indicate disposition of sample following analysis. Lab will charge for packing, shipping, archive and disposal.)
Return to Client _____ Disposal by Lab ✓ Archive _____ (Indicate number of months.)

FOR LAB USE ONLY
Received by Mark W [illegible], TDL Date/Time 11-6-90 1400 482833

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