LDC Report# 11280B1

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NASA JPL

Collection Date: November 5, 2003

LDC Report Date: December 22, 2003

Matrix: Water

Parameters: Volatiles

Validation Level: EPA Level III

Laboratory: Applied P & Ch Laboratory

Sample Delivery Group (SDG): 03-5973

Sample Identification

MW-9
MW-3-1
MW-3-2
TB-10-11-5-03
MW-3-1MS
MW-3-1MSD

Introduction

This data review covers 6 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 524.2 for Volatiles.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (October 1999) as there are no current guidelines for the method stated above.

A table summarizing all data qualification is provided at the end of this report. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 20.0% for selected compounds.

A curve fit, based on the initial calibration, was established for quantitation for selected compounds. The coefficient of determination (r^2) was greater than or equal to 0.990 .

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were less than or equal to 30.0% with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
11/6/03	Chloromethane Bromomethane 2,2-Dichloropropane	30.98 44.52 32.14	All samples in SDG 03-5973	J (all detects) UJ (all non-detects)	P

V. Blanks

Method blanks were reviewed for each matrix as applicable. No volatile contaminants were found in the method blanks with the following exceptions:

Method Blank ID	Analysis Date	Compound TIC (RT in minutes)	Concentration	Associated Samples
03G4717MB	11/6/03	2-Butanone	0.5 ug/L	All samples in SDG 03-5973

Sample concentrations were compared to concentrations detected in the method blanks. The sample concentrations were either not detected or were significantly greater (>10X for common contaminants, >5X for other contaminants) than the concentrations found in the associated method blanks.

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

Although matrix spike (MS) and matrix spike duplicate (MSD) samples were not required by the method, MS and MSD samples were reported by the laboratory. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

All internal standard areas and retention times were within QC limits.

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Compound Quantitation and CRQLs

Raw data were not reviewed for this SDG.

XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

XIV. System Performance

Raw data were not reviewed for this SDG.

XV. Overall Assessment of Data

Data flags have been summarized at the end of the report.

XVI. Field Duplicates

No field duplicates were identified in this SDG.

XVII. Field Blanks

Sample TB-10-11-5-03 was identified as a trip blank. No volatile contaminants were found in this blank with the following exceptions:

Trip Blank ID	Compound	Concentration (ug/L)
TB-10-11-5-03	Methylene chloride	0.5

NASA JPL
Volatiles - Data Qualification Summary - SDG 03-5973

SDG	Sample	Compound	Flag	A or P	Reason
03-5973	MW-9 MW-3-1 MW-3-2 TB-10-11-5-03	Chloromethane Bromomethane 2,2-Dichloropropane	J (all detects) UJ (all non-detects)	P	Continuing calibration (%D)

NASA JPL
Volatiles - Laboratory Blank Data Qualification Summary - SDG 03-5973

No Sample Data Qualified in this SDG

Applied P & Ch Laboratory

Organic Analysis Results for Method 524.2

Client Name:	GEOFON, Inc.	Project No:	04-4428.10	Collection Date:	11/05/2003
Project ID:	JPL	Service ID:	35973	Collected by:	JR
		Lab Sample ID:	03-5973-1	Received Date:	11/05/2003
Sample ID:	**MW-9**	Sample Matrix	Water	Moisture %:	–
Sample Type:	Field Sample	Prep. Method:	5030	Instrument ID:	GC/MS: A
Anal. Method:	524.2	Prep. Date:	11/06/03	Anal. Date:	11/06/03
Batch No:	03G4717	Prep. No:	–	Anal. Time:	15:38
Data File Name:	5973-01	Sample Amount:	25.0 mL	Dilution Factor:	1
Methanol Vol.	–				
Test Level:	Low	Sparge Size:	25 mL	Heated Purge:	(Y/N) N

#	Component Name	CAS No	Unit	RL	Result	Qualifier
1	BENZENE	71-43-2	μg/L	0.5	<0.5	U
2	BROMOBENZENE	108-86-1	μg/L	0.5	<0.5	U
3	BROMOCHLOROMETHANE	74-97-5	μg/L	0.5	<0.5	U
4	BROMODICHLOROMETHANE	75-27-4	μg/L	0.5	<0.5	U
5	BROMOFORM	75-25-2	μg/L	0.5	<0.5	U
6	BROMOMETHANE	74-83-9	μg/L	0.5	<0.5	U UJ
7	N-BUTYLBENZENE	104-51-8	μg/L	0.5	<0.5	U
8	SEC-BUTYLBENZENE	135-98-8	μg/L	0.5	<0.5	U
9	TERT-BUTYLBENZENE	98-06-6	μg/L	0.5	<0.5	U
10	2-BUTANONE	78-93-3	μg/L	10	<10	U
11	CARBON TETRACHLORIDE	56-23-5	μg/L	0.5	<0.5	U
12	CHLOROBENZENE	108-90-7	μg/L	0.5	<0.5	U
13	CHLORODIBROMOMETHANE	124-48-1	μg/L	0.5	<0.5	U
14	CHLOROETHANE	75-00-3	μg/L	0.5	<0.5	U
15	CHLOROFORM	67-66-3	μg/L	0.5	<0.5	U
16	CHLOROMETHANE	74-87-3	μg/L	0.5	<0.5	U UJ
17	2-CHLOROTOLUENE	95-49-8	μg/L	0.5	<0.5	U
18	4-CHLOROTOLUENE	106-43-4	μg/L	0.5	<0.5	U
19	1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	μg/L	0.5	<0.5	U
20	1,2-DIBROMOETHANE (EDB)	106-93-4	μg/L	0.5	<0.5	U
21	DIBROMOMETHANE	74-95-3	μg/L	0.5	<0.5	U
22	1,2-DICHLOROBENZENE	95-50-1	μg/L	0.5	<0.5	U
23	1,3-DICHLOROBENZENE	541-73-1	μg/L	0.5	<0.5	U
24	1,4-DICHLOROBENZENE	106-46-7	μg/L	0.5	<0.5	U
25	DICHLORODIFLUOROMETHANE	75-71-8	μg/L	0.5	<0.5	U
26	1,1-DICHLOROETHANE	75-34-3	μg/L	0.5	<0.5	U
27	1,2-DICHLOROETHANE	107-06-2	μg/L	0.5	<0.5	U
28	1,1-DICHLOROETHENE	75-35-4	μg/L	0.5	<0.5	U
29	CIS-1,2-DICHLOROETHENE	156-59-2	μg/L	0.5	<0.5	U
30	TRANS-1,2-DICHLOROETHENE	156-60-5	μg/L	0.5	<0.5	U
31	1,2-DICHLOROPROPANE	78-87-5	μg/L	0.5	<0.5	U
32	1,3-DICHLOROPROPANE	142-28-9	μg/L	0.5	<0.5	U
33	2,2-DICHLOROPROPANE	594-20-7	μg/L	0.5	<0.5	U UJ
34	1,1-DICHLOROPROPENE	563-58-6	μg/L	0.5	<0.5	U
35	CIS-1,3-DICHLOROPROPENE	10061-01-5	μg/L	0.5	<0.5	U
36	TRANS-1,3-DICHLOROPROPENE	10061-02-6	μg/L	0.5	<0.5	U
37	ETHYLBENZENE	100-41-4	μg/L	0.5	<0.5	U
38	HEXACHLOROBUTADIENE	87-68-3	μg/L	0.5	<0.5	U
39	ISOPROPYLBENZENE (CUMENE)	98-82-8	μg/L	0.5	<0.5	U

#	Component Name	CAS No	Unit	RL	Result	Qualifier
40	P-ISOPROPYLTOLUENE	99-87-6	μg/L	0.5	<0.5	U
41	METHYLENE CHLORIDE	75-09-2	μg/L	0.5	<0.5	U
42	METHYL-T-BUTYL ETHER (MTBE)	1634-04-4	μg/L	1	<1	U
43	4-METHYL-2-PENTANONE (MIBK)	108-10-1	μg/L	10	<10	U
44	NAPHTHALENE	91-20-3	μg/L	0.5	<0.5	U
45	N-PROPYLBENZENE	103-65-1	μg/L	0.5	<0.5	U
46	STYRENE	100-42-5	μg/L	0.5	<0.5	U
47	1,1,1,2-TETRACHLOROETHANE	630-20-6	μg/L	0.5	<0.5	U
48	1,1,2,2-TETRACHLOROETHANE	79-34-5	μg/L	0.5	<0.5	U
49	TETRACHLOROETHENE	127-18-4	μg/L	0.5	<0.5	U
50	TOLUENE	108-88-3	μg/L	0.5	<0.5	U
51	1,2,3-TRICHLOROBENZENE	87-61-6	μg/L	0.5	<0.5	U
52	1,2,4-TRICHLOROBENZENE	120-82-1	μg/L	0.5	<0.5	U
53	1,1,1-TRICHLOROETHANE	71-55-6	μg/L	0.5	<0.5	U
54	1,1,2-TRICHLOROETHANE	79-00-5	μg/L	0.5	<0.5	U
55	TRICHLOROETHENE	79-01-6	μg/L	0.5	<0.5	U
56	TRICHLOROFLUOROMETHANE	75-69-4	μg/L	0.5	<0.5	U
57	1,2,3-TRICHLOROPROPANE	96-18-4	μg/L	0.5	<0.5	U
58	112TRICHLORO-122TRIFLUOROETHANE	76-13-1	μg/L	0.5	<0.5	U
59	1,2,4-TRIMETHYLBENZENE	95-63-6	μg/L	0.5	<0.5	U
60	1,3,5-TRIMETHYLBENZENE	108-67-8	μg/L	0.5	<0.5	U
61	VINYL CHLORIDE	75-01-4	μg/L	0.5	<0.5	U
62	O-XYLENE	95-47-6	μg/L	0.5	<0.5	U
63	M/P-XYLENE	108-38-3	μg/L	0.5	<0.5	U

Surrogates			Control Limit, %	Surro. Rec.%
1	1-BROMO-4-FLUOROBENZENE (4-BROMOFL	460-00-4	70-129	107
2	1,2-DICHLOROETHANE-D4	17060-07-0	70-129	106
3	DIBROMOFLUOROMETHANE	1868-53-7	70-122	106
4	TOLUENE-D8	2037-26-5	73-129	108
# of out-of-control				0

Internal Standard			Control Limit, %	IS Rec.%
1	CHLOROBENZENE-D5	3114-55-4	50-200	97
2	1,4-DICHLOROBENZENE-D4	3855-82-1	50-200	95
3	FLUOROBENZENE	462-06-6	50-200	101
# of out-of-control				0

Not Detected is shown as PQL, with dilution and moisture corrected if applicable.

Qualifier: U - Not Detected or less than MDL
J - Less than RL (PQL, EQL or CRDL), but greater than MDL, or an estimated result (e.g. for TIC)
E - Exceed calibration range
B - A positive value was found in the method blank
D - Diluted

1822

Applied P & Ch Laboratory

Organic Analysis Results for Method 524.2

Client Name:	GEOFON, Inc.	Project No:	04-4428.10	Collection Date:	11/05/2003
Project ID:	JPL	Service ID:	35973	Collected by:	JR
		Lab Sample ID:	03-5973-2	Received Date:	11/05/2003
Sample ID:	**MW-3-1**	Sample Matrix	Water	Moisture %:	–
Sample Type:	Field Sample	Prep. Method:	5030	Instrument ID:	GC/MS: A
Anal. Method:	524.2	Prep. Date:	11/06/03	Anal. Date:	11/06/03
Batch No:	03G4717	Prep. No:	–	Anal. Time:	15:12
Data File Name:	5973-02	Sample Amount:	25.0 mL	Dilution Factor:	1
Methanol Vol.	–				
Test Level:	Low	Sparge Size:	25 mL	Heated Purge:	(Y/N) N

#	Component Name	CAS No	Unit	RL	Result	Qualifier
1	BENZENE	71-43-2	μg/L	0.5	<0.5	U
2	BROMOBENZENE	108-86-1	μg/L	0.5	<0.5	U
3	BROMOCHLOROMETHANE	74-97-5	μg/L	0.5	<0.5	U
4	BROMODICHLOROMETHANE	75-27-4	μg/L	0.5	<0.5	U
5	BROMOFORM	75-25-2	μg/L	0.5	<0.5	U
6	BROMOMETHANE	74-83-9	μg/L	0.5	<0.5	U UJ
7	N-BUTYLBENZENE	104-51-8	μg/L	0.5	<0.5	U
8	SEC-BUTYLBENZENE	135-98-8	μg/L	0.5	<0.5	U
9	TERT-BUTYLBENZENE	98-06-6	μg/L	0.5	<0.5	U
10	2-BUTANONE	78-93-3	μg/L	10	<10	U
11	CARBON TETRACHLORIDE	56-23-5	μg/L	0.5	<0.5	U
12	CHLOROBENZENE	108-90-7	μg/L	0.5	<0.5	U
13	CHLORODIBROMOMETHANE	124-48-1	μg/L	0.5	<0.5	U
14	CHLOROETHANE	75-00-3	μg/L	0.5	<0.5	U
15	CHLOROFORM	67-66-3	μg/L	0.5	<0.5	U
16	CHLOROMETHANE	74-87-3	μg/L	0.5	<0.5	U UJ
17	2-CHLOROTOLUENE	95-49-8	μg/L	0.5	<0.5	U
18	4-CHLOROTOLUENE	106-43-4	μg/L	0.5	<0.5	U
19	1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	μg/L	0.5	<0.5	U
20	1,2-DIBROMOETHANE (EDB)	106-93-4	μg/L	0.5	<0.5	U
21	DIBROMOMETHANE	74-95-3	μg/L	0.5	<0.5	U
22	1,2-DICHLOROBENZENE	95-50-1	μg/L	0.5	<0.5	U
23	1,3-DICHLOROBENZENE	541-73-1	μg/L	0.5	<0.5	U
24	1,4-DICHLOROBENZENE	106-46-7	μg/L	0.5	<0.5	U
25	DICHLORODIFLUOROMETHANE	75-71-8	μg/L	0.5	<0.5	U
26	1,1-DICHLOROETHANE	75-34-3	μg/L	0.5	<0.5	U
27	1,2-DICHLOROETHANE	107-06-2	μg/L	0.5	<0.5	U
28	1,1-DICHLOROETHENE	75-35-4	μg/L	0.5	<0.5	U
29	CIS-1,2-DICHLOROETHENE	156-59-2	μg/L	0.5	<0.5	U
30	TRANS-1,2-DICHLOROETHENE	156-60-5	μg/L	0.5	<0.5	U
31	1,2-DICHLOROPROPANE	78-87-5	μg/L	0.5	<0.5	U
32	1,3-DICHLOROPROPANE	142-28-9	μg/L	0.5	<0.5	U
33	2,2-DICHLOROPROPANE	594-20-7	μg/L	0.5	<0.5	U UJ
34	1,1-DICHLOROPROPENE	563-58-6	μg/L	0.5	<0.5	U
35	CIS-1,3-DICHLOROPROPENE	10061-01-5	μg/L	0.5	<0.5	U
36	TRANS-1,3-DICHLOROPROPENE	10061-02-6	μg/L	0.5	<0.5	U
37	ETHYLBENZENE	100-41-4	μg/L	0.5	<0.5	U
38	HEXACHLOROBUTADIENE	87-68-3	μg/L	0.5	<0.5	U
39	ISOPROPYLBENZENE (CUMENE)	98-82-8	μg/L	0.5	<0.5	U

#	Component Name	CAS No	Unit	RL	Result	Qualifier
40	P-ISOPROPYLTOLUENE	99-87-6	µg/L	0.5	<0.5	U
41	METHYLENE CHLORIDE	75-09-2	µg/L	0.5	<0.5	U
42	METHYL-T-BUTYL ETHER (MTBE)	1634-04-4	µg/L	1	<1	U
43	4-METHYL-2-PENTANONE (MIBK)	108-10-1	µg/L	10	<10	U
44	NAPHTHALENE	91-20-3	µg/L	0.5	<0.5	U
45	N-PROPYLBENZENE	103-65-1	µg/L	0.5	<0.5	U
46	STYRENE	100-42-5	µg/L	0.5	<0.5	U
47	1,1,1,2-TETRACHLOROETHANE	630-20-6	µg/L	0.5	<0.5	U
48	1,1,2,2-TETRACHLOROETHANE	79-34-5	µg/L	0.5	<0.5	U
49	TETRACHLOROETHENE	127-18-4	µg/L	0.5	<0.5	U
50	TOLUENE	108-88-3	µg/L	0.5	<0.5	U
51	1,2,3-TRICHLOROBENZENE	87-61-6	µg/L	0.5	<0.5	U
52	1,2,4-TRICHLOROBENZENE	120-82-1	µg/L	0.5	<0.5	U
53	1,1,1-TRICHLOROETHANE	71-55-6	µg/L	0.5	<0.5	U
54	1,1,2-TRICHLOROETHANE	79-00-5	µg/L	0.5	<0.5	U
55	TRICHLOROETHENE	79-01-6	µg/L	0.5	<0.5	U
56	TRICHLOROFLUOROMETHANE	75-69-4	µg/L	0.5	<0.5	U
57	1,2,3-TRICHLOROPROPANE	96-18-4	µg/L	0.5	<0.5	U
58	112TRICHLORO-122TRIFLUOROETHANE	76-13-1	µg/L	0.5	<0.5	U
59	1,2,4-TRIMETHYLBENZENE	95-63-6	µg/L	0.5	<0.5	U
60	1,3,5-TRIMETHYLBENZENE	108-67-8	µg/L	0.5	<0.5	U
61	VINYL CHLORIDE	75-01-4	µg/L	0.5	<0.5	U
62	O-XYLENE	95-47-6	µg/L	0.5	<0.5	U
63	M/P-XYLENE	108-38-3	µg/L	0.5	<0.5	U

Surrogates			Control Limit, %	Surro. Rec.%
1	1-BROMO-4-FLUOROBENZENE (4-BROMOFL	460-00-4	70-129	108
2	1,2-DICHLOROETHANE-D4	17060-07-0	70-129	107
3	DIBROMOFLUOROMETHANE	1868-53-7	70-122	105
4	TOLUENE-D8	2037-26-5	73-129	107
# of out-of-control				0

Internal Standard			Control Limit, %	IS Rec.%
1	CHLOROBENZENE-D5	3114-55-4	50-200	97
2	1,4-DICHLOROBENZENE-D4	3855-82-1	50-200	94
3	FLUOROBENZENE	462-06-6	50-200	100
# of out-of-control				0

Not Detected is shown as PQL, with dilution and moisture corrected if applicable.

Qualifier: U - Not Detected or less than MDL
J - Less than RL (PQL, EQL or CRDL), but greater than MDL, or an estimated result (e.g. for TIC)
E - Exceed calibration range
B - A positive value was found in the method blank
D - Diluted

Applied P & Ch Laboratory

Organic Analysis Results for Method 524.2

Client Name:	GEOFON, Inc.	Project No:	04-4428.10	Collection Date:	11/05/2003
Project ID:	JPL	Service ID:	35973	Collected by:	JR
		Lab Sample ID:	03-5973-3	Received Date:	11/05/2003
Sample ID:	**MW-3-2**	Sample Matrix	Water	Moisture %:	–
Sample Type:	Field Sample	Prep. Method:	5030	Instrument ID:	GC/MS: A
Anal. Method:	524.2	Prep. Date:	11/06/03	Anal. Date:	11/06/03
Batch No:	03G4717	Prep. No:	–	Anal. Time:	16:04
Data File Name:	5973-03	Sample Amount:	25.0 mL	Dilution Factor:	1
Methanol Vol.	–				
Test Level:	Low	Sparge Size:	25 mL	Heated Purge: (Y/N)	N

#	Component Name	CAS No	Unit	RL	Result	Qualifier
1	BENZENE	71-43-2	μg/L	0.5	< 0.5	U
2	BROMOBENZENE	108-86-1	μg/L	0.5	< 0.5	U
3	BROMOCHLOROMETHANE	74-97-5	μg/L	0.5	< 0.5	U
4	BROMODICHLOROMETHANE	75-27-4	μg/L	0.5	< 0.5	U
5	BROMOFORM	75-25-2	μg/L	0.5	< 0.5	U
6	BROMOMETHANE	74-83-9	μg/L	0.5	< 0.5	U UJ
7	N-BUTYLBENZENE	104-51-8	μg/L	0.5	< 0.5	U
8	SEC-BUTYLBENZENE	135-98-8	μg/L	0.5	< 0.5	U
9	TERT-BUTYLBENZENE	98-06-6	μg/L	0.5	< 0.5	U
10	2-BUTANONE	78-93-3	μg/L	10	< 10	U
11	CARBON TETRACHLORIDE	56-23-5	μg/L	0.5	0.8	
12	CHLOROBENZENE	108-90-7	μg/L	0.5	< 0.5	U
13	CHLORODIBROMOMETHANE	124-48-1	μg/L	0.5	< 0.5	U
14	CHLOROETHANE	75-00-3	μg/L	0.5	< 0.5	U
15	CHLOROFORM	67-66-3	μg/L	0.5	< 0.5	U
16	CHLOROMETHANE	74-87-3	μg/L	0.5	< 0.5	U UJ
17	2-CHLOROTOLUENE	95-49-8	μg/L	0.5	< 0.5	U
18	4-CHLOROTOLUENE	106-43-4	μg/L	0.5	< 0.5	U
19	1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	μg/L	0.5	< 0.5	U
20	1,2-DIBROMOETHANE (EDB)	106-93-4	μg/L	0.5	< 0.5	U
21	DIBROMOMETHANE	74-95-3	μg/L	0.5	< 0.5	U
22	1,2-DICHLOROBENZENE	95-50-1	μg/L	0.5	< 0.5	U
23	1,3-DICHLOROBENZENE	541-73-1	μg/L	0.5	< 0.5	U
24	1,4-DICHLOROBENZENE	106-46-7	μg/L	0.5	< 0.5	U
25	DICHLORODIFLUOROMETHANE	75-71-8	μg/L	0.5	< 0.5	U
26	1,1-DICHLOROETHANE	75-34-3	μg/L	0.5	< 0.5	U
27	1,2-DICHLOROETHANE	107-06-2	μg/L	0.5	< 0.5	U
28	1,1-DICHLOROETHENE	75-35-4	μg/L	0.5	< 0.5	U
29	CIS-1,2-DICHLOROETHENE	156-59-2	μg/L	0.5	< 0.5	U
30	TRANS-1,2-DICHLOROETHENE	156-60-5	μg/L	0.5	< 0.5	U
31	1,2-DICHLOROPROPANE	78-87-5	μg/L	0.5	< 0.5	U
32	1,3-DICHLOROPROPANE	142-28-9	μg/L	0.5	< 0.5	U
33	2,2-DICHLOROPROPANE	594-20-7	μg/L	0.5	< 0.5	U UJ
34	1,1-DICHLOROPROPENE	563-58-6	μg/L	0.5	< 0.5	U
35	CIS-1,3-DICHLOROPROPENE	10061-01-5	μg/L	0.5	< 0.5	U
36	TRANS-1,3-DICHLOROPROPENE	10061-02-6	μg/L	0.5	< 0.5	U
37	ETHYLBENZENE	100-41-4	μg/L	0.5	< 0.5	U
38	HEXACHLOROBUTADIENE	87-68-3	μg/L	0.5	< 0.5	U
39	ISOPROPYLBENZENE (CUMENE)	98-82-8	μg/L	0.5	< 0.5	U

#	Component Name	CAS No	Unit	RL	Result	Qualifier
40	P-ISOPROPYLTOLUENE	99-87-6	μg/L	0.5	<0.5	U
41	METHYLENE CHLORIDE	75-09-2	μg/L	0.5	<0.5	U
42	METHYL-T-BUTYL ETHER (MTBE)	1634-04-4	μg/L	1	<1	U
43	4-METHYL-2-PENTANONE (MIBK)	108-10-1	μg/L	10	<10	U
44	NAPHTHALENE	91-20-3	μg/L	0.5	<0.5	U
45	N-PROPYLBENZENE	103-65-1	μg/L	0.5	<0.5	U
46	STYRENE	100-42-5	μg/L	0.5	<0.5	U
47	1,1,1,2-TETRACHLOROETHANE	630-20-6	μg/L	0.5	<0.5	U
48	1,1,2,2-TETRACHLOROETHANE	79-34-5	μg/L	0.5	<0.5	U
49	TETRACHLOROETHENE	127-18-4	μg/L	0.5	<0.5	U
50	TOLUENE	108-88-3	μg/L	0.5	<0.5	U
51	1,2,3-TRICHLOROBENZENE	87-61-6	μg/L	0.5	<0.5	U
52	1,2,4-TRICHLOROBENZENE	120-82-1	μg/L	0.5	<0.5	U
53	1,1,1-TRICHLOROETHANE	71-55-6	μg/L	0.5	<0.5	U
54	1,1,2-TRICHLOROETHANE	79-00-5	μg/L	0.5	<0.5	U
55	TRICHLOROETHENE	79-01-6	μg/L	0.5	0.3	J
56	TRICHLOROFLUOROMETHANE	75-69-4	μg/L	0.5	<0.5	U
57	1,2,3-TRICHLOROPROPANE	96-18-4	μg/L	0.5	<0.5	U
58	112TRICHLORO-122TRIFLUOROETHANE	76-13-1	μg/L	0.5	<0.5	U
59	1,2,4-TRIMETHYLBENZENE	95-63-6	μg/L	0.5	<0.5	U
60	1,3,5-TRIMETHYLBENZENE	108-67-8	μg/L	0.5	<0.5	U
61	VINYL CHLORIDE	75-01-4	μg/L	0.5	<0.5	U
62	O-XYLENE	95-47-6	μg/L	0.5	<0.5	U
63	M/P-XYLENE	108-38-3	μg/L	0.5	<0.5	U

Surrogates			Control Limit, %	Surro. Rec.%
1	1-BROMO-4-FLUOROBENZENE (4-BROMOFL	460-00-4	70-129	108
2	1,2-DICHLOROETHANE-D4	17060-07-0	70-129	109
3	DIBROMOFLUOROMETHANE	1868-53-7	70-122	108
4	TOLUENE-D8	2037-26-5	73-129	109
# of out-of-control				0

Internal Standard			Control Limit, %	IS Rec.%
1	CHLOROBENZENE-D5	3114-55-4	50-200	96
2	1,4-DICHLOROBENZENE-D4	3855-82-1	50-200	95
3	FLUOROBENZENE	462-06-6	50-200	100
# of out-of-control				0

Not Detected is shown as PQL, with dilution and moisture corrected if applicable.

Qualifier: U - Not Detected or less than MDL
J - Less than RL (PQL, EQL or CRDL), but greater than MDL, or an estimated result (e.g. for TIC)
E - Exceed calibration range
B - A positive value was found in the method blank
D - Diluted

Applied P & Ch Laboratory

Organic Analysis Results for Method 524.2

Client Name:	GEOFON, Inc.	Project No:	04-4428.10	Collection Date:	11/05/2003
Project ID:	JPL	Service ID:	35973	Collected by:	JR
		Lab Sample ID:	03-5973-4	Received Date:	11/05/2003
Sample ID:	**TB-10-11-5-03**	Sample Matrix	Water	Moisture %:	–
Sample Type:	Field Sample	Prep. Method:	5030	Instrument ID:	GC/MS: A
Anal. Method:	524.2	Prep. Date:	11/06/03	Anal. Date:	11/06/03
Batch No:	03G4717	Prep. No:	–	Anal. Time:	14:46
Data File Name:	5973-04	Sample Amount:	25.0 mL	Dilution Factor:	1
Methanol Vol.	–				
Test Level:	Low	Sparge Size:	25 mL	Heated Purge:	(Y/N) N

#	Component Name	CAS No	Unit	RL	Result	Qualifier
1	BENZENE	71-43-2	μg/L	0.5	<0.5	U
2	BROMOBENZENE	108-86-1	μg/L	0.5	<0.5	U
3	BROMOCHLOROMETHANE	74-97-5	μg/L	0.5	<0.5	U
4	BROMODICHLOROMETHANE	75-27-4	μg/L	0.5	<0.5	U
5	BROMOFORM	75-25-2	μg/L	0.5	<0.5	U
6	BROMOMETHANE	74-83-9	μg/L	0.5	<0.5	U UJ
7	N-BUTYLBENZENE	104-51-8	μg/L	0.5	<0.5	U
8	SEC-BUTYLBENZENE	135-98-8	μg/L	0.5	<0.5	U
9	TERT-BUTYLBENZENE	98-06-6	μg/L	0.5	<0.5	U
10	2-BUTANONE	78-93-3	μg/L	10	<10	U
11	CARBON TETRACHLORIDE	56-23-5	μg/L	0.5	<0.5	U
12	CHLOROBENZENE	108-90-7	μg/L	0.5	<0.5	U
13	CHLORODIBROMOMETHANE	124-48-1	μg/L	0.5	<0.5	U
14	CHLOROETHANE	75-00-3	μg/L	0.5	<0.5	U
15	CHLOROFORM	67-66-3	μg/L	0.5	<0.5	U
16	CHLOROMETHANE	74-87-3	μg/L	0.5	<0.5	U UJ
17	2-CHLOROTOLUENE	95-49-8	μg/L	0.5	<0.5	U
18	4-CHLOROTOLUENE	106-43-4	μg/L	0.5	<0.5	U
19	1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	μg/L	0.5	<0.5	U
20	1,2-DIBROMOETHANE (EDB)	106-93-4	μg/L	0.5	<0.5	U
21	DIBROMOMETHANE	74-95-3	μg/L	0.5	<0.5	U
22	1,2-DICHLOROBENZENE	95-50-1	μg/L	0.5	<0.5	U
23	1,3-DICHLOROBENZENE	541-73-1	μg/L	0.5	<0.5	U
24	1,4-DICHLOROBENZENE	106-46-7	μg/L	0.5	<0.5	U
25	DICHLORODIFLUOROMETHANE	75-71-8	μg/L	0.5	<0.5	U
26	1,1-DICHLOROETHANE	75-34-3	μg/L	0.5	<0.5	U
27	1,2-DICHLOROETHANE	107-06-2	μg/L	0.5	<0.5	U
28	1,1-DICHLOROETHENE	75-35-4	μg/L	0.5	<0.5	U
29	CIS-1,2-DICHLOROETHENE	156-59-2	μg/L	0.5	<0.5	U
30	TRANS-1,2-DICHLOROETHENE	156-60-5	μg/L	0.5	<0.5	U
31	1,2-DICHLOROPROPANE	78-87-5	μg/L	0.5	<0.5	U
32	1,3-DICHLOROPROPANE	142-28-9	μg/L	0.5	<0.5	U
33	2,2-DICHLOROPROPANE	594-20-7	μg/L	0.5	<0.5	U UJ
34	1,1-DICHLOROPROPENE	563-58-6	μg/L	0.5	<0.5	U
35	CIS-1,3-DICHLOROPROPENE	10061-01-5	μg/L	0.5	<0.5	U
36	TRANS-1,3-DICHLOROPROPENE	10061-02-6	μg/L	0.5	<0.5	U
37	ETHYLBENZENE	100-41-4	μg/L	0.5	<0.5	U
38	HEXACHLOROBUTADIENE	87-68-3	μg/L	0.5	<0.5	U
39	ISOPROPYLBENZENE (CUMENE)	98-82-8	μg/L	0.5	<0.5	U

#	Component Name	CAS No	Unit	RL	Result	Qualifier
40	P-ISOPROPYLTOLUENE	99-87-6	μg/L	0.5	<0.5	U
41	METHYLENE CHLORIDE	75-09-2	μg/L	0.5	0.5	J
42	METHYL-T-BUTYL ETHER (MTBE)	1634-04-4	μg/L	1	<1	U
43	4-METHYL-2-PENTANONE (MIBK)	108-10-1	μg/L	10	<10	U
44	NAPHTHALENE	91-20-3	μg/L	0.5	<0.5	U
45	N-PROPYLBENZENE	103-65-1	μg/L	0.5	<0.5	U
46	STYRENE	100-42-5	μg/L	0.5	<0.5	U
47	1,1,1,2-TETRACHLOROETHANE	630-20-6	μg/L	0.5	<0.5	U
48	1,1,2,2-TETRACHLOROETHANE	79-34-5	μg/L	0.5	<0.5	U
49	TETRACHLOROETHENE	127-18-4	μg/L	0.5	<0.5	U
50	TOLUENE	108-88-3	μg/L	0.5	<0.5	U
51	1,2,3-TRICHLOROBENZENE	87-61-6	μg/L	0.5	<0.5	U
52	1,2,4-TRICHLOROBENZENE	120-82-1	μg/L	0.5	<0.5	U
53	1,1,1-TRICHLOROETHANE	71-55-6	μg/L	0.5	<0.5	U
54	1,1,2-TRICHLOROETHANE	79-00-5	μg/L	0.5	<0.5	U
55	TRICHLOROETHENE	79-01-6	μg/L	0.5	<0.5	U
56	TRICHLOROFLUOROMETHANE	75-69-4	μg/L	0.5	<0.5	U
57	1,2,3-TRICHLOROPROPANE	96-18-4	μg/L	0.5	<0.5	U
58	112TRICHLORO-122TRIFLUOROETHANE	76-13-1	μg/L	0.5	<0.5	U
59	1,2,4-TRIMETHYLBENZENE	95-63-6	μg/L	0.5	<0.5	U
60	1,3,5-TRIMETHYLBENZENE	108-67-8	μg/L	0.5	<0.5	U
61	VINYL CHLORIDE	75-01-4	μg/L	0.5	<0.5	U
62	O-XYLENE	95-47-6	μg/L	0.5	<0.5	U
63	M/P-XYLENE	108-38-3	μg/L	0.5	<0.5	U

Surrogates			Control Limit, %	Surro. Rec.%
1	1-BROMO-4-FLUOROBENZENE (4-BROMOFL	460-00-4	70-129	106
2	1,2-DICHLOROETHANE-D4	17060-07-0	70-129	107
3	DIBROMOFLUOROMETHANE	1868-53-7	70-122	105
4	TOLUENE-D8	2037-26-5	73-129	107
# of out-of-control				0

Internal Standard			Control Limit, %	IS Rec.%
1	CHLOROBENZENE-D5	3114-55-4	50-200	99
2	1,4-DICHLOROBENZENE-D4	3855-82-1	50-200	96
3	FLUOROBENZENE	462-06-6	50-200	102
# of out-of-control				0

Not Detected is shown as PQL, with dilution and moisture corrected if applicable.

Qualifier: U - Not Detected or less than MDL
J - Less than RL (PQL, EQL or CRDL), but greater than MDL, or an estimated result (e.g. for TIC)
E - Exceed calibration range
B - A positive value was found in the method blank
D - Diluted

LDC #: 11280B1
SDG #: 03-5973
Laboratory: Applied P & Ch Laboratory

VALIDATION COMPLETENESS WORKSHEET
Level III

Date: 12-16-03
Page: 1 of 1
Reviewer: Z. Pan
2nd Reviewer: [illegible]

METHOD: GC/MS Volatiles (EPA Method 524.2)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 11-5-03
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	%RSD OR $r^2 > 0.990$
IV.	Continuing calibration	SW	%D
V.	Blanks	SW	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	A	LCS
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentitatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	N	
XVII.	Field blanks	SW	TB = 4

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: All Water

1	MW-9	11	03G4717-MB	21		31	
2	MW-3-1	12		22		32	
3	MW-3-2	13		23		33	
4	TB-10-11-5-03	14		24		34	
5	MW-3-1MS	15		25		35	
6	MW-3-1MSD	16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

LDC Report# 11280C1

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NASA JPL

Collection Date: November 6, 2003

LDC Report Date: December 22, 2003

Matrix: Water

Parameters: Volatiles

Validation Level: EPA Level III & IV

Laboratory: Applied P & Ch Laboratory

Sample Delivery Group (SDG): 03-6002

Sample Identification

Dupe-7-4-Q03**
MW-5
MW-8
MW-10
TB-11-6-03
MW-5MS
MW-5MSD

**Indicates sample underwent EPA Level IV review

Introduction

This data review covers 7 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 524.2 for Volatiles.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (October 1999) as there are no current guidelines for the method stated above.

A table summarizing all data qualification is provided at the end of this report. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

Samples indicated by a double asterisk on the front cover underwent a EPA Level IV review. A EPA Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 20.0% for selected compounds.

A curve fit, based on the initial calibration, was established for quantitation for selected compounds. The coefficient of determination (r^2) was greater than or equal to 0.990 .

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were less than or equal to 30.0% with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
11/11/03 (20:21)	Chloromethane	39.69	All samples in SDG 03-6002	J (all detects) UJ (all non-detects)	P
	Bromomethane	37.19		J (all detects) UJ (all non-detects)	

V. Blanks

Method blanks were reviewed for each matrix as applicable. No volatile contaminants were found in the method blanks with the following exceptions:

Method Blank ID	Analysis Date	Compound TIC (RT in minutes)	Concentration	Associated Samples
03G4771-MB	11/12/03	Methylene chloride	0.4 ug/L	All samples in SDG 03-6002

Sample concentrations were compared to concentrations detected in the method blanks. The sample concentrations were either not detected or were significantly greater (>10X for common contaminants, >5X for other contaminants) than the concentrations found in the associated method blanks.

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

Although matrix spike (MS) and matrix spike duplicate (MSD) samples were not required by the method, MS and MSD samples were reported by the laboratory. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

All internal standard areas and retention times were within QC limits.

XI. Target Compound Identifications

All target compound identifications were within validation criteria for samples on which a EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

XII. Compound Quantitation and CRQLs

All compound quantitation and CRQLs were within validation criteria for samples on which a EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

XIII. Tentatively Identified Compounds (TICs)

Tentatively identified compounds were not reported by the laboratory.

XIV. System Performance

The system performance was within validation criteria for samples on which a EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

XV. Overall Assessment of Data

Data flags have been summarized at the end of the report.

XVI. Field Duplicates

Samples Dupe-7-4-Q03** and MW-8 were identified as field duplicates. No volatiles were detected in any of the samples.

XVII. Field Blanks

Sample TB-11-6-03 was identified as a trip blank. No volatile contaminants were found in this blank.

NASA JPL
Volatiles - Data Qualification Summary - SDG 03-6002

SDG	Sample	Compound	Flag	A or P	Reason
03-6002	Dupe-7-4-Q03** MW-5 MW-8 MW-10 TB-11-6-03	Chloromethane Bromomethane	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	P	Continuing calibration (%D)

NASA JPL
Volatiles - Laboratory Blank Data Qualification Summary - SDG 03-6002

No Sample Data Qualified in this SDG

Applied P & Ch Laboratory

Organic Analysis Results for Method 524.2

Client Name:	GEOFON, Inc.	Project No:	04-4428.10	Collection Date:	11/06/2003
Project ID:	JPL GW Mon-4Q03	Service ID:	36002	Collected by:	
		Lab Sample ID:	03-6002-1	Received Date:	11/06/2003
Sample ID:	**DUPE-7-4-Q03**	Sample Matrix	Water	Moisture %:	–
Sample Type:	Field Sample	Prep. Method:	5030	Instrument ID:	GC/MS: A
Anal. Method:	524.2	Prep. Date:	11/12/03	Anal. Date:	11/12/03
Batch No:	03G4771	Prep. No:	–	Anal. Time:	03:59
Data File Name:	6002-01	Sample Amount:	25.0 mL	Dilution Factor:	1
Methanol Vol.	–				
Test Level:	Low	Sparge Size:	25 mL	Heated Purge: (Y/N) N	

#	Component Name	CAS No	Unit	RL	Result	Qualifier
1	BENZENE	71-43-2	μg/L	0.5	<0.5	U
2	BROMOBENZENE	108-86-1	μg/L	0.5	<0.5	U
3	BROMOCHLOROMETHANE	74-97-5	μg/L	0.5	<0.5	U
4	BROMODICHLOROMETHANE	75-27-4	μg/L	0.5	<0.5	U
5	BROMOFORM	75-25-2	μg/L	0.5	<0.5	U
6	BROMOMETHANE	74-83-9	μg/L	0.5	<0.5	U UJ
7	N-BUTYLBENZENE	104-51-8	μg/L	0.5	<0.5	U
8	SEC-BUTYLBENZENE	135-98-8	μg/L	0.5	<0.5	U
9	TERT-BUTYLBENZENE	98-06-6	μg/L	0.5	<0.5	U
10	2-BUTANONE	78-93-3	μg/L	10	<10	U
11	CARBON TETRACHLORIDE	56-23-5	μg/L	0.5	<0.5	U
12	CHLOROBENZENE	108-90-7	μg/L	0.5	<0.5	U
13	CHLORODIBROMOMETHANE	124-48-1	μg/L	0.5	<0.5	U
14	CHLOROETHANE	75-00-3	μg/L	0.5	<0.5	U
15	CHLOROFORM	67-66-3	μg/L	0.5	<0.5	U
16	CHLOROMETHANE	74-87-3	μg/L	0.5	<0.5	U UJ
17	2-CHLOROTOLUENE	95-49-8	μg/L	0.5	<0.5	U
18	4-CHLOROTOLUENE	106-43-4	μg/L	0.5	<0.5	U
19	1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	μg/L	0.5	<0.5	U
20	1,2-DIBROMOETHANE (EDB)	106-93-4	μg/L	0.5	<0.5	U
21	DIBROMOMETHANE	74-95-3	μg/L	0.5	<0.5	U
22	1,2-DICHLOROBENZENE	95-50-1	μg/L	0.5	<0.5	U
23	1,3-DICHLOROBENZENE	541-73-1	μg/L	0.5	<0.5	U
24	1,4-DICHLOROBENZENE	106-46-7	μg/L	0.5	<0.5	U
25	DICHLORODIFLUOROMETHANE	75-71-8	μg/L	0.5	<0.5	U
26	1,1-DICHLOROETHANE	75-34-3	μg/L	0.5	<0.5	U
27	1,2-DICHLOROETHANE	107-06-2	μg/L	0.5	<0.5	U
28	1,1-DICHLOROETHENE	75-35-4	μg/L	0.5	<0.5	U
29	CIS-1,2-DICHLOROETHENE	156-59-2	μg/L	0.5	<0.5	U
30	TRANS-1,2-DICHLOROETHENE	156-60-5	μg/L	0.5	<0.5	U
31	1,2-DICHLOROPROPANE	78-87-5	μg/L	0.5	<0.5	U
32	1,3-DICHLOROPROPANE	142-28-9	μg/L	0.5	<0.5	U
33	2,2-DICHLOROPROPANE	594-20-7	μg/L	0.5	<0.5	U
34	1,1-DICHLOROPROPENE	563-58-6	μg/L	0.5	<0.5	U
35	CIS-1,3-DICHLOROPROPENE	10061-01-5	μg/L	0.5	<0.5	U
36	TRANS-1,3-DICHLOROPROPENE	10061-02-6	μg/L	0.5	<0.5	U
37	ETHYLBENZENE	100-41-4	μg/L	0.5	<0.5	U
38	HEXACHLOROBUTADIENE	87-68-3	μg/L	0.5	<0.5	U
39	ISOPROPYLBENZENE (CUMENE)	98-82-8	μg/L	0.5	<0.5	U

#	Component Name	CAS No	Unit	RL	Result	Qualifier
40	P-ISOPROPYLTOLUENE	99-87-6	µg/L	0.5	<0.5	U
41	METHYLENE CHLORIDE	75-09-2	µg/L	0.5	<0.5	U
42	METHYL-T-BUTYL ETHER (MTBE)	1634-04-4	µg/L	1	<1	U
43	4-METHYL-2-PENTANONE (MIBK)	108-10-1	µg/L	10	<10	U
44	NAPHTHALENE	91-20-3	µg/L	0.5	<0.5	U
45	N-PROPYLBENZENE	103-65-1	µg/L	0.5	<0.5	U
46	STYRENE	100-42-5	µg/L	0.5	<0.5	U
47	1,1,1,2-TETRACHLOROETHANE	630-20-6	µg/L	0.5	<0.5	U
48	1,1,2,2-TETRACHLOROETHANE	79-34-5	µg/L	0.5	<0.5	U
49	TETRACHLOROETHENE	127-18-4	µg/L	0.5	<0.5	U
50	TOLUENE	108-88-3	µg/L	0.5	<0.5	U
51	1,2,3-TRICHLOROBENZENE	87-61-6	µg/L	0.5	<0.5	U
52	1,2,4-TRICHLOROBENZENE	120-82-1	µg/L	0.5	<0.5	U
53	1,1,1-TRICHLOROETHANE	71-55-6	µg/L	0.5	<0.5	U
54	1,1,2-TRICHLOROETHANE	79-00-5	µg/L	0.5	<0.5	U
55	TRICHLOROETHENE	79-01-6	µg/L	0.5	<0.5	U
56	TRICHLOROFLUOROMETHANE	75-69-4	µg/L	0.5	<0.5	U
57	1,2,3-TRICHLOROPROPANE	96-18-4	µg/L	0.5	<0.5	U
58	112TRICHLORO-122TRIFLUOROETHANE	76-13-1	µg/L	0.5	<0.5	U
59	1,2,4-TRIMETHYLBENZENE	95-63-6	µg/L	0.5	<0.5	U
60	1,3,5-TRIMETHYLBENZENE	108-67-8	µg/L	0.5	<0.5	U
61	VINYL CHLORIDE	75-01-4	µg/L	0.5	<0.5	U
62	O-XYLENE	95-47-6	µg/L	0.5	<0.5	U
63	M/P-XYLENE	108-38-3	µg/L	0.5	<0.5	U

Surrogates			Control Limit, %	Surro. Rec.%
1	1-BROMO-4-FLUOROBENZENE (4-BROMOFL	460-00-4	70-129	107
2	1,2-DICHLOROETHANE-D4	17060-07-0	70-129	116
3	DIBROMOFLUOROMETHANE	1868-53-7	70-122	112
4	TOLUENE-D8	2037-26-5	73-129	104
# of out-of-control				0

Internal Standard			Control Limit, %	IS Rec.%
1	CHLOROBENZENE-D5	3114-55-4	50-200	103
2	1,4-DICHLOROBENZENE-D4	3855-82-1	50-200	103
3	FLUOROBENZENE	462-06-6	50-200	100
# of out-of-control				0

Not Detected is shown as PQL, with dilution and moisture corrected if applicable.

Qualifier: U - Not Detected or less than MDL
J - Less than RL (PQL, EQL or CRDL), but greater than MDL, or an estimated result (e.g. for TIC)
E - Exceed calibration range
B - A positive value was found in the method blank
D - Diluted

1088

Applied P & Ch Laboratory

Organic Analysis Results for Method 524.2

Client Name:	GEOFON, Inc.	Project No:	04-4428.10	Collection Date:	11/06/2003
Project ID:	JPL GW Mon-4Q03	Service ID:	36002	Collected by:	
		Lab Sample ID:	03-6002-2	Received Date:	11/06/2003
Sample ID:	**MW-5**	Sample Matrix	Water	Moisture %:	–
Sample Type:	Field Sample	Prep. Method:	5030	Instrument ID:	GC/MS: A
Anal. Method:	524.2	Prep. Date:	11/12/03	Anal. Date:	11/12/03
Batch No:	03G4771	Prep. No:	–	Anal. Time:	03:33
Data File Name:	6002-02	Sample Amount:	25.0 mL	Dilution Factor:	1
Methanol Vol.	–				
Test Level:	Low	Sparge Size:	25 mL	Heated Purge: (Y/N) N	

#	Component Name	CAS No	Unit	RL	Result	Qualifier
1	BENZENE	71-43-2	μg/L	0.5	<0.5	U
2	BROMOBENZENE	108-86-1	μg/L	0.5	<0.5	U
3	BROMOCHLOROMETHANE	74-97-5	μg/L	0.5	<0.5	U
4	BROMODICHLOROMETHANE	75-27-4	μg/L	0.5	<0.5	U
5	BROMOFORM	75-25-2	μg/L	0.5	<0.5	U
6	BROMOMETHANE	74-83-9	μg/L	0.5	<0.5	U UJ
7	N-BUTYLBENZENE	104-51-8	μg/L	0.5	<0.5	U
8	SEC-BUTYLBENZENE	135-98-8	μg/L	0.5	<0.5	U
9	TERT-BUTYLBENZENE	98-06-6	μg/L	0.5	<0.5	U
10	2-BUTANONE	78-93-3	μg/L	10	<10	U
11	CARBON TETRACHLORIDE	56-23-5	μg/L	0.5	<0.5	U
12	CHLOROBENZENE	108-90-7	μg/L	0.5	<0.5	U
13	CHLORODIBROMOMETHANE	124-48-1	μg/L	0.5	<0.5	U
14	CHLOROETHANE	75-00-3	μg/L	0.5	<0.5	U
15	CHLOROFORM	67-66-3	μg/L	0.5	<0.5	U
16	CHLOROMETHANE	74-87-3	μg/L	0.5	<0.5	U UJ
17	2-CHLOROTOLUENE	95-49-8	μg/L	0.5	<0.5	U
18	4-CHLOROTOLUENE	106-43-4	μg/L	0.5	<0.5	U
19	1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	μg/L	0.5	<0.5	U
20	1,2-DIBROMOETHANE (EDB)	106-93-4	μg/L	0.5	<0.5	U
21	DIBROMOMETHANE	74-95-3	μg/L	0.5	<0.5	U
22	1,2-DICHLOROBENZENE	95-50-1	μg/L	0.5	<0.5	U
23	1,3-DICHLOROBENZENE	541-73-1	μg/L	0.5	<0.5	U
24	1,4-DICHLOROBENZENE	106-46-7	μg/L	0.5	<0.5	U
25	DICHLORODIFLUOROMETHANE	75-71-8	μg/L	0.5	<0.5	U
26	1,1-DICHLOROETHANE	75-34-3	μg/L	0.5	<0.5	U
27	1,2-DICHLOROETHANE	107-06-2	μg/L	0.5	<0.5	U
28	1,1-DICHLOROETHENE	75-35-4	μg/L	0.5	<0.5	U
29	CIS-1,2-DICHLOROETHENE	156-59-2	μg/L	0.5	<0.5	U
30	TRANS-1,2-DICHLOROETHENE	156-60-5	μg/L	0.5	<0.5	U
31	1,2-DICHLOROPROPANE	78-87-5	μg/L	0.5	<0.5	U
32	1,3-DICHLOROPROPANE	142-28-9	μg/L	0.5	<0.5	U
33	2,2-DICHLOROPROPANE	594-20-7	μg/L	0.5	<0.5	U
34	1,1-DICHLOROPROPENE	563-58-6	μg/L	0.5	<0.5	U
35	CIS-1,3-DICHLOROPROPENE	10061-01-5	μg/L	0.5	<0.5	U
36	TRANS-1,3-DICHLOROPROPENE	10061-02-6	μg/L	0.5	<0.5	U
37	ETHYLBENZENE	100-41-4	μg/L	0.5	<0.5	U
38	HEXACHLOROBUTADIENE	87-68-3	μg/L	0.5	<0.5	U
39	ISOPROPYLBENZENE (CUMENE)	98-82-8	μg/L	0.5	<0.5	U

#	Component Name	CAS No	Unit	RL	Result	Qualifier
40	P-ISOPROPYLTOLUENE	99-87-6	µg/L	0.5	<0.5	U
41	METHYLENE CHLORIDE	75-09-2	µg/L	0.5	<0.5	U
42	METHYL-T-BUTYL ETHER (MTBE)	1634-04-4	µg/L	1	<1	U
43	4-METHYL-2-PENTANONE (MIBK)	108-10-1	µg/L	10	<10	U
44	NAPHTHALENE	91-20-3	µg/L	0.5	<0.5	U
45	N-PROPYLBENZENE	103-65-1	µg/L	0.5	<0.5	U
46	STYRENE	100-42-5	µg/L	0.5	<0.5	U
47	1,1,1,2-TETRACHLOROETHANE	630-20-6	µg/L	0.5	<0.5	U
48	1,1,2,2-TETRACHLOROETHANE	79-34-5	µg/L	0.5	<0.5	U
49	TETRACHLOROETHENE	127-18-4	µg/L	0.5	<0.5	U
50	TOLUENE	108-88-3	µg/L	0.5	<0.5	U
51	1,2,3-TRICHLOROBENZENE	87-61-6	µg/L	0.5	<0.5	U
52	1,2,4-TRICHLOROBENZENE	120-82-1	µg/L	0.5	<0.5	U
53	1,1,1-TRICHLOROETHANE	71-55-6	µg/L	0.5	<0.5	U
54	1,1,2-TRICHLOROETHANE	79-00-5	µg/L	0.5	<0.5	U
55	TRICHLOROETHENE	79-01-6	µg/L	0.5	<0.5	U
56	TRICHLOROFLUOROMETHANE	75-69-4	µg/L	0.5	<0.5	U
57	1,2,3-TRICHLOROPROPANE	96-18-4	µg/L	0.5	<0.5	U
58	112TRICHLORO-122TRIFLUOROETHANE	76-13-1	µg/L	0.5	<0.5	U
59	1,2,4-TRIMETHYLBENZENE	95-63-6	µg/L	0.5	<0.5	U
60	1,3,5-TRIMETHYLBENZENE	108-67-8	µg/L	0.5	<0.5	U
61	VINYL CHLORIDE	75-01-4	µg/L	0.5	<0.5	U
62	O-XYLENE	95-47-6	µg/L	0.5	<0.5	U
63	M/P-XYLENE	108-38-3	µg/L	0.5	<0.5	U

Surrogates			Control Limit, %	Surro. Rec.%
1	1-BROMO-4-FLUOROBENZENE (4-BROMOFL	460-00-4	70-129	105
2	1,2-DICHLOROETHANE-D4	17060-07-0	70-129	114
3	DIBROMOFLUOROMETHANE	1868-53-7	70-122	112
4	TOLUENE-D8	2037-26-5	73-129	102
# of out-of-control				0

Internal Standard			Control Limit, %	IS Rec.%
1	CHLOROBENZENE-D5	3114-55-4	50-200	104
2	1,4-DICHLOROBENZENE-D4	3855-82-1	50-200	105
3	FLUOROBENZENE	462-06-6	50-200	101
# of out-of-control				0

Not Detected is shown as PQL, with dilution and moisture corrected if applicable.

Qualifier: U - Not Detected or less than MDL
J - Less than RL (PQL, EQL or CRDL), but greater than MDL, or an estimated result (e.g. for TIC)
E - Exceed calibration range
B - A positive value was found in the method blank
D - Diluted

Applied P & Ch Laboratory

Organic Analysis Results for Method 524.2

Client Name:	GEOFON, Inc.	Project No:	04-4428.10	Collection Date:	11/06/2003
Project ID:	JPL GW Mon-4Q03	Service ID:	36002	Collected by:	
		Lab Sample ID:	03-6002-3	Received Date:	11/06/2003
Sample ID:	**MW-8**	Sample Matrix	Water	Moisture %:	–
Sample Type:	Field Sample	Prep. Method:	5030	Instrument ID:	GC/MS: A
Anal. Method:	524.2	Prep. Date:	11/12/03	Anal. Date:	11/12/03
Batch No:	03G4771	Prep. No:	–	Anal. Time:	04:26
Data File Name:	6002-03	Sample Amount:	25.0 mL	Dilution Factor:	1
Methanol Vol.	–				
Test Level:	Low	Sparge Size:	25 mL	Heated Purge: (Y/N) N	

#	Component Name	CAS No	Unit	RL	Result	Qualifier
1	BENZENE	71-43-2	μg/L	0.5	<0.5	U
2	BROMOBENZENE	108-86-1	μg/L	0.5	<0.5	U
3	BROMOCHLOROMETHANE	74-97-5	μg/L	0.5	<0.5	U
4	BROMODICHLOROMETHANE	75-27-4	μg/L	0.5	<0.5	U
5	BROMOFORM	75-25-2	μg/L	0.5	<0.5	U
6	BROMOMETHANE	74-83-9	μg/L	0.5	<0.5	U UJ
7	N-BUTYLBENZENE	104-51-8	μg/L	0.5	<0.5	U
8	SEC-BUTYLBENZENE	135-98-8	μg/L	0.5	<0.5	U
9	TERT-BUTYLBENZENE	98-06-6	μg/L	0.5	<0.5	U
10	2-BUTANONE	78-93-3	μg/L	10	<10	U
11	CARBON TETRACHLORIDE	56-23-5	μg/L	0.5	<0.5	U
12	CHLOROBENZENE	108-90-7	μg/L	0.5	<0.5	U
13	CHLORODIBROMOMETHANE	124-48-1	μg/L	0.5	<0.5	U
14	CHLOROETHANE	75-00-3	μg/L	0.5	<0.5	U
15	CHLOROFORM	67-66-3	μg/L	0.5	<0.5	U
16	CHLOROMETHANE	74-87-3	μg/L	0.5	<0.5	U UJ
17	2-CHLOROTOLUENE	95-49-8	μg/L	0.5	<0.5	U
18	4-CHLOROTOLUENE	106-43-4	μg/L	0.5	<0.5	U
19	1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	μg/L	0.5	<0.5	U
20	1,2-DIBROMOETHANE (EDB)	106-93-4	μg/L	0.5	<0.5	U
21	DIBROMOMETHANE	74-95-3	μg/L	0.5	<0.5	U
22	1,2-DICHLOROBENZENE	95-50-1	μg/L	0.5	<0.5	U
23	1,3-DICHLOROBENZENE	541-73-1	μg/L	0.5	<0.5	U
24	1,4-DICHLOROBENZENE	106-46-7	μg/L	0.5	<0.5	U
25	DICHLORODIFLUOROMETHANE	75-71-8	μg/L	0.5	<0.5	U
26	1,1-DICHLOROETHANE	75-34-3	μg/L	0.5	<0.5	U
27	1,2-DICHLOROETHANE	107-06-2	μg/L	0.5	<0.5	U
28	1,1-DICHLOROETHENE	75-35-4	μg/L	0.5	<0.5	U
29	CIS-1,2-DICHLOROETHENE	156-59-2	μg/L	0.5	<0.5	U
30	TRANS-1,2-DICHLOROETHENE	156-60-5	μg/L	0.5	<0.5	U
31	1,2-DICHLOROPROPANE	78-87-5	μg/L	0.5	<0.5	U
32	1,3-DICHLOROPROPANE	142-28-9	μg/L	0.5	<0.5	U
33	2,2-DICHLOROPROPANE	594-20-7	μg/L	0.5	<0.5	U
34	1,1-DICHLOROPROPENE	563-58-6	μg/L	0.5	<0.5	U
35	CIS-1,3-DICHLOROPROPENE	10061-01-5	μg/L	0.5	<0.5	U
36	TRANS-1,3-DICHLOROPROPENE	10061-02-6	μg/L	0.5	<0.5	U
37	ETHYLBENZENE	100-41-4	μg/L	0.5	<0.5	U
38	HEXACHLOROBUTADIENE	87-68-3	μg/L	0.5	<0.5	U
39	ISOPROPYLBENZENE (CUMENE)	98-82-8	μg/L	0.5	<0.5	U

#	Component Name	CAS No	Unit	RL	Result	Qualifier
40	P-ISOPROPYLTOLUENE	99-87-6	μg/L	0.5	<0.5	U
41	METHYLENE CHLORIDE	75-09-2	μg/L	0.5	<0.5	U
42	METHYL-T-BUTYL ETHER (MTBE)	1634-04-4	μg/L	1	<1	U
43	4-METHYL-2-PENTANONE (MIBK)	108-10-1	μg/L	10	<10	U
44	NAPHTHALENE	91-20-3	μg/L	0.5	<0.5	U
45	N-PROPYLBENZENE	103-65-1	μg/L	0.5	<0.5	U
46	STYRENE	100-42-5	μg/L	0.5	<0.5	U
47	1,1,1,2-TETRACHLOROETHANE	630-20-6	μg/L	0.5	<0.5	U
48	1,1,2,2-TETRACHLOROETHANE	79-34-5	μg/L	0.5	<0.5	U
49	TETRACHLOROETHENE	127-18-4	μg/L	0.5	<0.5	U
50	TOLUENE	108-88-3	μg/L	0.5	<0.5	U
51	1,2,3-TRICHLOROBENZENE	87-61-6	μg/L	0.5	<0.5	U
52	1,2,4-TRICHLOROBENZENE	120-82-1	μg/L	0.5	<0.5	U
53	1,1,1-TRICHLOROETHANE	71-55-6	μg/L	0.5	<0.5	U
54	1,1,2-TRICHLOROETHANE	79-00-5	μg/L	0.5	<0.5	U
55	TRICHLOROETHENE	79-01-6	μg/L	0.5	<0.5	U
56	TRICHLOROFLUOROMETHANE	75-69-4	μg/L	0.5	<0.5	U
57	1,2,3-TRICHLOROPROPANE	96-18-4	μg/L	0.5	<0.5	U
58	112TRICHLORO-122TRIFLUOROETHANE	76-13-1	μg/L	0.5	<0.5	U
59	1,2,4-TRIMETHYLBENZENE	95-63-6	μg/L	0.5	<0.5	U
60	1,3,5-TRIMETHYLBENZENE	108-67-8	μg/L	0.5	<0.5	U
61	VINYL CHLORIDE	75-01-4	μg/L	0.5	<0.5	U
62	O-XYLENE	95-47-6	μg/L	0.5	<0.5	U
63	M/P-XYLENE	108-38-3	μg/L	0.5	<0.5	U

Surrogates			Control Limit, %	Surro. Rec.%
1	1-BROMO-4-FLUOROBENZENE (4-BROMOFL	460-00-4	70-129	107
2	1,2-DICHLOROETHANE-D4	17060-07-0	70-129	115
3	DIBROMOFLUOROMETHANE	1868-53-7	70-122	113
4	TOLUENE-D8	2037-26-5	73-129	104
# of out-of-control				0

Internal Standard			Control Limit, %	IS Rec.%
1	CHLOROBENZENE-D5	3114-55-4	50-200	104
2	1,4-DICHLOROBENZENE-D4	3855-82-1	50-200	104
3	FLUOROBENZENE	462-06-6	50-200	100
# of out-of-control				0

Not Detected is shown as PQL, with dilution and moisture corrected if applicable.

Qualifier: U - Not Detected or less than MDL
J - Less than RL (PQL, EQL or CRDL), but greater than MDL, or an estimated result (e.g. for TIC)
E - Exceed calibration range
B - A positive value was found in the method blank
D - Diluted

LDC #: 11280C1
SDG #: 03-6002
Laboratory: Applied P & Ch Laboratory

VALIDATION COMPLETENESS WORKSHEET
Level III/IV

Date: 12-19-03
Page: 1 of 1
Reviewer: Z. Pan
2nd Reviewer: [illegible]

METHOD: GC/MS Volatiles (EPA Method 524.2)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 11-6-03
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	%RSD OR $r^2 > 0.990$
IV.	Continuing calibration	SW	%D
V.	Blanks	SW	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	A	LCS
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	A	Not reviewed for Level III validation.
XII.	Compound quantitation/CRQLs	A	Not reviewed for Level III validation.
XIII.	Tentitatively identified compounds (TICs)	N	Not reviewed for Level III validation. ~~Not required~~
XIV.	System performance	A	Not reviewed for Level III validation.
XV.	Overall assessment of data	A	
XVI.	Field duplicates	ND	D = 1, 3
XVII.	Field blanks	ND	TB = 5

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation.

AM Waters

1 D	Dupe-7-4-Q03**	11	03G4771-MB	21		31	
2	MW-5	12		22		32	
3 D	MW-8	13		23		33	
4	MW-10	14		24		34	
5	TB-11-6-03	15		25		35	
6	MW-5MS	16		26		36	
7	MW-5MSD	17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

LDC #: 11280 C1
SDG #: 03-6002

VALIDATION FINDINGS CHECKLIST

Reviewer: Z. Pan
2nd Reviewer: [illegible]

Method: Volatiles (EPA Method 524.2)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. GC/MS instrument performance check				
Were the BFB performance results reviewed and found to be within the specified criteria?	✓			
Were all samples analyzed within the 12 hour clock criteria?	✓			
III. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) ≤ 20%?		✓		
IV. Continuing calibration				
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?	✓			
Were all percent differences (%D) ≤ 30%?		✓		
V. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank analyzed at least once every 12 hours for each matrix and concentration?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.	✓			
VI. Surrogate spikes				
Were all surrogate %R within QC limits?	✓			
If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R outside of criteria?			✓	
VII. Matrix spike/Matrix spike duplicates				
Was a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for this SDG?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	✓			
VIII. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per analytical batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			

LDC #: 11280C1
SDG #: 03-6002

VALIDATION FINDINGS CHECKLIST

Reviewer: Z. Pan
2nd Reviewer: MH

Validation Area	Yes	No	NA	Findings/Comments
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?			✓	
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
X. Internal standards				
Were internal standard area counts within +/-40% from the associated calibration standard?	✓			
Were retention times within - 30% of the last continuing calibration or +/- 50% of the initial calibration?	✓			
XI. Target compound identification				
Were relative retention times (RRT's) within ± 0.06 RRT units of the standard?			✓	
Did compound spectra meet specified EPA "Functional Guidelines" criteria?			✓	
Were chromatogram peaks verified and accounted for?			✓	
XII. Compound quantitation/CRQLs				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?	✓			
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Tentatively identified compounds (TICs)				
Were the major ions (> 25 percent relative intensity) in the reference spectrum evaluated in sample spectrum?			✓	
Were relative intensities of the major ions within ± 20% between the sample and the reference spectra?			✓	
Did the raw data indicate that the laboratory performed a library search for all required peaks in the chromatograms (samples and blanks)?			✓	
XIV. System performance				
System performance was found to be acceptable.	✓			
XV. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XVI. Field duplicates				
Field duplicate pairs were identified in this SDG.	✓			
Target compounds were detected in the field duplicates.		✓		
XVII. Field blanks				
Field blanks were identified in this SDG.	✓			
Target compounds were detected in the field blanks.		✓		

TARGET COMPOUND WORKSHEET

METHOD: VOA (EPA Method 524.2)

A. Chloromethane	Q. 1,2-Dichloropropane	GG. Xylenes, total	WW. Bromobenzene	MMM. Naphthalene
B. Bromomethane	R. cis-1,3-Dichloropropene	HH. Vinyl acetate	XX. 1,2,3-Trichloropropane	NNN. 1,2,3-Trichlorobenzene
C. Vinyl choride	S. Trichloroethene	II. 2-Chloroethylvinyl ether	YY. n-Propylbenzene	OOO. 1,3,5-Trichlorobenzene
D. Chloroethane	T. Dibromochloromethane	JJ. Dichlorodifluoromethane	ZZ. 2-Chlorotoluene	PPP. trans-1,2-Dichloroethene
E. Methylene chloride	U. 1,1,2-Trichloroethane	KK. Trichlorofluoromethane	AAA. 1,3,5-Trimethylbenzene	QQQ. cis-1,2-Dichloroethene
F. Acetone	V. Benzene	LL. Methyl-tert-butyl ether	BBB. 4-Chlorotoluene	RRR. m,p-Xylenes
G. Carbon disulfide	W. trans-1,3-Dichloropropene	MM. 1,2-Dibromo-3-chloropropane	CCC. tert-Butylbenzene	SSS. o-Xylene
H. 1,1-Dichloroethene	X. Bromoform	NN. Diethyl ether	DDD. 1,2,4-Trimethylbenzene	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane
I. 1,1-Dichloroethane	Y. 4-Methyl-2-pentanone	OO. 2,2-Dichloropropane	EEE. sec-Butylbenzene	UUU. Benzyl chloride
J. 1,2-Dichloroethene, total	Z. 2-Hexanone	PP. Bromochloromethane	FFF. 1,3-Dichlorobenzene	VVV. 4-Ethyltoluene
K. Chloroform	AA. Tetrachloroethene	QQ. 1,1-Dichloropropene	GGG. p-Isopropyltoluene	WWW. Ethanol
L. 1,2-Dichloroethane	BB. 1,1,2,2-Tetrachloroethane	RR. Dibromomethane	HHH. 1,4-Dichlorobenzene	XXX. Ethyl ether
M. 2-Butanone	CC. Toluene	SS. 1,3-Dichloropropane	III. n-Butylbenzene	
N. 1,1,1-Trichloroethane	DD. Chlorobenzene	TT. 1,2-Dibromoethane	JJJ. 1,2-Dichlorobenzene	
O. Carbon tetrachloride	EE. Ethylbenzene	UU. 1,1,1,2-Tetrachloroethane	KKK. 1,2,4-Trichlorobenzene	
P. Bromodichloromethane	FF. Styrene	VV. Isopropylbenzene	LLL. Hexachlorobutadiene	

Notes:

LDC #: 11280C1
SDG #: 03-6002

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Page: 1 of 1
Reviewer: Z. Pan
2nd Reviewer: MM

METHOD: GC/MS VOA (EPA Method 524.2)
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?
Y N N/A Were all percent differences (%D) ≤ 30% ?

#	Date	Standard ID	Compound	Finding %D (Limit: ≤30.0%)	Associated Samples	Qualifications
1	11-11-2003 (8:21 PM)	G4771Q01	A	39.69	All + BLK	J/UJ/A P
			B	37.19	↓	↓

CONCAL1S5

LDC #: 11280 C1
SDG #: 03-6002

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: Z. Pan
2nd Reviewer: MH

METHOD: GC/MS VOA (EPA Method 524.2)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a method blank associated with every sample in this SDG?
Y N N/A Was a method blank analyzed at least once every 12 hours for each matrix and concentration?
Y N N/A Was there contamination in the method blanks? If yes, please see the qualifications below.

Blank analysis date: ~~ug/L~~ 11-12-03
Conc. units: ug/L
Associated Samples: ALL

Compound	Blank ID	Sample Identification								
	03G4771-MB	#1	2	3	4	5				
Methylene chloride	0.4		–	–	–	–	–			
Acetone										
CRQL										

Blank analysis date:
Conc. units:
Associated Samples:

Compound	Blank ID	Sample Identification								
Methylene chloride										
Acetone										
CRQL										

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:

Note: Common contaminants such as Methylene chloride, Acetone, 2-Butanone, Carbon disulfide and TICs that were detected in samples within ten times the associated method blank concentration were qualified as not detected, "U". Other contaminants within five times the method blank concentration were also qualified as not detected, "U".

LDC # 11280 C1
SDG# 03-6002

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: Z. Pan
2nd Reviewer: MH

METHOD: GC / MS

Parameter:

Order of regression: 1.00

Date	IS Fluorobenzene	Methylene chloride	Y Area / (Area IS)	Methylene chloride Conc. (ppb)	X C / (C IS)
10/21/2003	920067	10278	0.0112	0.3	0.03
	916201	48191	0.0526	2	0.2
	919392	203033	0.2208	10	1
	955116	407143	0.4263	20	2
	907151	804880	0.8873	40	4
	1006211	1192483	1.1851	60	6

Regression Output: Regression Output:		Reported	
Constant	0.02025	c =	0.02025
Std Err of Y Est	0.04		
R Squared	0.9947	r^2 =	0.9947
No. of Observations	6.00		
Degrees of Freedom	4.00		
		b(X)	a(X^2)
X Coefficient(s)	0.20119	0.20119	0.00000
Std Err of Coef.	0.01		

LDC #: 11280C1
SDG #: 03-6002

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Page: 1 of 1
Reviewer: Z. Pan
2nd Reviewer: 144

METHOD: GC/MS VOA (EPA Method 524.2)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

RRF = $(A_x)(C_{is})/(A_{is})(C_x)$
average RRF = sum of the RRFs/number of standards
%RSD = 100 * (S/X)

A_x = Area of compound,
C_x = Concentration of compound,
S = Standard deviation of the RRFs
X = Mean of the RRFs

A_{is} = Area of associated internal standard
C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Reported RRF (10 std)	Recalculated RRF (10 std)	Reported Average RRF (Initial)	Recalculated Average RRF (Initial)	Reported %RSD	Recalculated %RSD
1	E524A003	10-21-03	Methylene chloride (1st Internal Standard)	0.221	0.221	See	Next page		
			~~Trichlorethene~~ Toluene (2nd internal standard)	1.322	1.322	1.354	1.354	5.13	5.12
			~~Bromoform~~ Ethylbenzene (3rd internal standard)	2.614	2.614	2.542	2.542	4.04	4.04
2			Methylene chloride (1st Internal Standard)						
			Trichlorethene (2nd internal standard)						
			Bromoform (3rd internal standard)						
3			Methylene chloride (1st Internal Standard)						
			Trichlorethene (2nd internal standard)						
			Bromoform (3rd internal standard)						
4			Methylene chloride (1st Internal Standard)						
			Trichlorethene (2nd internal standard)						
			Bromoform (3rd internal standard)						

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 11280C1
SDG #: 03-6002

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Page: 1 of 1
Reviewer: Z. Pan
2nd Reviewer: 4h

METHOD: GC/MS VOA (EPA Method 524.2)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
RRF = $(A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
A_x = Area of compound, A_{is} = Area of associated internal standard
C_x = Concentration of compound, C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Average RRF (Initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	G477/Q01	11-11-03 (8:21 PM)	Methylene chloride (1st Internal Standard)	20 *	17.58	17.58	12.09	12.1
			~~Trichlorethene~~ Toluene (2nd internal standard)	1.354	1.209	1.209	10.7	10.7
			~~Bromoform~~ Ethylbenzene (3rd internal standard)	2.542	2.456	2.456	3.4	3.4
2			Methylene chloride (1st Internal Standard)					
			Trichlorethene (2nd internal standard)					
			Bromoform (3rd internal standard)					
3			Methylene chloride (1st Internal Standard)					
			Trichlorethene (2nd internal standard)					
			Bromoform (3rd internal standard)					
4			Methylene chloride (1st Internal Standard)					
			Trichlorethene (2nd internal standard)					
			Bromoform (3rd internal standard)					

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

* Conc.

CONCLC.1S5

LDC #: 11280C1
SDG #: 03-6002

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Page: 1 of 1
Reviewer: Z. Pan
2nd reviewer: HH

METHOD: GC/MS VOA (EPA Method 524.2)

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: #1

	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
			Reported	Recalculated	
Toluene-d8	20.0	20.78	104	104	0
Bromofluorobenzene		21.34	107	107	
1,2-Dichloro~~benzene~~ethane-d4		23.18	116	116	
Dibromofluoromethane		22.36	112	112	

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
			Reported	Recalculated	
Toluene-d8					
Bromofluorobenzene					
1,2-Dichlorobenzene-d4					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
			Reported	Recalculated	
Toluene-d8					
Bromofluorobenzene					
1,2-Dichlorobenzene-d4					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
			Reported	Recalculated	
Toluene-d8					
Bromofluorobenzene					
1,2-Dichlorobenzene-d4					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
			Reported	Recalculated	
Toluene-d8					
Bromofluorobenzene					
1,2-Dichlorobenzene-d4					

LDC #: 11280C1
SDG #: 03-6002

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Page: 1 of 1
Reviewer: Z. Pan
2nd Reviewer: HM

METHOD: GC/MS VOA (EPA Method 524.2)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SSC - SC)/SA Where: SSC = Spiked sample concentration; SA = Spike added; SC = Sample concentration

RPD = I MSC - MSDC I * 2/(MSC + MSDC) MSC = Matrix spike percent recovery MSDC = Matrix spike duplicate percent recovery

MS/MSD sample: # 6/7

Compound	Spike Added (ug/L)		Sample Concentration (ug/L)	Spiked Sample Concentration (ug/L)		Matrix Spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	----	MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
1,1-Dichloroethene	20	20	0	20.4	20.1	102	102	101	101	1	1
Trichloroethene	↓	↓	↓	18.8	18.9	94	94	95	95	1	1
Benzene	↓	↓	↓	17.3	17.3	87	87	87	87	0	0
Toluene	↓	↓	↓	17.3	17.1	87	87	86	86	1	1
Chlorobenzene	↓	↓	↓	18.6	18.2	93	93	91	91	2	2

Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 11280C1
SDG #: 03-6002

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample Results Verification

Reviewer: Z. Pan
2nd Reviewer: [illegible]

METHOD: GC/MS VOA (EPA Method 524.2)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratoy control sample and laboratory control sample duplicate (if applicable) were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * SSC/SA Where: SSC = Spiked sample concentration
SA = Spike added

RPD = I LCS - LCSD I * 2/(LCS + LCSD) LCS = Laboraotry control sample percent recovery LCSD = Laboratory control sample duplicate percent recovery

LCS ID: G4771L01

Compound	Spike Added (ug/L)		Spiked Sample Concentration (ug/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
1,1-Dichloroethene	20		20.4		102	102				
Trichloroethene			18.5		93	93				
Benzene			17.0		85	85				
Toluene			17.2		86	86				
Chlorobenzene			18.5		93	93				

Comments: Refer to Laboratory Control Sample findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 11280C1
SDG #: 03-6002

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: Z. Pan
2nd reviewer: [illegible]

METHOD: GC/MS VOA (EPA Method 524.2)

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentration = $\frac{(A_x)(I_s)(DF)}{(A_{is})(RRF)(V_o)(\%S)}$

A_x = Area of the characteristic ion (EICP) for the compound to be measured

A_{is} = Area of the characteristic ion (EICP) for the specific internal standard

I_s = Amount of internal standard added in nanograms (ng)

RRF = Relative response factor of the calibration standard.

V_o = Volume or weight of sample pruged in milliliters (ml) or grams (g).

Df = Dilution factor.

%S = Percent solids, applicable to soils and solid matrices only.

Example:

Sample I.D. #1 ND, _____:

Conc. = ( ) ( ) ( ) / ( ) ( ) ( ) ( )

=

#	Sample ID	Compound	Reported Concentration ( )	Calculated Concentration ( )	Qualification

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NASA JPL

Collection Date: November 7, 2003

LDC Report Date: December 22, 2003

Matrix: Water

Parameters: Volatiles

Validation Level: EPA Level III & IV

Laboratory: Applied P & Ch Laboratory

Sample Delivery Group (SDG): 03-6034

Sample Identification

DUPE-2-4-Q03**
MW-6
MW-13
MW-15
TB-12-11-7-03
MW-13MS
MW-13MSD

**Indicates sample underwent EPA Level IV review

Introduction

This data review covers 7 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 524.2 for Volatiles.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (October 1999) as there are no current guidelines for the method stated above.

A table summarizing all data qualification is provided at the end of this report. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

Samples indicated by a double asterisk on the front cover underwent a EPA Level IV review. A EPA Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 20.0% for selected compounds.

A curve fit, based on the initial calibration, was established for quantitation for selected compounds. The coefficient of determination (r^2) was greater than or equal to 0.990 .

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were less than or equal to 30.0% with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
11/11/03 (20:21)	Chloromethane	39.69	All samples in SDG 03-6034	J (all detects) UJ (all non-detects)	P
	Bromomethane	37.19		J (all detects) UJ (all non-detects)	

V. Blanks

Method blanks were reviewed for each matrix as applicable. No volatile contaminants were found in the method blanks with the following exceptions:

Method Blank ID	Analysis Date	Compound TIC (RT in minutes)	Concentration	Associated Samples
03G4771-MB	11/12/03	Methylene chloride	0.4 ug/L	All samples in SDG 03-6034

Sample concentrations were compared to concentrations detected in the method blanks. The sample concentrations were either not detected or were significantly greater (>10X for common contaminants, >5X for other contaminants) than the concentrations found in the associated method blanks.

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

Although matrix spike (MS) and matrix spike duplicate (MSD) samples were not required by the method, MS and MSD samples were reported by the laboratory. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

All internal standard areas and retention times were within QC limits.

XI. Target Compound Identifications

All target compound identifications were within validation criteria for samples on which a EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

XII. Compound Quantitation and CRQLs

All compound quantitation and CRQLs were within validation criteria for samples on which a EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

XIII. Tentatively Identified Compounds (TICs)

Tentatively identified compounds were not reported by the laboratory.

XIV. System Performance

The system performance was within validation criteria for samples on which a EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

XV. Overall Assessment of Data

Data flags have been summarized at the end of the report.

XVI. Field Duplicates

Samples DUPE-2-4-Q03** and MW-15 were identified as field duplicates. No volatiles were detected in any of the samples.

XVII. Field Blanks

Sample TB-12-11-7-03 was identified as a trip blank. No volatile contaminants were found in this blank.

NASA JPL
Volatiles - Data Qualification Summary - SDG 03-6034

SDG	Sample	Compound	Flag	A or P	Reason
03-6034	DUPE-2-4-Q03** MW-6 MW-13 MW-15 TB-12-11-7-03	Chloromethane Bromomethane	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	P	Continuing calibration (%D)

NASA JPL
Volatiles - Laboratory Blank Data Qualification Summary - SDG 03-6034

No Sample Data Qualified in this SDG

Applied P & Ch Laboratory

Organic Analysis Results for Method 524.2

Client Name:	GEOFON, Inc.	Project No:	04-4428.10	Collection Date:	11/07/2003
Project ID:	JPL	Service ID:	36034	Collected by:	JR
		Lab Sample ID:	03-6034-1	Received Date:	11/07/2003
Sample ID:	**DUPE-2-4-Q03**	Sample Matrix	Water	Moisture %:	–
Sample Type:	Field Sample	Prep. Method:	5030	Instrument ID:	GC/MS: A
Anal. Method:	524.2	Prep. Date:	11/12/03	Anal. Date:	11/12/03
Batch No:	03G4771	Prep. No:	–	Anal. Time:	05:18
Data File Name:	6034-01	Sample Amount:	25.0 mL	Dilution Factor:	1
Methanol Vol.	–				
Test Level:	Low	Sparge Size:	25 mL	Heated Purge: (Y/N)	N

#	Component Name	CAS No	Unit	RL	Result	Qualifier
1	BENZENE	71-43-2	μg/L	0.5	<0.5	U
2	BROMOBENZENE	108-86-1	μg/L	0.5	<0.5	U
3	BROMOCHLOROMETHANE	74-97-5	μg/L	0.5	<0.5	U
4	BROMODICHLOROMETHANE	75-27-4	μg/L	0.5	<0.5	U
5	BROMOFORM	75-25-2	μg/L	0.5	<0.5	U
6	BROMOMETHANE	74-83-9	μg/L	0.5	<0.5	U UJ
7	N-BUTYLBENZENE	104-51-8	μg/L	0.5	<0.5	U
8	SEC-BUTYLBENZENE	135-98-8	μg/L	0.5	<0.5	U
9	TERT-BUTYLBENZENE	98-06-6	μg/L	0.5	<0.5	U
10	2-BUTANONE	78-93-3	μg/L	10	<10	U
11	CARBON TETRACHLORIDE	56-23-5	μg/L	0.5	<0.5	U
12	CHLOROBENZENE	108-90-7	μg/L	0.5	<0.5	U
13	CHLORODIBROMOMETHANE	124-48-1	μg/L	0.5	<0.5	U
14	CHLOROETHANE	75-00-3	μg/L	0.5	<0.5	U
15	CHLOROFORM	67-66-3	μg/L	0.5	<0.5	U
16	CHLOROMETHANE	74-87-3	μg/L	0.5	<0.5	U UJ
17	2-CHLOROTOLUENE	95-49-8	μg/L	0.5	<0.5	U
18	4-CHLOROTOLUENE	106-43-4	μg/L	0.5	<0.5	U
19	1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	μg/L	0.5	<0.5	U
20	1,2-DIBROMOETHANE (EDB)	106-93-4	μg/L	0.5	<0.5	U
21	DIBROMOMETHANE	74-95-3	μg/L	0.5	<0.5	U
22	1,2-DICHLOROBENZENE	95-50-1	μg/L	0.5	<0.5	U
23	1,3-DICHLOROBENZENE	541-73-1	μg/L	0.5	<0.5	U
24	1,4-DICHLOROBENZENE	106-46-7	μg/L	0.5	<0.5	U
25	DICHLORODIFLUOROMETHANE	75-71-8	μg/L	0.5	<0.5	U
26	1,1-DICHLOROETHANE	75-34-3	μg/L	0.5	<0.5	U
27	1,2-DICHLOROETHANE	107-06-2	μg/L	0.5	<0.5	U
28	1,1-DICHLOROETHENE	75-35-4	μg/L	0.5	<0.5	U
29	CIS-1,2-DICHLOROETHENE	156-59-2	μg/L	0.5	<0.5	U
30	TRANS-1,2-DICHLOROETHENE	156-60-5	μg/L	0.5	<0.5	U
31	1,2-DICHLOROPROPANE	78-87-5	μg/L	0.5	<0.5	U
32	1,3-DICHLOROPROPANE	142-28-9	μg/L	0.5	<0.5	U
33	2,2-DICHLOROPROPANE	594-20-7	μg/L	0.5	<0.5	U
34	1,1-DICHLOROPROPENE	563-58-6	μg/L	0.5	<0.5	U
35	CIS-1,3-DICHLOROPROPENE	10061-01-5	μg/L	0.5	<0.5	U
36	TRANS-1,3-DICHLOROPROPENE	10061-02-6	μg/L	0.5	<0.5	U
37	ETHYLBENZENE	100-41-4	μg/L	0.5	<0.5	U
38	HEXACHLOROBUTADIENE	87-68-3	μg/L	0.5	<0.5	U
39	ISOPROPYLBENZENE (CUMENE)	98-82-8	μg/L	0.5	<0.5	U

#	Component Name	CAS No	Unit	RL	Result	Qualifier
40	P-ISOPROPYLTOLUENE	99-87-6	µg/L	0.5	<0.5	U
41	METHYLENE CHLORIDE	75-09-2	µg/L	0.5	<0.5	U
42	METHYL-T-BUTYL ETHER (MTBE)	1634-04-4	µg/L	1	<1	U
43	4-METHYL-2-PENTANONE (MIBK)	108-10-1	µg/L	10	<10	U
44	NAPHTHALENE	91-20-3	µg/L	0.5	<0.5	U
45	N-PROPYLBENZENE	103-65-1	µg/L	0.5	<0.5	U
46	STYRENE	100-42-5	µg/L	0.5	<0.5	U
47	1,1,1,2-TETRACHLOROETHANE	630-20-6	µg/L	0.5	<0.5	U
48	1,1,2,2-TETRACHLOROETHANE	79-34-5	µg/L	0.5	<0.5	U
49	TETRACHLOROETHENE	127-18-4	µg/L	0.5	<0.5	U
50	TOLUENE	108-88-3	µg/L	0.5	<0.5	U
51	1,2,3-TRICHLOROBENZENE	87-61-6	µg/L	0.5	<0.5	U
52	1,2,4-TRICHLOROBENZENE	120-82-1	µg/L	0.5	<0.5	U
53	1,1,1-TRICHLOROETHANE	71-55-6	µg/L	0.5	<0.5	U
54	1,1,2-TRICHLOROETHANE	79-00-5	µg/L	0.5	<0.5	U
55	TRICHLOROETHENE	79-01-6	µg/L	0.5	<0.5	U
56	TRICHLOROFLUOROMETHANE	75-69-4	µg/L	0.5	<0.5	U
57	1,2,3-TRICHLOROPROPANE	96-18-4	µg/L	0.5	<0.5	U
58	112TRICHLORO-122TRIFLUOROETHANE	76-13-1	µg/L	0.5	<0.5	U
59	1,2,4-TRIMETHYLBENZENE	95-63-6	µg/L	0.5	<0.5	U
60	1,3,5-TRIMETHYLBENZENE	108-67-8	µg/L	0.5	<0.5	U
61	VINYL CHLORIDE	75-01-4	µg/L	0.5	<0.5	U
62	O-XYLENE	95-47-6	µg/L	0.5	<0.5	U
63	M/P-XYLENE	108-38-3	µg/L	0.5	<0.5	U

Surrogates			Control Limit, %	Surro. Rec.%
1	1-BROMO-4-FLUOROBENZENE (4-BROMOFL	460-00-4	70-129	107
2	1,2-DICHLOROETHANE-D4	17060-07-0	70-129	115
3	DIBROMOFLUOROMETHANE	1868-53-7	70-122	113
4	TOLUENE-D8	2037-26-5	73-129	103
# of out-of-control				0

Internal Standard			Control Limit, %	IS Rec.%
1	CHLOROBENZENE-D5	3114-55-4	50-200	102
2	1,4-DICHLOROBENZENE-D4	3855-82-1	50-200	102
3	FLUOROBENZENE	462-06-6	50-200	97
# of out-of-control				0

Not Detected is shown as PQL, with dilution and moisture corrected if applicable.

Qualifier: U - Not Detected or less than MDL
J - Less than RL (PQL, EQL or CRDL), but greater than MDL, or an estimated result (e.g. for TIC)
E - Exceed calibration range
B - A positive value was found in the method blank
D - Diluted

102

Applied P & Ch Laboratory

Organic Analysis Results for Method 524.2

Client Name:	GEOFON, Inc.	Project No:	04-4428.10	Collection Date:	11/07/2003
Project ID:	JPL	Service ID:	36034	Collected by:	JR
		Lab Sample ID:	03-6034-2	Received Date:	11/07/2003
Sample ID:	MW-6	Sample Matrix	Water	Moisture %:	–
Sample Type:	Field Sample	Prep. Method:	5030	Instrument ID:	GC/MS: A
Anal. Method:	524.2	Prep. Date:	11/12/03	Anal. Date:	11/12/03
Batch No:	03G4771	Prep. No:	–	Anal. Time:	05:44
Data File Name:	6034-02	Sample Amount:	25.0 mL	Dilution Factor:	1
Methanol Vol.	–				
Test Level:	Low	Sparge Size:	25 mL	Heated Purge: (Y/N) N	

#	Component Name	CAS No	Unit	RL	Result	Qualifier
1	BENZENE	71-43-2	µg/L	0.5	<0.5	U
2	BROMOBENZENE	108-86-1	µg/L	0.5	<0.5	U
3	BROMOCHLOROMETHANE	74-97-5	µg/L	0.5	<0.5	U
4	BROMODICHLOROMETHANE	75-27-4	µg/L	0.5	<0.5	U
5	BROMOFORM	75-25-2	µg/L	0.5	<0.5	U
6	BROMOMETHANE	74-83-9	µg/L	0.5	<0.5	U UJ
7	N-BUTYLBENZENE	104-51-8	µg/L	0.5	<0.5	U
8	SEC-BUTYLBENZENE	135-98-8	µg/L	0.5	<0.5	U
9	TERT-BUTYLBENZENE	98-06-6	µg/L	0.5	<0.5	U
10	2-BUTANONE	78-93-3	µg/L	10	<10	U
11	CARBON TETRACHLORIDE	56-23-5	µg/L	0.5	<0.5	U
12	CHLOROBENZENE	108-90-7	µg/L	0.5	<0.5	U
13	CHLORODIBROMOMETHANE	124-48-1	µg/L	0.5	<0.5	U
14	CHLOROETHANE	75-00-3	µg/L	0.5	<0.5	U
15	CHLOROFORM	67-66-3	µg/L	0.5	0.3	J
16	CHLOROMETHANE	74-87-3	µg/L	0.5	<0.5	U UJ
17	2-CHLOROTOLUENE	95-49-8	µg/L	0.5	<0.5	U
18	4-CHLOROTOLUENE	106-43-4	µg/L	0.5	<0.5	U
19	1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	µg/L	0.5	<0.5	U
20	1,2-DIBROMOETHANE (EDB)	106-93-4	µg/L	0.5	<0.5	U
21	DIBROMOMETHANE	74-95-3	µg/L	0.5	<0.5	U
22	1,2-DICHLOROBENZENE	95-50-1	µg/L	0.5	<0.5	U
23	1,3-DICHLOROBENZENE	541-73-1	µg/L	0.5	<0.5	U
24	1,4-DICHLOROBENZENE	106-46-7	µg/L	0.5	<0.5	U
25	DICHLORODIFLUOROMETHANE	75-71-8	µg/L	0.5	<0.5	U
26	1,1-DICHLOROETHANE	75-34-3	µg/L	0.5	0.9	
27	1,2-DICHLOROETHANE	107-06-2	µg/L	0.5	<0.5	U
28	1,1-DICHLOROETHENE	75-35-4	µg/L	0.5	0.8	
29	CIS-1,2-DICHLOROETHENE	156-59-2	µg/L	0.5	<0.5	U
30	TRANS-1,2-DICHLOROETHENE	156-60-5	µg/L	0.5	<0.5	U
31	1,2-DICHLOROPROPANE	78-87-5	µg/L	0.5	<0.5	U
32	1,3-DICHLOROPROPANE	142-28-9	µg/L	0.5	<0.5	U
33	2,2-DICHLOROPROPANE	594-20-7	µg/L	0.5	<0.5	U
34	1,1-DICHLOROPROPENE	563-58-6	µg/L	0.5	<0.5	U
35	CIS-1,3-DICHLOROPROPENE	10061-01-5	µg/L	0.5	<0.5	U
36	TRANS-1,3-DICHLOROPROPENE	10061-02-6	µg/L	0.5	<0.5	U
37	ETHYLBENZENE	100-41-4	µg/L	0.5	<0.5	U
38	HEXACHLOROBUTADIENE	87-68-3	µg/L	0.5	<0.5	U
39	ISOPROPYLBENZENE (CUMENE)	98-82-8	µg/L	0.5	<0.5	U

#	Component Name	CAS No	Unit	RL	Result	Qualifier
40	P-ISOPROPYLTOLUENE	99-87-6	μg/L	0.5	< 0.5	U
41	METHYLENE CHLORIDE	75-09-2	μg/L	0.5	< 0.5	U
42	METHYL-T-BUTYL ETHER (MTBE)	1634-04-4	μg/L	1	< 1	U
43	4-METHYL-2-PENTANONE (MIBK)	108-10-1	μg/L	10	< 10	U
44	NAPHTHALENE	91-20-3	μg/L	0.5	< 0.5	U
45	N-PROPYLBENZENE	103-65-1	μg/L	0.5	< 0.5	U
46	STYRENE	100-42-5	μg/L	0.5	< 0.5	U
47	1,1,1,2-TETRACHLOROETHANE	630-20-6	μg/L	0.5	< 0.5	U
48	1,1,2,2-TETRACHLOROETHANE	79-34-5	μg/L	0.5	< 0.5	U
49	TETRACHLOROETHENE	127-18-4	μg/L	0.5	3.0	
50	TOLUENE	108-88-3	μg/L	0.5	< 0.5	U
51	1,2,3-TRICHLOROBENZENE	87-61-6	μg/L	0.5	< 0.5	U
52	1,2,4-TRICHLOROBENZENE	120-82-1	μg/L	0.5	< 0.5	U
53	1,1,1-TRICHLOROETHANE	71-55-6	μg/L	0.5	< 0.5	U
54	1,1,2-TRICHLOROETHANE	79-00-5	μg/L	0.5	< 0.5	U
55	TRICHLOROETHENE	79-01-6	μg/L	0.5	< 0.5	U
56	TRICHLOROFLUOROMETHANE	75-69-4	μg/L	0.5	< 0.5	U
57	1,2,3-TRICHLOROPROPANE	96-18-4	μg/L	0.5	< 0.5	U
58	112TRICHLORO-122TRIFLUOROETHANE	76-13-1	μg/L	0.5	< 0.5	U
59	1,2,4-TRIMETHYLBENZENE	95-63-6	μg/L	0.5	< 0.5	U
60	1,3,5-TRIMETHYLBENZENE	108-67-8	μg/L	0.5	< 0.5	U
61	VINYL CHLORIDE	75-01-4	μg/L	0.5	< 0.5	U
62	O-XYLENE	95-47-6	μg/L	0.5	< 0.5	U
63	M/P-XYLENE	108-38-3	μg/L	0.5	< 0.5	U

Surrogates			Control Limit, %	Surro. Rec.%
1	1-BROMO-4-FLUOROBENZENE (4-BROMOFL	460-00-4	70-129	107
2	1,2-DICHLOROETHANE-D4	17060-07-0	70-129	117
3	DIBROMOFLUOROMETHANE	1868-53-7	70-122	113
4	TOLUENE-D8	2037-26-5	73-129	104
# of out-of-control				0

Internal Standard			Control Limit, %	IS Rec.%
1	CHLOROBENZENE-D5	3114-55-4	50-200	102
2	1,4-DICHLOROBENZENE-D4	3855-82-1	50-200	103
3	FLUOROBENZENE	462-06-6	50-200	98
# of out-of-control				0

Not Detected is shown as PQL, with dilution and moisture corrected if applicable.

Qualifier: U - Not Detected or less than MDL
J - Less than RL (PQL, EQL or CRDL), but greater than MDL, or an estimated result (e.g. for TIC)
E - Exceed calibration range
B - A positive value was found in the method blank
D - Diluted

Applied P & Ch Laboratory

Organic Analysis Results for Method 524.2

Client Name:	GEOFON, Inc.	Project No:	04-4428.10	Collection Date:	11/07/2003
Project ID:	JPL	Service ID:	36034	Collected by:	JR
		Lab Sample ID:	03-6034-3	Received Date:	11/07/2003
Sample ID:	**MW-13**	Sample Matrix	Water	Moisture %:	–
Sample Type:	Field Sample	Prep. Method:	5030	Instrument ID:	GC/MS: A
Anal. Method:	524.2	Prep. Date:	11/12/03	Anal. Date:	11/12/03
Batch No:	03G4771	Prep. No:	–	Anal. Time:	03:07
Data File Name:	6034-03	Sample Amount:	25.0 mL	Dilution Factor:	1
Methanol Vol.	–				
Test Level:	Low	Sparge Size:	25 mL	Heated Purge: (Y/N)	N

#	Component Name	CAS No	Unit	RL	Result	Qualifier
1	BENZENE	71-43-2	μg/L	0.5	<0.5	U
2	BROMOBENZENE	108-86-1	μg/L	0.5	<0.5	U
3	BROMOCHLOROMETHANE	74-97-5	μg/L	0.5	<0.5	U
4	BROMODICHLOROMETHANE	75-27-4	μg/L	0.5	<0.5	U
5	BROMOFORM	75-25-2	μg/L	0.5	<0.5	U
6	BROMOMETHANE	74-83-9	μg/L	0.5	<0.5	U UJ
7	N-BUTYLBENZENE	104-51-8	μg/L	0.5	<0.5	U
8	SEC-BUTYLBENZENE	135-98-8	μg/L	0.5	<0.5	U
9	TERT-BUTYLBENZENE	98-06-6	μg/L	0.5	<0.5	U
10	2-BUTANONE	78-93-3	μg/L	10	<10	U
11	CARBON TETRACHLORIDE	56-23-5	μg/L	0.5	1.5	
12	CHLOROBENZENE	108-90-7	μg/L	0.5	<0.5	U
13	CHLORODIBROMOMETHANE	124-48-1	μg/L	0.5	<0.5	U
14	CHLOROETHANE	75-00-3	μg/L	0.5	<0.5	U
15	CHLOROFORM	67-66-3	μg/L	0.5	1.7	
16	CHLOROMETHANE	74-87-3	μg/L	0.5	<0.5	U UJ
17	2-CHLOROTOLUENE	95-49-8	μg/L	0.5	<0.5	U
18	4-CHLOROTOLUENE	106-43-4	μg/L	0.5	<0.5	U
19	1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	μg/L	0.5	<0.5	U
20	1,2-DIBROMOETHANE (EDB)	106-93-4	μg/L	0.5	<0.5	U
21	DIBROMOMETHANE	74-95-3	μg/L	0.5	<0.5	U
22	1,2-DICHLOROBENZENE	95-50-1	μg/L	0.5	<0.5	U
23	1,3-DICHLOROBENZENE	541-73-1	μg/L	0.5	<0.5	U
24	1,4-DICHLOROBENZENE	106-46-7	μg/L	0.5	<0.5	U
25	DICHLORODIFLUOROMETHANE	75-71-8	μg/L	0.5	<0.5	U
26	1,1-DICHLOROETHANE	75-34-3	μg/L	0.5	0.4	J
27	1,2-DICHLOROETHANE	107-06-2	μg/L	0.5	<0.5	U
28	1,1-DICHLOROETHENE	75-35-4	μg/L	0.5	<0.5	U
29	CIS-1,2-DICHLOROETHENE	156-59-2	μg/L	0.5	<0.5	U
30	TRANS-1,2-DICHLOROETHENE	156-60-5	μg/L	0.5	<0.5	U
31	1,2-DICHLOROPROPANE	78-87-5	μg/L	0.5	<0.5	U
32	1,3-DICHLOROPROPANE	142-28-9	μg/L	0.5	<0.5	U
33	2,2-DICHLOROPROPANE	594-20-7	μg/L	0.5	<0.5	U
34	1,1-DICHLOROPROPENE	563-58-6	μg/L	0.5	<0.5	U
35	CIS-1,3-DICHLOROPROPENE	10061-01-5	μg/L	0.5	<0.5	U
36	TRANS-1,3-DICHLOROPROPENE	10061-02-6	μg/L	0.5	<0.5	U
37	ETHYLBENZENE	100-41-4	μg/L	0.5	<0.5	U
38	HEXACHLOROBUTADIENE	87-68-3	μg/L	0.5	<0.5	U
39	ISOPROPYLBENZENE (CUMENE)	98-82-8	μg/L	0.5	<0.5	U

#	Component Name	CAS No	Unit	RL	Result	Qualifier
40	P-ISOPROPYLTOLUENE	99-87-6	µg/L	0.5	<0.5	U
41	METHYLENE CHLORIDE	75-09-2	µg/L	0.5	<0.5	U
42	METHYL-T-BUTYL ETHER (MTBE)	1634-04-4	µg/L	1	<1	U
43	4-METHYL-2-PENTANONE (MIBK)	108-10-1	µg/L	10	<10	U
44	NAPHTHALENE	91-20-3	µg/L	0.5	<0.5	U
45	N-PROPYLBENZENE	103-65-1	µg/L	0.5	<0.5	U
46	STYRENE	100-42-5	µg/L	0.5	<0.5	U
47	1,1,1,2-TETRACHLOROETHANE	630-20-6	µg/L	0.5	<0.5	U
48	1,1,2,2-TETRACHLOROETHANE	79-34-5	µg/L	0.5	<0.5	U
49	TETRACHLOROETHENE	127-18-4	µg/L	0.5	0.9	
50	TOLUENE	108-88-3	µg/L	0.5	<0.5	U
51	1,2,3-TRICHLOROBENZENE	87-61-6	µg/L	0.5	<0.5	U
52	1,2,4-TRICHLOROBENZENE	120-82-1	µg/L	0.5	<0.5	U
53	1,1,1-TRICHLOROETHANE	71-55-6	µg/L	0.5	<0.5	U
54	1,1,2-TRICHLOROETHANE	79-00-5	µg/L	0.5	<0.5	U
55	TRICHLOROETHENE	79-01-6	µg/L	0.5	9.0	
56	TRICHLOROFLUOROMETHANE	75-69-4	µg/L	0.5	<0.5	U
57	1,2,3-TRICHLOROPROPANE	96-18-4	µg/L	0.5	<0.5	U
58	112TRICHLORO-122TRIFLUOROETHANE	76-13-1	µg/L	0.5	<0.5	U
59	1,2,4-TRIMETHYLBENZENE	95-63-6	µg/L	0.5	<0.5	U
60	1,3,5-TRIMETHYLBENZENE	108-67-8	µg/L	0.5	<0.5	U
61	VINYL CHLORIDE	75-01-4	µg/L	0.5	<0.5	U
62	O-XYLENE	95-47-6	µg/L	0.5	<0.5	U
63	M/P-XYLENE	108-38-3	µg/L	0.5	<0.5	U

Surrogates			Control Limit, %	Surro. Rec.%
1	1-BROMO-4-FLUOROBENZENE (4-BROMOFL	460-00-4	70-129	109
2	1,2-DICHLOROETHANE-D4	17060-07-0	70-129	113
3	DIBROMOFLUOROMETHANE	1868-53-7	70-122	111
4	TOLUENE-D8	2037-26-5	73-129	103
# of out-of-control				0

Internal Standard			Control Limit, %	IS Rec.%
1	CHLOROBENZENE-D5	3114-55-4	50-200	105
2	1,4-DICHLOROBENZENE-D4	3855-82-1	50-200	105
3	FLUOROBENZENE	462-06-6	50-200	100
# of out-of-control				0

Not Detected is shown as PQL, with dilution and moisture corrected if applicable.

Qualifier: U - Not Detected or less than MDL
J - Less than RL (PQL, EQL or CRDL), but greater than MDL, or an estimated result (e.g. for TIC)
E - Exceed calibration range
B - A positive value was found in the method blank
D - Diluted

Applied P & Ch Laboratory

Organic Analysis Results for Method 524.2

Client Name:	GEOFON, Inc.	Project No:	04-4428.10	Collection Date:	11/07/2003
Project ID:	JPL	Service ID:	36034	Collected by:	JR
		Lab Sample ID:	03-6034-4	Received Date:	11/07/2003
Sample ID:	**MW-15**	Sample Matrix	Water	Moisture %:	–
Sample Type:	Field Sample	Prep. Method:	5030	Instrument ID:	GC/MS: A
Anal. Method:	524.2	Prep. Date:	11/12/03	Anal. Date:	11/12/03
Batch No:	03G4771	Prep. No:	–	Anal. Time:	06:10
Data File Name:	6034-04	Sample Amount:	25.0 mL	Dilution Factor:	1
Methanol Vol.	–				
Test Level:	Low	Sparge Size:	25 mL	Heated Purge: (Y/N)	N

#	Component Name	CAS No	Unit	RL	Result	Qualifier
1	BENZENE	71-43-2	µg/L	0.5	<0.5	U
2	BROMOBENZENE	108-86-1	µg/L	0.5	<0.5	U
3	BROMOCHLOROMETHANE	74-97-5	µg/L	0.5	<0.5	U
4	BROMODICHLOROMETHANE	75-27-4	µg/L	0.5	<0.5	U
5	BROMOFORM	75-25-2	µg/L	0.5	<0.5	U
6	BROMOMETHANE	74-83-9	µg/L	0.5	<0.5	U UJ
7	N-BUTYLBENZENE	104-51-8	µg/L	0.5	<0.5	U
8	SEC-BUTYLBENZENE	135-98-8	µg/L	0.5	<0.5	U
9	TERT-BUTYLBENZENE	98-06-6	µg/L	0.5	<0.5	U
10	2-BUTANONE	78-93-3	µg/L	10	<10	U
11	CARBON TETRACHLORIDE	56-23-5	µg/L	0.5	<0.5	U
12	CHLOROBENZENE	108-90-7	µg/L	0.5	<0.5	U
13	CHLORODIBROMOMETHANE	124-48-1	µg/L	0.5	<0.5	U
14	CHLOROETHANE	75-00-3	µg/L	0.5	<0.5	U
15	CHLOROFORM	67-66-3	µg/L	0.5	<0.5	U
16	CHLOROMETHANE	74-87-3	µg/L	0.5	<0.5	U UJ
17	2-CHLOROTOLUENE	95-49-8	µg/L	0.5	<0.5	U
18	4-CHLOROTOLUENE	106-43-4	µg/L	0.5	<0.5	U
19	1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	µg/L	0.5	<0.5	U
20	1,2-DIBROMOETHANE (EDB)	106-93-4	µg/L	0.5	<0.5	U
21	DIBROMOMETHANE	74-95-3	µg/L	0.5	<0.5	U
22	1,2-DICHLOROBENZENE	95-50-1	µg/L	0.5	<0.5	U
23	1,3-DICHLOROBENZENE	541-73-1	µg/L	0.5	<0.5	U
24	1,4-DICHLOROBENZENE	106-46-7	µg/L	0.5	<0.5	U
25	DICHLORODIFLUOROMETHANE	75-71-8	µg/L	0.5	<0.5	U
26	1,1-DICHLOROETHANE	75-34-3	µg/L	0.5	<0.5	U
27	1,2-DICHLOROETHANE	107-06-2	µg/L	0.5	<0.5	U
28	1,1-DICHLOROETHENE	75-35-4	µg/L	0.5	<0.5	U
29	CIS-1,2-DICHLOROETHENE	156-59-2	µg/L	0.5	<0.5	U
30	TRANS-1,2-DICHLOROETHENE	156-60-5	µg/L	0.5	<0.5	U
31	1,2-DICHLOROPROPANE	78-87-5	µg/L	0.5	<0.5	U
32	1,3-DICHLOROPROPANE	142-28-9	µg/L	0.5	<0.5	U
33	2,2-DICHLOROPROPANE	594-20-7	µg/L	0.5	<0.5	U
34	1,1-DICHLOROPROPENE	563-58-6	µg/L	0.5	<0.5	U
35	CIS-1,3-DICHLOROPROPENE	10061-01-5	µg/L	0.5	<0.5	U
36	TRANS-1,3-DICHLOROPROPENE	10061-02-6	µg/L	0.5	<0.5	U
37	ETHYLBENZENE	100-41-4	µg/L	0.5	<0.5	U
38	HEXACHLOROBUTADIENE	87-68-3	µg/L	0.5	<0.5	U
39	ISOPROPYLBENZENE (CUMENE)	98-82-8	µg/L	0.5	<0.5	U

#	Component Name	CAS No	Unit	RL	Result	Qualifier
40	P-ISOPROPYLTOLUENE	99-87-6	µg/L	0.5	<0.5	U
41	METHYLENE CHLORIDE	75-09-2	µg/L	0.5	<0.5	U
42	METHYL-T-BUTYL ETHER (MTBE)	1634-04-4	µg/L	1	<1	U
43	4-METHYL-2-PENTANONE (MIBK)	108-10-1	µg/L	10	<10	U
44	NAPHTHALENE	91-20-3	µg/L	0.5	<0.5	U
45	N-PROPYLBENZENE	103-65-1	µg/L	0.5	<0.5	U
46	STYRENE	100-42-5	µg/L	0.5	<0.5	U
47	1,1,1,2-TETRACHLOROETHANE	630-20-6	µg/L	0.5	<0.5	U
48	1,1,2,2-TETRACHLOROETHANE	79-34-5	µg/L	0.5	<0.5	U
49	TETRACHLOROETHENE	127-18-4	µg/L	0.5	<0.5	U
50	TOLUENE	108-88-3	µg/L	0.5	<0.5	U
51	1,2,3-TRICHLOROBENZENE	87-61-6	µg/L	0.5	<0.5	U
52	1,2,4-TRICHLOROBENZENE	120-82-1	µg/L	0.5	<0.5	U
53	1,1,1-TRICHLOROETHANE	71-55-6	µg/L	0.5	<0.5	U
54	1,1,2-TRICHLOROETHANE	79-00-5	µg/L	0.5	<0.5	U
55	TRICHLOROETHENE	79-01-6	µg/L	0.5	<0.5	U
56	TRICHLOROFLUOROMETHANE	75-69-4	µg/L	0.5	<0.5	U
57	1,2,3-TRICHLOROPROPANE	96-18-4	µg/L	0.5	<0.5	U
58	112TRICHLORO-122TRIFLUOROETHANE	76-13-1	µg/L	0.5	<0.5	U
59	1,2,4-TRIMETHYLBENZENE	95-63-6	µg/L	0.5	<0.5	U
60	1,3,5-TRIMETHYLBENZENE	108-67-8	µg/L	0.5	<0.5	U
61	VINYL CHLORIDE	75-01-4	µg/L	0.5	<0.5	U
62	O-XYLENE	95-47-6	µg/L	0.5	<0.5	U
63	M/P-XYLENE	108-38-3	µg/L	0.5	<0.5	U

Surrogates			Control Limit, %	Surro. Rec.%
1	1-BROMO-4-FLUOROBENZENE (4-BROMOFL	460-00-4	70-129	106
2	1,2-DICHLOROETHANE-D4	17060-07-0	70-129	114
3	DIBROMOFLUOROMETHANE	1868-53-7	70-122	113
4	TOLUENE-D8	2037-26-5	73-129	103
# of out-of-control				0

Internal Standard			Control Limit, %	IS Rec.%
1	CHLOROBENZENE-D5	3114-55-4	50-200	102
2	1,4-DICHLOROBENZENE-D4	3855-82-1	50-200	102
3	FLUOROBENZENE	462-06-6	50-200	98
# of out-of-control				0

Not Detected is shown as PQL, with dilution and moisture corrected if applicable.

Qualifier: U - Not Detected or less than MDL
J - Less than RL (PQL, EQL or CRDL), but greater than MDL, or an estimated result (e.g. for TIC)
E - Exceed calibration range
B - A positive value was found in the method blank
D - Diluted

Applied P & Ch Laboratory

Organic Analysis Results for Method 524.2

Client Name:	GEOFON, Inc.	Project No:	04-4428.10	Collection Date:	11/07/2003
Project ID:	JPL	Service ID:	36034	Collected by:	JR
		Lab Sample ID:	03-6034-5	Received Date:	11/07/2003
Sample ID:	**TB-12-11-7-03**	Sample Matrix	Water	Moisture %:	–
Sample Type:	Field Sample	Prep. Method:	5030	Instrument ID:	GC/MS: A
Anal. Method:	524.2	Prep. Date:	11/12/03	Anal. Date:	11/12/03
Batch No:	03G4771	Prep. No:	–	Anal. Time:	02:41
Data File Name:	6034-05	Sample Amount:	25.0 mL	Dilution Factor:	1
Methanol Vol.	–				
Test Level:	Low	Sparge Size:	25 mL	Heated Purge: (Y/N) N	

#	Component Name	CAS No	Unit	RL	Result	Qualifier
1	BENZENE	71-43-2	µg/L	0.5	<0.5	U
2	BROMOBENZENE	108-86-1	µg/L	0.5	<0.5	U
3	BROMOCHLOROMETHANE	74-97-5	µg/L	0.5	<0.5	U
4	BROMODICHLOROMETHANE	75-27-4	µg/L	0.5	<0.5	U
5	BROMOFORM	75-25-2	µg/L	0.5	<0.5	U
6	BROMOMETHANE	74-83-9	µg/L	0.5	<0.5	U UJ
7	N-BUTYLBENZENE	104-51-8	µg/L	0.5	<0.5	U
8	SEC-BUTYLBENZENE	135-98-8	µg/L	0.5	<0.5	U
9	TERT-BUTYLBENZENE	98-06-6	µg/L	0.5	<0.5	U
10	2-BUTANONE	78-93-3	µg/L	10	<10	U
11	CARBON TETRACHLORIDE	56-23-5	µg/L	0.5	<0.5	U
12	CHLOROBENZENE	108-90-7	µg/L	0.5	<0.5	U
13	CHLORODIBROMOMETHANE	124-48-1	µg/L	0.5	<0.5	U
14	CHLOROETHANE	75-00-3	µg/L	0.5	<0.5	U
15	CHLOROFORM	67-66-3	µg/L	0.5	<0.5	U
16	CHLOROMETHANE	74-87-3	µg/L	0.5	<0.5	U UJ
17	2-CHLOROTOLUENE	95-49-8	µg/L	0.5	<0.5	U
18	4-CHLOROTOLUENE	106-43-4	µg/L	0.5	<0.5	U
19	1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	µg/L	0.5	<0.5	U
20	1,2-DIBROMOETHANE (EDB)	106-93-4	µg/L	0.5	<0.5	U
21	DIBROMOMETHANE	74-95-3	µg/L	0.5	<0.5	U
22	1,2-DICHLOROBENZENE	95-50-1	µg/L	0.5	<0.5	U
23	1,3-DICHLOROBENZENE	541-73-1	µg/L	0.5	<0.5	U
24	1,4-DICHLOROBENZENE	106-46-7	µg/L	0.5	<0.5	U
25	DICHLORODIFLUOROMETHANE	75-71-8	µg/L	0.5	<0.5	U
26	1,1-DICHLOROETHANE	75-34-3	µg/L	0.5	<0.5	U
27	1,2-DICHLOROETHANE	107-06-2	µg/L	0.5	<0.5	U
28	1,1-DICHLOROETHENE	75-35-4	µg/L	0.5	<0.5	U
29	CIS-1,2-DICHLOROETHENE	156-59-2	µg/L	0.5	<0.5	U
30	TRANS-1,2-DICHLOROETHENE	156-60-5	µg/L	0.5	<0.5	U
31	1,2-DICHLOROPROPANE	78-87-5	µg/L	0.5	<0.5	U
32	1,3-DICHLOROPROPANE	142-28-9	µg/L	0.5	<0.5	U
33	2,2-DICHLOROPROPANE	594-20-7	µg/L	0.5	<0.5	U
34	1,1-DICHLOROPROPENE	563-58-6	µg/L	0.5	<0.5	U
35	CIS-1,3-DICHLOROPROPENE	10061-01-5	µg/L	0.5	<0.5	U
36	TRANS-1,3-DICHLOROPROPENE	10061-02-6	µg/L	0.5	<0.5	U
37	ETHYLBENZENE	100-41-4	µg/L	0.5	<0.5	U
38	HEXACHLOROBUTADIENE	87-68-3	µg/L	0.5	<0.5	U
39	ISOPROPYLBENZENE (CUMENE)	98-82-8	µg/L	0.5	<0.5	U

#	Component Name	CAS No	Unit	RL	Result	Qualifier
40	P-ISOPROPYLTOLUENE	99-87-6	μg/L	0.5	<0.5	U
41	METHYLENE CHLORIDE	75-09-2	μg/L	0.5	<0.5	U
42	METHYL-T-BUTYL ETHER (MTBE)	1634-04-4	μg/L	1	<1	U
43	4-METHYL-2-PENTANONE (MIBK)	108-10-1	μg/L	10	<10	U
44	NAPHTHALENE	91-20-3	μg/L	0.5	<0.5	U
45	N-PROPYLBENZENE	103-65-1	μg/L	0.5	<0.5	U
46	STYRENE	100-42-5	μg/L	0.5	<0.5	U
47	1,1,1,2-TETRACHLOROETHANE	630-20-6	μg/L	0.5	<0.5	U
48	1,1,2,2-TETRACHLOROETHANE	79-34-5	μg/L	0.5	<0.5	U
49	TETRACHLOROETHENE	127-18-4	μg/L	0.5	<0.5	U
50	TOLUENE	108-88-3	μg/L	0.5	<0.5	U
51	1,2,3-TRICHLOROBENZENE	87-61-6	μg/L	0.5	<0.5	U
52	1,2,4-TRICHLOROBENZENE	120-82-1	μg/L	0.5	<0.5	U
53	1,1,1-TRICHLOROETHANE	71-55-6	μg/L	0.5	<0.5	U
54	1,1,2-TRICHLOROETHANE	79-00-5	μg/L	0.5	<0.5	U
55	TRICHLOROETHENE	79-01-6	μg/L	0.5	<0.5	U
56	TRICHLOROFLUOROMETHANE	75-69-4	μg/L	0.5	<0.5	U
57	1,2,3-TRICHLOROPROPANE	96-18-4	μg/L	0.5	<0.5	U
58	112TRICHLORO-122TRIFLUOROETHANE	76-13-1	μg/L	0.5	<0.5	U
59	1,2,4-TRIMETHYLBENZENE	95-63-6	μg/L	0.5	<0.5	U
60	1,3,5-TRIMETHYLBENZENE	108-67-8	μg/L	0.5	<0.5	U
61	VINYL CHLORIDE	75-01-4	μg/L	0.5	<0.5	U
62	O-XYLENE	95-47-6	μg/L	0.5	<0.5	U
63	M/P-XYLENE	108-38-3	μg/L	0.5	<0.5	U

Surrogates			Control Limit, %	Surro. Rec.%
1	1-BROMO-4-FLUOROBENZENE (4-BROMOFL	460-00-4	70-129	106
2	1,2-DICHLOROETHANE-D4	17060-07-0	70-129	114
3	DIBROMOFLUOROMETHANE	1868-53-7	70-122	112
4	TOLUENE-D8	2037-26-5	73-129	102
# of out-of-control				0

Internal Standard			Control Limit, %	IS Rec.%
1	CHLOROBENZENE-D5	3114-55-4	50-200	103
2	1,4-DICHLOROBENZENE-D4	3855-82-1	50-200	104
3	FLUOROBENZENE	462-06-6	50-200	99
# of out-of-control				0

Not Detected is shown as PQL, with dilution and moisture corrected if applicable.

Qualifier: U - Not Detected or less than MDL
J - Less than RL (PQL, EQL or CRDL), but greater than MDL, or an estimated result (e.g. for TIC)
E - Exceed calibration range
B - A positive value was found in the method blank
D - Diluted

LDC #: 11280D1
SDG #: 03-6034
Laboratory: Applied P & Ch Laboratory

VALIDATION COMPLETENESS WORKSHEET
Level III/IV

Date: 12-22-03
Page: 1 of 1
Reviewer: Z. Pan
2nd Reviewer: [illegible]

METHOD: GC/MS Volatiles (EPA Method 524.2)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 11-7-03
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	%RSD, OR r^2
IV.	Continuing calibration	SW	%D
V.	Blanks	SW	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	A	LCS
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	A	Not reviewed for Level III validation.
XII.	Compound quantitation/CRQLs	A	Not reviewed for Level III validation.
XIII.	Tentitatively identified compounds (TICs)	N	Not reviewed for Level III validation.
XIV.	System performance	A	Not reviewed for Level III validation.
XV.	Overall assessment of data	A	
XVI.	Field duplicates	ND	D = 1, 4
XVII.	Field blanks	ND	TB = 5

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation. All Water

1 D	DUPE-2-4-Q03**	11	03G4771-MB	21		31	
2	MW-6	12		22		32	
3	MW-13	13		23		33	
4 D	MW-15	14		24		34	
5	TB-12-11-7-03	15		25		35	
6	MW-13MS	16		26		36	
7	MW-13MSD	17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

LDC #: 11280D1
SDG #: 03-6034

VALIDATION FINDINGS CHECKLIST

Reviewer: Z. Pan
2nd Reviewer: [illegible]

Method: Volatiles (EPA Method 524.2)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. GC/MS Instrument performance check				
Were the BFB performance results reviewed and found to be within the specified criteria?	✓			
Were all samples analyzed within the 12 hour clock criteria?	✓			
III. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) ≤ 20%?		✓		
IV. Continuing calibration				
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?	✓			
Were all percent differences (%D) ≤ 30%?		✓		
V. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank analyzed at least once every 12 hours for each matrix and concentration?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.	✓			
VI. Surrogate spikes				
Were all surrogate %R within QC limits?	✓			
If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R outside of criteria?			✓	
VII. Matrix spike/Matrix spike duplicates				
Was a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for this SDG?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	✓			
VIII. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per analytical batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			

LDC #: 11280D1
SDG #: 03-6034

VALIDATION FINDINGS CHECKLIST

Reviewer: Z. Pan
2nd Reviewer: [illegible]

Validation Area	Yes	No	NA	Findings/Comments
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?			✓	
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
X. Internal standards				
Were internal standard area counts within +/-40% from the associated calibration standard?	✓			
Were retention times within - 30% of the last continuing calibration or +/- 50% of the initial calibration?	✓			
XI. Target compound identification				
Were relative retention times (RRT's) within ± 0.06 RRT units of the standard?			✓	
Did compound spectra meet specified EPA "Functional Guidelines" criteria?			✓	
Were chromatogram peaks verified and accounted for?			✓	
XII. Compound quantitation/CRQLs				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?	✓			
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Tentatively identified compounds (TICs)				
Were the major ions (> 25 percent relative intensity) in the reference spectrum evaluated in sample spectrum?			✓	
Were relative intensities of the major ions within ± 20% between the sample and the reference spectra?			✓	
Did the raw data indicate that the laboratory performed a library search for all required peaks in the chromatograms (samples and blanks)?			✓	
XIV. System performance				
System performance was found to be acceptable.	✓			
XV. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XVI. Field duplicates				
Field duplicate pairs were identified in this SDG.	✓			
Target compounds were detected in the field duplicates.		✓		
XVII. Field blanks				
Field blanks were identified in this SDG.	✓			
Target compounds were detected in the field blanks.		✓		

TARGET COMPOUND WORKSHEET

METHOD: VOA (EPA Method 524.2)

A. Chloromethane	Q. 1,2-Dichloropropane	GG. Xylenes, total	WW. Bromobenzene	MMM. Naphthalene
B. Bromomethane	R. cis-1,3-Dichloropropene	HH. Vinyl acetate	XX. 1,2,3-Trichloropropane	NNN. 1,2,3-Trichlorobenzene
C. Vinyl choride	S. Trichloroethene	II. 2-Chloroethylvinyl ether	YY. n-Propylbenzene	OOO. 1,3,5-Trichlorobenzene
D. Chloroethane	T. Dibromochloromethane	JJ. Dichlorodifluoromethane	ZZ. 2-Chlorotoluene	PPP. trans-1,2-Dichloroethene
E. Methylene chloride	U. 1,1,2-Trichloroethane	KK. Trichlorofluoromethane	AAA. 1,3,5-Trimethylbenzene	QQQ. cis-1,2-Dichloroethene
F. Acetone	V. Benzene	LL. Methyl-tert-butyl ether	BBB. 4-Chlorotoluene	RRR. m,p-Xylenes
G. Carbon disulfide	W. trans-1,3-Dichloropropene	MM. 1,2-Dibromo-3-chloropropane	CCC. tert-Butylbenzene	SSS. o-Xylene
H. 1,1-Dichloroethene	X. Bromoform	NN. Diethyl ether	DDD. 1,2,4-Trimethylbenzene	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane
I. 1,1-Dichloroethane	Y. 4-Methyl-2-pentanone	OO. 2,2-Dichloropropane	EEE. sec-Butylbenzene	UUU. Benzyl chloride
J. 1,2-Dichloroethene, total	Z. 2-Hexanone	PP. Bromochloromethane	FFF. 1,3-Dichlorobenzene	VVV. 4-Ethyltoluene
K. Chloroform	AA. Tetrachloroethene	QQ. 1,1-Dichloropropene	GGG. p-Isopropyltoluene	WWW. Ethanol
L. 1,2-Dichloroethane	BB. 1,1,2,2-Tetrachloroethane	RR. Dibromomethane	HHH. 1,4-Dichlorobenzene	XXX. Ethyl ether
M. 2-Butanone	CC. Toluene	SS. 1,3-Dichloropropane	III. n-Butylbenzene	
N. 1,1,1-Trichloroethane	DD. Chlorobenzene	TT. 1,2-Dibromoethane	JJJ. 1,2-Dichlorobenzene	
O. Carbon tetrachloride	EE. Ethylbenzene	UU. 1,1,1,2-Tetrachloroethane	KKK. 1,2,4-Trichlorobenzene	
P. Bromodichloromethane	FF. Styrene	VV. Isopropylbenzene	LLL. Hexachlorobutadiene	

Notes: _____

LDC #: 11280D1
SDG #: 03-6034

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Page: 1 of 1
Reviewer: Z. Pan
2nd Reviewer: [illegible]

METHOD: GC/MS VOA (EPA Method 524.2)
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
Y N N/A Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?
Y N N/A Were all percent differences (%D) ≤ 30% ?

#	Date	Standard ID	Compound	Finding %D (Limit: ≤30.0%)	Associated Samples	Qualifications
1	11-11-2003 (8:21 PM)	G4771Q01	A	39.69	All + BLK	J/UJ/~~A~~P
			B	37.19	↓	↓

CONCAL1S5

LDC #: 11280D1
SDG #: 03-6034

VALIDATION FINDINGS WORKSHEET
Blanks

Page: 1 of 1
Reviewer: Z. Pan
2nd Reviewer: [illegible]

METHOD: GC/MS VOA (EPA Method 524.2)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a method blank associated with every sample in this SDG?
Y N N/A Was a method blank analyzed at least once every 12 hours for each matrix and concentration?
Y N N/A Was there contamination in the method blanks? If yes, please see the qualifications below.

Blank analysis date: 11-12-03
Conc. units: ug/L
Associated Samples: All (ND)

Compound	Blank ID	Sample Identification								
	03G4771-MB									
Methylene chloride	0.4									
Acetone										
CRQL										

Blank analysis date:
Conc. units:
Associated Samples:

Compound	Blank ID	Sample Identification								
Methylene chloride										
Acetone										
CRQL										

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:

Note: Common contaminants such as Methylene chloride, Acetone, 2-Butanone, Carbon disulfide and TICs that were detected in samples within ten times the associated method blank concentration were qualified as not detected, "U". Other contaminants within five times the method blank concentration were also qualified as not detected, "U".

LDC # 11280D1
SDG# 03-6034

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: Z. Pan
2nd Reviewer: [illegible]

METHOD: GC / MS

Parameter:

Order of regression: 1.00

Date	IS Fluorobenzene	Methylene chloride	Y Area / (Area IS)	Methylene chloride Conc. (ppb)	X C / (C IS)
10/21/2003	920067	10278	0.0112	0.3	0.03
	916201	48191	0.0526	2	0.2
	919392	203033	0.2208	10	1
	955116	407143	0.4263	20	2
	907151	804880	0.8873	40	4
	1006211	1192483	1.1851	60	6

Regression Output: Regression Output:		Reported	
Constant	0.02025	c =	0.02025
Std Err of Y Est	0.04		
R Squared	0.9947	r^2 =	0.9947
No. of Observations	6.00		
Degrees of Freedom	4.00		
		b(X)	a(X^2)
X Coefficient(s)	0.20119	0.20119	0.00000
Std Err of Coef.	0.01		

LDC #: 11280D1
SDG #: 03-6034

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Page: 1 of 1
Reviewer: Z. Pan
2nd Reviewer: [illegible]

METHOD: GC/MS VOA (EPA Method 524.2)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

$RRF = (A_x)(C_{is})/(A_{is})(C_x)$
average RRF = sum of the RRFs/number of standards
%RSD = 100 * (S/X)

A_x = Area of compound,
C_x = Concentration of compound,
S = Standard deviation of the RRFs
X = Mean of the RRFs

A_{is} = Area of associated internal standard
C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Reported RRF (10 std)	Recalculated RRF (10 std)	Reported Average RRF (initial)	Recalculated Average RRF (initial)	Reported %RSD	Recalculated %RSD
1	E524A003	10-21-03	Methylene chloride (1st Internal Standard)	0.221	0.221	See	Next page		
			~~Trichlorethene~~ Toluene (2nd internal standard)	1.322	1.322	1.354	1.354	5.13	5.12
			~~Bromoform~~ Ethylbenzene (3rd internal standard)	2.614	2.614	2.542	2.542	4.04	4.04
2			Methylene chloride (1st Internal Standard)						
			Trichlorethene (2nd internal standard)						
			Bromoform (3rd internal standard)						
3			Methylene chloride (1st Internal Standard)						
			Trichlorethene (2nd internal standard)						
			Bromoform (3rd internal standard)						
4			Methylene chloride (1st Internal Standard)						
			Trichlorethene (2nd internal standard)						
			Bromoform (3rd internal standard)						

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 11280D1
SDG #: 03-6034

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Page: 1 of 1
Reviewer: Z. Pan
2nd Reviewer: A

METHOD: GC/MS VOA (EPA Method 524.2)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
RRF = $(A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
A_x = Area of compound,
C_x = Concentration of compound,
A_{is} = Area of associated internal standard
C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference internal Standard)	Average RRF (Initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	G477/Q01	11-11-03 (9:21 PM)	Methylene chloride (1st Internal Standard)	20 *	17.58	17.58	12.09	12.1
			~~Trichlorethene~~ Toluene (2nd internal standard)	1.354	1.209	1.209	10.7	10.7
			~~Bromoform~~ Ethylbenzene (3rd internal standard)	2.542	2.456	2.456	3.4	3.4
2			Methylene chloride (1st Internal Standard)					
			Trichlorethene (2nd internal standard)					
			Bromoform (3rd internal standard)					
3			Methylene chloride (1st Internal Standard)					
			Trichlorethene (2nd internal standard)					
			Bromoform (3rd internal standard)					
4			Methylene chloride (1st Internal Standard)					
			Trichlorethene (2nd internal standard)					
			Bromoform (3rd internal standard)					

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

* Conc.

CONCLC.1S5

LDC #: 11280 D1
SDG #: 03-6034

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Page: 1 of 1
Reviewer: Z. Pan
2nd reviewer: [illegible]

METHOD: GC/MS VOA (EPA Method 524.2)

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: #1

	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
			Reported	Recalculated	
Toluene-d8	20	20.55	103	103	0
Bromofluorobenzene		21.36	107	107	
1,2-Dichlorobenzene-d4 (ethane)		22.93	115	115	
Dibromofluoromethane		~~25.57~~ 22.57	113	113	

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
			Reported	Recalculated	
Toluene-d8					
Bromofluorobenzene					
1,2-Dichlorobenzene-d4					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
			Reported	Recalculated	
Toluene-d8					
Bromofluorobenzene					
1,2-Dichlorobenzene-d4					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
			Reported	Recalculated	
Toluene-d8					
Bromofluorobenzene					
1,2-Dichlorobenzene-d4					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
			Reported	Recalculated	
Toluene-d8					
Bromofluorobenzene					
1,2-Dichlorobenzene-d4					

LDC #: 11280D1
SDG #: 03-6034

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Reviewer: Z. Pan
2nd Reviewer: [illegible]

METHOD: GC/MS VOA (EPA Method 524.2)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SSC - SC)/SA Where: SSC = Spiked sample concentration; SA = Spike added; SC = Sample concentration

RPD = I MSC - MSDC I * 2/(MSC + MSDC) MSC = Matrix spike percent recovery MSDC = Matrix spike duplicate percent recovery

MS/MSD sample: #6/7

Compound	Spike Added (ug/L)		Sample Concentration (ug/L)	Spiked Sample Concentration (ug/L)		Matrix Spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	----	MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
1,1-Dichloroethene	20	20	0	20.5	20.9	103	103	105	105	2	2
Trichloroethene	↓	↓	9.0	27.1	28.0	91	91	95	95	4	4
Benzene	↓	↓	0	17.0	17.8	85	85	89	89	5	5
Toluene	↓	↓	↓	16.9	17.6	85	85	88	88	3	3
Chlorobenzene	↓	↓	↓	18.2	18.7	91	91	94	94	3	3

Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 11280 D1
SDG #: 03-6034

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample Results Verification

Reviewer: Z. Pan
2nd Reviewer: [illegible]

METHOD: GC/MS VOA (EPA Method 524.2)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratoy control sample and laboratory control sample duplicate (if applicable) were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * SSC/SA Where: SSC = Spiked sample concentration
SA = Spike added

RPD = I LCS - LCSD I * 2/(LCS + LCSD) LCS = Laboratory control sample percent recovery LCSD = Laboratory control sample duplicate percent recovery

LCS ID: G477120

Compound	Spike Added (ug/L)		Spiked Sample Concentration (ug/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
1,1-Dichloroethene	20		20.4		102	102				
Trichloroethene			18.5		93	93				
Benzene			17.0		85	85				
Toluene			17.2		86	86				
Chlorobenzene			18.5		93	93				

Comments: Refer to Laboratory Control Sample findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 11290D1
SDG #: 03-6034

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: Z. Pan
2nd reviewer: F

METHOD: GC/MS VOA (EPA Method 524.2)

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentration = $\frac{(A_x)(I_s)(DF)}{(A_{is})(RRF)(V_o)(\%S)}$

A_x = Area of the characteristic ion (EICP) for the compound to be measured

A_{is} = Area of the characteristic ion (EICP) for the specific internal standard

I_s = Amount of internal standard added in nanograms (ng)

RRF = Relative response factor of the calibration standard.

V_o = Volume or weight of sample pruged in milliliters (ml) or grams (g).

Df = Dilution factor.

%S = Percent solids, applicable to soils and solid matrices only.

Example:

Sample I.D. #1 ND, _____:

Conc. = ( ) ( ) ( ) / ( ) ( ) ( ) ( )

=

#	Sample ID	Compound	Reported Concentration ( )	Calculated Concentration ( )	Qualification