Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NASA JPL

Collection Date: April 28, 2003

LDC Report Date: June 13, 2003

Matrix: Water

Parameters: N-Nitrosodimethylamine

Validation Level: EPA Level III

Laboratory: Maxxam Analytics, Inc.

Sample Delivery Group (SDG): 03-2937

Sample Identification

MW-17-4

Introduction

This data review covers one water sample listed on the cover sheet including dilutions and reanalysis, as applicable. The analyses were per SOP TO.1021.08 for N-Nitrosodimethylamine.

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 XIV.

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 the required daily frequency.

III. Initial Calibration

A five point initial calibration was performed as required by the method.

Percent relative standard deviations (%RSD) were less than or equal to 25.0% for all compounds.

IV. Routine Calibration (Continuing)

Routine calibration was performed at the required frequencies.

All of the routine calibration percent differences (%D) between the initial calibration RRF and the routine calibration RRF were less than or equal to 25.0% .

V. Blanks

Method blanks were reviewed for each matrix as applicable. No N-Nitrosodimethylamine contaminants were found in the method blanks.

VI. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

VII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. The percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VIII. Regional Quality Assurance and Quality Control

Not applicable.

IX. Internal Standards

All internal standard recoveries were within QC limits.

X. Target Compound Identifications

Raw data were not reviewed for this SDG.

XI. Compound Quantitation and CRQLs

Raw data were not reviewed for this SDG.

XII. System Performance

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

No field duplicates were identified in this SDG.

XV. Field Blanks

No field blanks were identified in this SDG.

NASA JPL
N-Nitrosodimethylamine - Data Qualification Summary - SDG 03-2937

No Sample Data Qualified in this SDG

NASA JPL
N-Nitrosodimethylamine - Laboratory Blank Data Qualification Summary - SDG 03-2937

No Sample Data Qualified in this SDG

1041411

MW-17-4

Lab Name	Maxxam Analytics Inc.				
Matrix (soil/water):	water			Lab Sample ID:	A315096-A01352
				Project Name:	JPL
Sample wt/vol:	1000	(g/mL)	mL	Lab File ID:	KR23490012
Level (low/med)	low			Date Received:	May 2, 2003
% Moisture	Not applicable	Decanted (Y/N):	N	Date Extracted:	May 5, 2003
				Lab Batch:	472719
Concentrated Extract Volume	1000	(uL)		Date Analyzed:	May 14, 2003
				Calib. Ref.:	20030513
Injection Volume	2	(uL)		Time Analyzed:	11:55:48
				Dilution Factor:	1
Acid Wash Cleanup (Y/N):	N	pH	Not analyzed		

CAS No.	Compound	Conc. (ug/L)	Qualifier	EDL (ug/L)	RL (ug/L)
62-75-9	NDMA	0.00200	U	0.000370	0.00200
	Surrogate	Recovery (%)	Acceptance Criteria (%)		
000	D6-NDMA	25	10-85		

6/19/03

LDC #: 10414H87 **VALIDATION COMPLETENESS WORKSHEET** Date: 6/11/03
SDG #: 03-2937 Level III Page: 1 of 1
Laboratory: Maxxam Analytics, Inc. Reviewer: +
2nd Reviewer:

METHOD: HRGC/HRMS NDMA (~~Method~~ SOP #TO.102 .08)

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: 1/28/03
II.	HRGC/HRMS Instrument performance check	A	
III.	Initial calibration	A	%RSD ≤ 25 %
IV.	Routine calibration	A	%D ≤ 25 %
V.	Blanks	A	
VI.	Matrix spike/Matrix spike duplicates	N	client specified
VII.	Laboratory control samples	A	LCS/D
VIII.	Regional quality assurance and quality control	N	
IX.	Internal standards	A	
X.	Target compound identifications	N	
XI.	Compound quantitation and CRQLs	N	
XII.	System performance	N	
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	N	
XV.	Field blanks	N	

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:

1	MW-17-4 W	11		21		31	
2	KT-3T19MB	12		22		32	
3		13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NASA JPL

Collection Date: April 29, 2003

LDC Report Date: June 13, 2003

Matrix: Water

Parameters: N-Nitrosodimethylamine

Validation Level: EPA Level III

Laboratory: Maxxam Analytics, Inc.

Sample Delivery Group (SDG): 03-2966

Sample Identification

MW-24-1

Introduction

This data review covers one water sample listed on the cover sheet including dilutions and reanalysis, as applicable. The analyses were per SOP TO.1021.08 for N-Nitrosodimethylamine.

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 XIV.

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 the required daily frequency.

III. Initial Calibration

A five point initial calibration was performed as required by the method.

Percent relative standard deviations (%RSD) were less than or equal to 25.0% for all compounds.

IV. Routine Calibration (Continuing)

Routine calibration was performed at the required frequencies.

All of the routine calibration percent differences (%D) between the initial calibration RRF and the routine calibration RRF were less than or equal to 25.0% .

V. Blanks

Method blanks were reviewed for each matrix as applicable. No N-Nitrosodimethylamine contaminants were found in the method blanks.

VI. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

VII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. The percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VIII. Regional Quality Assurance and Quality Control

Not applicable.

IX. Internal Standards

All internal standard recoveries were within QC limits.

X. Target Compound Identifications

Raw data were not reviewed for this SDG.

XI. Compound Quantitation and CRQLs

Raw data were not reviewed for this SDG.

XII. System Performance

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

No field duplicates were identified in this SDG.

XV. Field Blanks

No field blanks were identified in this SDG.

NASA JPL
N-Nitrosodimethylamine - Data Qualification Summary - SDG 03-2966

No Sample Data Qualified in this SDG

NASA JPL
N-Nitrosodimethylamine - Laboratory Blank Data Qualification Summary - SDG 03-2966

No Sample Data Qualified in this SDG

10414J.

MW-24-1

Lab Name	Maxxam Analytics Inc.				
Matrix (soil/water):	water			Lab Sample ID:	A315100-A01366
				Project Name:	JPL
Sample wt/vol:	1000	(g/mL)	mL	Lab File ID:	KR23490013
Level (low/med)	low			Date Received:	May 2, 2003
% Moisture	Not applicable	Decanted (Y/N):	N	Date Extracted:	May 5, 2003
				Lab Batch:	472719
Concentrated Extract Volume	1000	(uL)		Date Analyzed:	May 14, 2003
				Calib. Ref.:	20030513
Injection Volume	2	(uL)		Time Analyzed:	12:14:45
				Dilution Factor:	1
Acid Wash Cleanup (Y/N):	N	pH	Not analyzed		

CAS No.	Compound	Conc. (ug/L)	Qualifier	EDL (ug/L)	RL (ug/L)
62-75-9	NDMA	0.00200	U	0.000370	0.00200
	Surrogate	Recovery (%)	Acceptance Criteria (%)		
000	D6-NDMA	27	10-85		

6/19/03

LDC #: 10414J87

SDG #: 03-2966

Laboratory: Maxxam Analytics, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 6/11/03

Page: 1 of 1

Reviewer: T

2nd Reviewer: R

METHOD: HRGC/HRMS NDMA (~~Method~~ SOP # TO.1021.08)

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: 4/29/03
II.	HRGC/HRMS Instrument performance check	A	
III.	Initial calibration	A	%RSD ≤ 30
IV.	Routine calibration	A	%D ≤ 25
V.	Blanks	A	
VI.	Matrix spike/Matrix spike duplicates	N	client spiked
VII.	Laboratory control samples	A	LCS/D
VIII.	Regional quality assurance and quality control	N	
IX.	Internal standards	A	
X.	Target compound identifications	N	
XI.	Compound quantitation and CRQLs	N	
XII.	System performance	N	
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	N	
XV.	Field blanks	N	

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

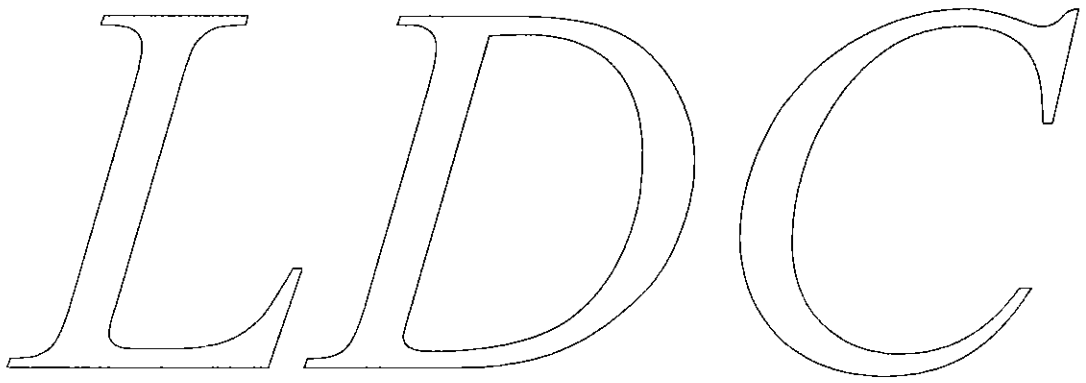
Validated Samples:

1	MW-24-1 W	11		21		31	
2	472T19MB	12		22		32	
3		13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes: _____

NASA JPL
Data Validation Reports
LDC# 10414

Metals



Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NASA JPL

Collection Date: April 17, 2003

LDC Report Date: June 17, 2003

Matrix: Water

Parameters: Metals

Validation Level: EPA Level III

Laboratory: Applied P & Ch Laboratory

Sample Delivery Group (SDG): 03-2767

Sample Identification

EB-1-4/17/03
MW-21-1
MW-21-2
MW-21-3
MW-21-4
MW-21-5

Introduction

This data review covers 6 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Methods 200.7 and 200.9 for Metals. The metals analyzed were Arsenic, Calcium, Iron, Magnesium, Potassium, and Sodium.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (February 1994) as there are no current guidelines for the methods stated above.

A table summarizing all data qualification flags 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 specified protocols or is of technical advisory nature.

Blanks are summarized in Section III.

Field duplicates are summarized in Section XIII.

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. Calibration

An initial calibration was performed.

The frequency and analysis criteria of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met with the following exceptions:

Date	Lab. Reference/ID	Analyte	%R (Limits)	Associated Samples	Flag	A or P
4/23/03	CCV (15:33)	Arsenic	110.2 (90-110)	EB-1-4/17/03 MW-21-1 MW-21-2 MW-21-3 MW-21-4	J (all detects)	P
4/23/03	CCV (16:50)	Arsenic	111.0 (90-110)	MW-21-5	J (all detects)	P

III. Blanks

Method blanks were reviewed for each matrix as applicable.

Data qualification by the initial, continuing and preparation blanks (ICB/CCB/PBs) was based on the maximum contaminant concentration in the ICB/CCB/PBs in the analysis of each analyte. No contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Calcium Magnesium Potassium Sodium	158 ug/L 62.6 ug/L 131 ug/L 403 ug/L	All samples in SDG 03-2767
ICB/CCB	Calcium Iron Magnesium Potassium Sodium	238.28 ug/L 44.45 ug/L 81.45 ug/L 156.73 ug/L 752.30 ug/L	All samples in SDG 03-2767

Sample concentrations were compared to the maximum contaminant concentrations detected in the ICB/CCB/PBs. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated method blanks with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
EB-1-4/17/03	Calcium Iron Magnesium Potassium Sodium	278 ug/L 19.4 ug/L 38.4 ug/L 152 ug/L 720 ug/L	278U ug/L 19.4U ug/L 38.4U ug/L 152U ug/L 720U ug/L
MW-21-1	Iron	150 ug/L	150U ug/L
MW-21-2	Iron	146 ug/L	146U ug/L
MW-21-3	Iron	40.5 ug/L	40.5U ug/L
MW-21-4	Iron	16.1 ug/L	16.1U ug/L
MW-21-5	Iron	210 ug/L	210U ug/L

IV. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

V. Matrix Spike Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VI. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

VII. Laboratory Control Samples (LCS)

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

VIII. Internal Standards (ICP-MS)

ICP-MS was not utilized in this SDG.

IX. Furnace Atomic Absorption QC

Raw data were not reviewed for this SDG.

X. ICP Serial Dilution

ICP serial dilution was not required by the method.

XI. Sample Result Verification

Raw data were not reviewed for this SDG.

XII. Overall Assessment of Data

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

XIII. Field Duplicates

No field duplicates were identified in this SDG.

XIV. Field Blanks

Sample EB-1-4/17/03 was identified as an equipment blank. No metal contaminants were found in this blank with the following exceptions:

Equipment Blank ID	Analyte	Concentration (ug/L)
EB-1-4/17/03	Calcium	278
	Iron	19.4
	Magnesium	38.4
	Potassium	152
	Sodium	720

NASA JPL
Metals - Data Qualification Summary - SDG 03-2767

SDG	Sample	Analyte	Flag	A or P	Reason
03-2767	EB-1-4/17/03 MW-21-1 MW-21-2 MW-21-3 MW-21-4 MW-21-5	Arsenic	J (all detects)	P	Calibration verification (%R)

NASA JPL
Metals - Laboratory Blank Data Qualification Summary - SDG 03-2767

SDG	Sample	Analyte	Modified Final Concentration	A or P
03-2767	EB-1-4/17/03	Calcium Iron Magnesium Potassium Sodium	278U ug/L 19.4U ug/L 38.4U ug/L 152U ug/L 720U ug/L	A
03-2767	MW-21-1	Iron	150U ug/L	A
03-2767	MW-21-2	Iron	146U ug/L	A
03-2767	MW-21-3	Iron	40.5U ug/L	A
03-2767	MW-21-4	Iron	16.1U ug/L	A
03-2767	MW-21-5	Iron	210U ug/L	A

Applied P & Ch Laboratory

Metal Analysis Results

Client Name:	GEOFON, Inc.	Project No:	04-4428.10	Collection Date:	04/17/2003
Project ID:	JPL	Service ID:	32767	Collected by:	
		Lab Sample ID:	03-2767-1	Received Date:	04/17/2003
Sample ID:	**EB-1-4/17/03**	Sample Matrix	Water	Moisture %:	–
Sample Type:	Field Sample				

Element Name	CAS No	Unit	RL	Result	C	M	Q	Batch	D-Date	A-Date	DF	Method
ARSENIC	7440-38-2	µg/L	5	< 5	U	F		03M1360E	04/23/03	04/23/03	1	200.9
CALCIUM	7440-70-2	µg/L	200	278		P		03M1353M	04/22/03	04/22/03	1	200.7
IRON	7439-89-6	µg/L	50	19.4	B	P		03M1353M	04/22/03	04/22/03	1	200.7
MAGNESIUM	7439-95-4	µg/L	100	38.4	B	P		03M1353M	04/22/03	04/22/03	1	200.7
POTASSIUM	7440-09-7	µg/L	400	152	B	P		03M1353M	04/22/03	04/22/03	1	200.7
SODIUM	7440-23-5	µg/L	2000	720	B	P		03M1353M	04/22/03	04/22/03	1	200.7

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

Note: RL: PQL (EQL) or CRDL D-Date: Digestion Date; A-Date: Analysis Date; DF: Dilution Factor

C Qualifier: U - Not Detected or less than IDL B - Less than RL (PQL, EQL or CRDL), but greater than IDL.

Q Qualifier: N - Spike recovery out of control * - Duplicate analysis out of control

W - Post digestion spike for GFAA out of control E - Serial dilution difference out of control

M Qualifier: P - ICP A - FLAA F - GFAA CV - Cold Vapor

6/18/03

Applied P & Ch Laboratory

Metal Analysis Results

Client Name:	GEOFON, Inc.	Project No:	04-4428.10	Collection Date:	04/17/2003
Project ID:	JPL	Service ID:	32767	Collected by:	
		Lab Sample ID:	03-2767-2	Received Date:	04/17/2003
Sample ID:	**MW-21-1**	Sample Matrix	Water	Moisture %:	–
Sample Type:	Field Sample				

Element Name	CAS No	Unit	RL	Result	C	M	Q	Batch	D-Date	A-Date	DF	Method
ARSENIC	7440-38-2	µg/L	5	< 5	U	F		03M1360E	04/23/03	04/23/03	1	200.9
CALCIUM	7440-70-2	µg/L	200	128000		P		03M1353M	04/22/03	04/22/03	1	200.7
IRON	7439-89-6	µg/L	50	150	U	P		03M1353M	04/22/03	04/22/03	1	200.7
MAGNESIUM	7439-95-4	µg/L	100	40300		P		03M1353M	04/22/03	04/22/03	1	200.7
POTASSIUM	7440-09-7	µg/L	400	2180		P		03M1353M	04/22/03	04/22/03	1	200.7
SODIUM	7440-23-5	µg/L	2000	30800		P		03M1353M	04/22/03	04/22/03	1	200.7

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

Note: RL: PQL (EQL) or CRDL D-Date: Digestion Date; A-Date: Analysis Date; DF: Dilution Factor

C Qualifier: U - Not Detected or less than IDL B - Less than RL (PQL, EQL or CRDL), but greater than IDL.

Q Qualifier: N - Spike recovery out of control * - Duplicate analysis out of control

W - Post digestion spike for GFAA out of control E - Serial dilution difference out of control

M Qualifier: P - ICP A - FLAA F - GFAA CV - Cold Vapor

6/18/03

Applied P & Ch Laboratory

Metal Analysis Results

Client Name:	GEOFON, Inc.	Project No:	04-4428.10	Collection Date:	04/17/2003
Project ID:	JPL	Service ID:	32767	Collected by:	
		Lab Sample ID:	03-2767-3	Received Date:	04/17/2003
Sample ID:	**MW-21-2**	Sample Matrix	Water	Moisture %:	–
Sample Type:	Field Sample				

Element Name	CAS No	Unit	RL	Result	C	M	Q	Batch	D-Date	A-Date	DF	Method
ARSENIC	7440-38-2	µg/L	5	< 5	U	F		03M1360E	04/23/03	04/23/03	1	200.9
CALCIUM	7440-70-2	µg/L	200	122000		P		03M1353M	04/22/03	04/22/03	1	200.7
IRON	7439-89-6	µg/L	50	146	U	P		03M1353M	04/22/03	04/22/03	1	200.7
MAGNESIUM	7439-95-4	µg/L	100	41800		P		03M1353M	04/22/03	04/22/03	1	200.7
POTASSIUM	7440-09-7	µg/L	400	3370		P		03M1353M	04/22/03	04/22/03	1	200.7
SODIUM	7440-23-5	µg/L	2000	67300		P		03M1353M	04/22/03	04/22/03	1	200.7

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

Note: RL: PQL (EQL) or CRDL D-Date: Digestion Date; A-Date: Analysis Date; DF: Dilution Factor

C Qualifier: U - Not Detected or less than IDL B - Less than RL (PQL, EQL or CRDL), but greater than IDL.

Q Qualifier: N - Spike recovery out of control * - Duplicate analysis out of control

W - Post digestion spike for GFAA out of control E - Serial dilution difference out of control

M Qualifier: P - ICP A - FLAA F - GFAA CV - Cold Vapor

6/18/03

Applied P & Ch Laboratory

Metal Analysis Results

Client Name:	GEOFON, Inc.	Project No:	04-4428.10	Collection Date:	04/17/2003
Project ID:	JPL	Service ID:	32767	Collected by:	
		Lab Sample ID:	03-2767-4	Received Date:	04/17/2003
Sample ID:	**MW-21-3**	Sample Matrix	Water	Moisture %:	–
Sample Type:	Field Sample				

Element Name	CAS No	Unit	RL	Result	C	M	Q	Batch	D-Date	A-Date	DF	Method
ARSENIC	7440-38-2	µg/L	5	< 5	U	F		03M1360E	04/23/03	04/23/03	1	200.9
CALCIUM	7440-70-2	µg/L	200	123000		P		03M1353M	04/22/03	04/22/03	1	200.7
IRON	7439-89-6	µg/L	50	40.5	U B	P		03M1353M	04/22/03	04/22/03	1	200.7
MAGNESIUM	7439-95-4	µg/L	100	40300		P		03M1353M	04/22/03	04/22/03	1	200.7
POTASSIUM	7440-09-7	µg/L	400	3130		P		03M1353M	04/22/03	04/22/03	1	200.7
SODIUM	7440-23-5	µg/L	2000	39800		P		03M1353M	04/22/03	04/22/03	1	200.7

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

Note: RL: PQL (EQL) or CRDL D-Date: Digestion Date; A-Date: Analysis Date; DF: Dilution Factor

C Qualifier: U - Not Detected or less than IDL B - Less than RL (PQL, EQL or CRDL), but greater than IDL.

Q Qualifier: N - Spike recovery out of control * - Duplicate analysis out of control

W - Post digestion spike for GFAA out of control E - Serial dilution difference out of control

M Qualifier: P - ICP A - FLAA F - GFAA CV - Cold Vapor

6/18/03

Applied P & Ch Laboratory

Metal Analysis Results

Client Name:	GEOFON, Inc.	Project No:	04-4428.10	Collection Date:	04/17/2003
Project ID:	JPL	Service ID:	32767	Collected by:	
		Lab Sample ID:	03-2767-5	Received Date:	04/17/2003
Sample ID:	MW-21-4	Sample Matrix	Water	Moisture %:	–
Sample Type:	Field Sample				

Element Name	CAS No	Unit	RL	Result	C	M	Q	Batch	D-Date	A-Date	DF	Method
ARSENIC	7440-38-2	µg/L	5	2.2	B	F	J	03M1360E	04/23/03	04/23/03	1	200.9
CALCIUM	7440-70-2	µg/L	200	77200		P		03M1353M	04/22/03	04/22/03	1	200.7
IRON	7439-89-6	µg/L	50	16.1 U	B	P		03M1353M	04/22/03	04/22/03	1	200.7
MAGNESIUM	7439-95-4	µg/L	100	23900		P		03M1353M	04/22/03	04/22/03	1	200.7
POTASSIUM	7440-09-7	µg/L	400	2130		P		03M1353M	04/22/03	04/22/03	1	200.7
SODIUM	7440-23-5	µg/L	2000	26200		P		03M1353M	04/22/03	04/22/03	1	200.7

Note: RL: PQL (EQL) or CRDL D-Date: Digestion Date; A-Date: Analysis Date; DF: Dilution Factor

C Qualifier: U - Not Detected or less than IDL; B - Less than RL (PQL, EQL or CRDL), but greater than IDL.

Q Qualifier: N - Spike recovery out of control; * - Duplicate analysis out of control; W - Post digestion spike for GFAA out of control; E - Serial dilution difference out of control

M Qualifier: P - ICP A - FLAA F - GFAA CV - Cold Vapor

5/18/03

Applied P & Ch Laboratory

Metal Analysis Results

Client Name:	GEOFON, Inc.	Project No:	04-4428.10	Collection Date:	04/17/2003
Project ID:	JPL	Service ID:	32767	Collected by:	
		Lab Sample ID:	03-2767-6	Received Date:	04/17/2003
Sample ID:	MW-21-5	Sample Matrix	Water	Moisture %:	–
Sample Type:	Field Sample				

Element Name	CAS No	Unit	RL	Result	C	M	Q	Batch	D-Date	A-Date	DF	Method
ARSENIC	7440-38-2	µg/L	5	< 5	U	F		03M1360E	04/23/03	04/23/03	1	200.9
CALCIUM	7440-70-2	µg/L	200	83600		P		03M1353M	04/22/03	04/22/03	1	200.7
IRON	7439-89-6	µg/L	50	210	U	P		03M1353M	04/22/03	04/22/03	1	200.7
MAGNESIUM	7439-95-4	µg/L	100	30800		P		03M1353M	04/22/03	04/22/03	1	200.7
POTASSIUM	7440-09-7	µg/L	400	2570		P		03M1353M	04/22/03	04/22/03	1	200.7
SODIUM	7440-23-5	µg/L	2000	32500		P		03M1353M	04/22/03	04/22/03	1	200.7

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

Note: RL: PQL (EQL) or CRDL D-Date: Digestion Date; A-Date: Analysis Date; DF: Dilution Factor

C Qualifier: U - Not Detected or less than IDL B - Less than RL (PQL, EQL or CRDL), but greater than IDL.

Q Qualifier: N - Spike recovery out of control * - Duplicate analysis out of control

W - Post digestion spike for GFAA out of control E - Serial dilution difference out of control

M Qualifier: P - ICP A - FLAA F - GFAA CV - Cold Vapor

4/18/03

LDC #: 10414A4

SDG #: 03-2767

Laboratory: Applied P & Ch Laboratory

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 6/16/03

Page: 1 of 1

Reviewer: MB

2nd Reviewer: A

METHOD: Metals (EPA Method 200.7 & 200.9)

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: 4/17/03
II.	Calibration	SW	
III.	Blanks	SW	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Matrix Spike Analysis	A	MS/MSD/Dup from SDG 03-2809 for As
VI.	Duplicate Sample Analysis	A	
VII.	Laboratory Control Samples (LCS)	A	LCS/LCSD
VIII.	Internal Standard (ICP-MS)	N	Not Analyzed
IX.	Furnace Atomic Absorption QC	A	MSA was not performed.
X.	ICP Serial Dilution	N	Not required
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	SW	EB=1

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:

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

Notes: _____

LDC #: 10414A4
SDG #: 03-2717

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: MB
2nd reviewer: ✓

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-6	Aq	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
ICP Trace		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___

Comments: Mercury by CVAA if performed

ELEMENTS.4

LDC #: 04144A4
SDG #: 03-2767

VALIDATION FINDINGS WORKSHEET
Calibration

Page: 1 of 1
Reviewer: MH
2nd Reviewer:

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

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

(Y) N N/A Were all instruments calibrated daily, each set-up time, and were the proper number of standards used?

Y (N) N/A Were all initial and continuing calibration verification percent recoveries (%R) within the control limits of 90-110% for all analytes except mercury (80-120%) and cyanide (85-115%)?

LEVEL IV ONLY:

Y N (N/A) Was a midrange cyanide standard distilled?

Y N (N/A) Are all correlation coefficients ≥0.995?

Y N (N/A) Were recalculated results acceptable? See Level IV Initial and Continuing Calibration Recalculation Worksheet for recalculations.

#	Date	Calibration ID	Analyte	%R	Associated Samples	Qualification of Data
1	4/23/03	ccv (1533)	As	110.2 (90-110)	1-5	J detects/ND
2	4/23/03	ccv (1650)	As	111.0 ↓	6	↓

Comments:

CAL4SW

LDC #: 10414A4
SDG #: 03-2767

VALIDATION FINDINGS WORKSHEET
Prep Blank/ICB/CCB Findings

Page: 1 of 1
Reviewer: MH
2nd Reviewer:

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)
Blank concentration units, unless otherwise noted: ug/L
Associated Samples: A1

	Blank Identification										
Analyte	ICB	CCB1	CCB2	CCB3	PB ( )	ICB	CCB1	CCB2	CCB3	PB ( )	Analyte
Al											Al
Sb											Sb
As											As
Ba											Ba
Be											Be
Cd											Cd
Ca	238.28										Ca
Cr											Cr
Co											Co
Cu											Cu
Fe	14.82	44.45									Fe
Pb											Pb
Mg	81.45										Mg
Mn											Mn
Hg											Hg
Ni											Ni
K	140.78	156.73									K
Se											Se
Ag											Ag
Na	752.30										Na
Tl											Tl
V											V
Zn											Zn
B											B
Mo											Mo
Sr											Sr

The highest concentration found in the Prep Blank and ICB/CCB for each analyte is circled on this worksheet and transferred to the PB/ICB/CCB Qualified Samples worksheet.

LDC #: 10414A4
SDG #: 03-2767

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Page: 1 of 1
Reviewer: MH
2nd Reviewer:

METHOD: Trace Metals (EPA SW 846 Method 6010/7000) Soil preparation factor applied:
Sample Concentration units, unless otherwise noted: ug/L Associated Samples: All

Analyte	Maximum PB* (mg/Kg)	Maximum PB* (ug/L)	Maximum ICB/CCB* (ug/L)	Blank Action Limit	Sample Identification 1	2	3	4	5	6					Analyte
Al															Al
Sb															Sb
As															As
Ba															Ba
Be															Be
Cd															Cd
Ca		158	278.28	1191.4	29.8										Ca
Cr															Cr
Co															Co
Cu															Cu
Fe			44.45	222.25	19.4	150	146	40.5	16.1	210					Fe
Pb															Pb
Mg		62.6	81.45	409.25	38.4										Mg
Mn															Mn
Hg															Hg
Ni															Ni
K		131	156.73	983.65	152										K
Se															Se
Ag															Ag
Na		403	752.30	3761.5	720										Na
Tl															Tl
V															V
Zn															Zn
B															B
Mo															Mo
Sr															Sr

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".
Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC #: 10414A4
SDG #: 03-2767

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 1
Reviewer: MH
2nd reviewer: A

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

(Y) N N/A Were field blanks identified in this SDG?
(Y) N N/A Were target analytes detected in the field blanks?

Sample: 1 Field Blank / Trip Blank / Rinsate / (Other) EB (circle one)

Analyte	Concentration Units (ug/L)
Ca	218
Fe	19.4
Mg	58.4
K	152
Na	720

Sample: _____ Field Blank / Trip Blank / Rinsate / Other_____ (circle one)

Analyte	Concentration Units ( )

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NASA JPL

Collection Date: April 21, 2003

LDC Report Date: June 17, 2003

Matrix: Water

Parameters: Metals

Validation Level: EPA Level III

Laboratory: Applied P & Ch Laboratory

Sample Delivery Group (SDG): 03-2809

Sample Identification

DUPE-1-2Q03
EB-2-4/21/03
MW-4-1
MW-4-2
MW-4-3
MW-4-4
MW-4-5
SOURCE-2Q03
MW-4-2MS
MW-4-2MSD
MW-4-2DUP

Introduction

This data review covers 11 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Methods 200.7 and 200.9 for Metals. The metals analyzed were Arsenic, Calcium, Iron, Magnesium, Potassium, and Sodium.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (February 1994) as there are no current guidelines for the methods stated above.

A table summarizing all data qualification flags 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 specified protocols or is of technical advisory nature.

Blanks are summarized in Section III.

Field duplicates are summarized in Section XIII.

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. Calibration

An initial calibration was performed.

The frequency and analysis criteria of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met with the following exceptions:

Date	Lab. Reference/ID	Analyte	%R (Limits)	Associated Samples	Flag	A or P
4/23/03	CCV (14:17)	Arsenic	110.2 (90-110)	EB-2-4/21/03 MW-4-1 MW-4-3 MW-4-4 MW-4-5 SOURCE-2Q03	J (all detects)	P

III. Blanks

Method blanks were reviewed for each matrix as applicable.

Data qualification by the initial, continuing and preparation blanks (ICB/CCB/PBs) was based on the maximum contaminant concentration in the ICB/CCB/PBs in the analysis of each analyte. No contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Potassium	49.3 ug/L	All samples in SDG 03-2809
ICB/CCB	Calcium Iron Magnesium Potassium Sodium	241.36 ug/L 86.02 ug/L 99.01 ug/L 145.74 ug/L 714.37 ug/L	All samples in SDG 03-2809

Sample concentrations were compared to the maximum contaminant concentrations detected in the ICB/CCB/PBs. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated method blanks with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
DUPE-1-2Q03	Iron	231 ug/L	231U ug/L
EB-2-4/21/03	Potassium Sodium	80.7 ug/L 398 ug/L	80.7U ug/L 398U ug/L
MW-4-1	Iron	274 ug/L	274U ug/L
MW-4-4	Iron	243 ug/L	243U ug/L
SOURCE-2Q03	Potassium Sodium	66.7 ug/L 341 ug/L	66.7U ug/L 341U ug/L

IV. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

V. Matrix Spike Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VI. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

VII. Laboratory Control Samples (LCS)

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

VIII. Internal Standards (ICP-MS)

ICP-MS was not utilized in this SDG.

IX. Furnace Atomic Absorption QC

Raw data were not reviewed for this SDG.

X. ICP Serial Dilution

Although ICP serial dilution analysis was not required by the method, it was performed by the laboratory. The analysis criteria were met with the following exceptions:

Diluted Sample	Analyte	%D (Limits)	Associated Samples	Flag	A or P
MW-4-2L	Potassium	16.3 (≤10)	All samples in SDG 03-2609	J (all detects)	A

XI. Sample Result Verification

Raw data were not reviewed for this SDG.

XII. Overall Assessment of Data

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

XIII. Field Duplicates

Samples DUPE-1-2Q03 and MW-4-4 were identified as field duplicates. No metals were detected in any of the samples with the following exceptions:

Analyte	Concentration (ug/L)		RPD
	DUPE-1-2Q03	MW-4-4	
Calcium	24500	24500	0
Iron	231	243	5
Magnesium	11900	11800	1
Potassium	1930	1920	1
Sodium	37500	37000	1

XIV. Field Blanks

Sample EB-2-4/21/03 was identified as an equipment blank. No metal contaminants were found in this blank with the following exceptions:

Equipment Blank ID	Analyte	Concentration (ug/L)
EB-2-4/21/03	Potassium Sodium	80.7 398

Sample SOURCE-2Q03 was identified as a source blank. No metal contaminants were found in this blank with the following exceptions:

Source Blank ID	Analyte	Concentration (ug/L)
SOURCE-2Q03	Potassium Sodium	66.7 341

NASA JPL
Metals - Data Qualification Summary - SDG 03-2809

SDG	Sample	Analyte	Flag	A or P	Reason
03-2809	EB-2-4/21/03 MW-4-1 MW-4-3 MW-4-4 MW-4-5 SOURCE-2Q03	Arsenic	J (all detects)	P	Calibration verification (%R)
03-2809	DUPE-1-2Q03 EB-2-4/21/03 MW-4-1 MW-4-2 MW-4-3 MW-4-4 MW-4-5 SOURCE-2Q03	Potassium	J (all detects)	A	ICP serial dilution (%D)

NASA JPL
Metals - Laboratory Blank Data Qualification Summary - SDG 03-2809

SDG	Sample	Analyte	Modified Final Concentration	A or P
03-2809	DUPE-1-2Q03	Iron	231U ug/L	A
03-2809	EB-2-4/21/03	Potassium Sodium	80.7U ug/L 398U ug/L	A
03-2809	MW-4-1	Iron	274U ug/L	A
03-2809	MW-4-4	Iron	243U ug/L	A
03-2809	SOURCE-2Q03	Potassium Sodium	66.7U ug/L 341U ug/L	A

B

Applied P & Ch Laboratory

Metal Analysis Results

Client Name:	GEOFON, Inc.	Project No:	04-4428.10	Collection Date:	04/21/2003
Project ID:	JPL	Service ID:	32809	Collected by:	
		Lab Sample ID:	03-2809-1	Received Date:	04/21/2003
Sample ID:	**DUPE-1-2Q03**	Sample Matrix	Water	Moisture %:	–
Sample Type:	Field Sample				

Element Name	CAS No	Unit	RL	Result	C	M	Q	Batch	D-Date	A-Date	DF	Method
ARSENIC	7440-38-2	µg/L	5	< 5	U	F		03M1360E	04/23/03	04/23/03	1	200.9
CALCIUM	7440-70-2	µg/L	200	24500		P		03M1359M	04/23/03	04/23/03	1	200.7
IRON	7439-89-6	µg/L	50	231	N	P		03M1359M	04/23/03	04/23/03	1	200.7
MAGNESIUM	7439-95-4	µg/L	100	11900		P		03M1359M	04/23/03	04/23/03	1	200.7
POTASSIUM	7440-09-7	µg/L	400	1930	J	P		03M1359M	04/23/03	04/23/03	1	200.7
SODIUM	7440-23-5	µg/L	2000	37500		P		03M1359M	04/23/03	04/23/03	1	200.7

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

Note: RL: PQL (EQL) or CRDL D-Date: Digestion Date; A-Date: Analysis Date; DF: Dilution Factor

C Qualifier: U - Not Detected or less than IDL B - Less than RL (PQL, EQL or CRDL), but greater than IDL.

Q Qualifier: N - Spike recovery out of control * - Duplicate analysis out of control

W - Post digestion spike for GFAA out of control E - Serial dilution difference out of control

M Qualifier: P - ICP A - FLAA F - GFAA CV - Cold Vapor

6/18/03

Applied P & Ch Laboratory

Metal Analysis Results

Client Name:	GEOFON, Inc.	Project No:	04-4428.10	Collection Date:	04/21/2003
Project ID:	JPL	Service ID:	32809	Collected by:	
		Lab Sample ID:	03-2809-2	Received Date:	04/21/2003
Sample ID:	**EB-2-4/21/03**	Sample Matrix	Water	Moisture %:	–
Sample Type:	Field Sample				

Element Name	CAS No	Unit	RL	Result	C	M	Q	Batch	D-Date	A-Date	DF	Method
ARSENIC	7440-38-2	µg/L	5	< 5	U	F		03M1360E	04/23/03	04/23/03	1	200.9
CALCIUM	7440-70-2	µg/L	200	< 200	U	P		03M1359M	04/23/03	04/23/03	1	200.7
IRON	7439-89-6	µg/L	50	< 50	U	P		03M1359M	04/23/03	04/23/03	1	200.7
MAGNESIUM	7439-95-4	µg/L	100	< 100	U	P		03M1359M	04/23/03	04/23/03	1	200.7
POTASSIUM	7440-09-7	µg/L	400	80.7 UJ	B	P		03M1359M	04/23/03	04/23/03	1	200.7
SODIUM	7440-23-5	µg/L	2000	398 U	B	P		03M1359M	04/23/03	04/23/03	1	200.7

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

Note: RL: PQL (EQL) or CRDL D-Date: Digestion Date; A-Date: Analysis Date; DF: Dilution Factor

C Qualifier: U - Not Detected or less than IDL B - Less than RL (PQL, EQL or CRDL), but greater than IDL.

Q Qualifier: N - Spike recovery out of control * - Duplicate analysis out of control

W - Post digestion spike for GFAA out of control E - Serial dilution difference out of control

M Qualifier: P - ICP A - FLAA F - GFAA CV - Cold Vapor

6/18/03

Applied P & Ch Laboratory

Metal Analysis Results

Client Name: GEOFON, Inc.
Project ID: JPL

Project No: 04-4428.10
Service ID: 32809
Lab Sample ID: 03-2809-3
Sample Matrix Water

Collection Date: 04/21/2003
Collected by:
Received Date: 04/21/2003
Moisture %: –

Sample ID: **MW-4-1**
Sample Type: Field Sample

Element Name	CAS No	Unit	RL	Result	C	M	Q	Batch	D-Date	A-Date	DF	Method
ARSENIC	7440-38-2	µg/L	5	<5	U	F		03M1360E	04/23/03	04/23/03	1	200.9
CALCIUM	7440-70-2	µg/L	200	54200		P		03M1359M	04/23/03	04/23/03	1	200.7
IRON	7439-89-6	µg/L	50	274	U	P		03M1359M	04/23/03	04/23/03	1	200.7
MAGNESIUM	7439-95-4	µg/L	100	17700		P		03M1359M	04/23/03	04/23/03	1	200.7
POTASSIUM	7440-09-7	µg/L	400	2510	J	P		03M1359M	04/23/03	04/23/03	1	200.7
SODIUM	7440-23-5	µg/L	2000	19100		P		03M1359M	04/23/03	04/23/03	1	200.7

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

Note: RL: PQL (EQL) or CRDL D-Date: Digestion Date; A-Date: Analysis Date; DF: Dilution Factor
C Qualifier: U - Not Detected or less than IDL
B - Less than RL (PQL, EQL or CRDL), but greater than IDL.
Q Qualifier: N - Spike recovery out of control
* - Duplicate analysis out of control
W - Post digestion spike for GFAA out of control
E - Serial dilution difference out of control
M Qualifier: P - ICP A - FLAA F - GFAA CV - Cold Vapor

6/18/03

Applied P & Ch Laboratory

Metal Analysis Results

Client Name: GEOFON, Inc.
Project ID: JPL

Project No: 04-4428.10
Service ID: 32809
Lab Sample ID: 03-2809-4
Sample Matrix Water

Collection Date: 04/21/2003
Collected by:
Received Date: 04/21/2003
Moisture %: –

Sample ID: **MW-4-2**
Sample Type: Field Sample

Element Name	CAS No	Unit	RL	Result	C	M	Q	Batch	D-Date	A-Date	DF	Method
ARSENIC	7440-38-2	µg/L	5	<5	U	F		03M1360E	04/23/03	04/23/03	1	200.9
CALCIUM	7440-70-2	µg/L	200	115000		P		03M1359M	04/23/03	04/23/03	1	200.7
IRON	7439-89-6	µg/L	50	592		P		03M1359M	04/23/03	04/23/03	1	200.7
MAGNESIUM	7439-95-4	µg/L	100	39300		P		03M1359M	04/23/03	04/23/03	1	200.7
POTASSIUM	7440-09-7	µg/L	400	2990 J		P		03M1359M	04/23/03	04/23/03	1	200.7
SODIUM	7440-23-5	µg/L	2000	32500		P		03M1359M	04/23/03	04/23/03	1	200.7

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

Note: RL: PQL (EQL) or CRDL D-Date: Digestion Date; A-Date: Analysis Date; DF: Dilution Factor
C Qualifier: U - Not Detected or less than IDL
B - Less than RL (PQL, EQL or CRDL), but greater than IDL.
Q Qualifier: N - Spike recovery out of control
* - Duplicate analysis out of control
W - Post digestion spike for GFAA out of control
E - Serial dilution difference out of control
M Qualifier: P - ICP A - FLAA F - GFAA
CV - Cold Vapor

6/18/03

Applied P & Ch Laboratory

Metal Analysis Results

Client Name:	GEOFON, Inc.	Project No:	04-4428.10	Collection Date:	04/21/2003
Project ID:	JPL	Service ID:	32809	Collected by:	
		Lab Sample ID:	03-2809-5	Received Date:	04/21/2003
Sample ID:	**MW-4-3**	Sample Matrix	Water	Moisture %:	–
Sample Type:	Field Sample				

Element Name	CAS No	Unit	RL	Result	C	M	Q	Batch	D-Date	A-Date	DF	Method
ARSENIC	7440-38-2	µg/L	5	< 5	U	F		03M1360E	04/23/03	04/23/03	1	200.9
CALCIUM	7440-70-2	µg/L	200	38200		P		03M1359M	04/23/03	04/23/03	1	200.7
IRON	7439-89-6	µg/L	50	6410		P		03M1359M	04/23/03	04/23/03	1	200.7
MAGNESIUM	7439-95-4	µg/L	100	16100		P		03M1359M	04/23/03	04/23/03	1	200.7
POTASSIUM	7440-09-7	µg/L	400	2320	J	P		03M1359M	04/23/03	04/23/03	1	200.7
SODIUM	7440-23-5	µg/L	2000	32700		P		03M1359M	04/23/03	04/23/03	1	200.7

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

Note: RL: PQL (EQL) or CRDL D-Date: Digestion Date; A-Date: Analysis Date; DF: Dilution Factor

C Qualifier: U - Not Detected or less than IDL
B - Less than RL (PQL, EQL or CRDL), but greater than IDL.

Q Qualifier: N - Spike recovery out of control
* - Duplicate analysis out of control
W - Post digestion spike for GFAA out of control
E - Serial dilution difference out of control

M Qualifier: P - ICP A - FLAA F - GFAA CV - Cold Vapor

6/18/03

Applied P & Ch Laboratory

Metal Analysis Results

Client Name: GEOFON, Inc.
Project ID: JPL

Project No: 04-4428.10
Service ID: 32809
Lab Sample ID: 03-2809-6
Sample Matrix Water

Collection Date: 04/21/2003
Collected by:
Received Date: 04/21/2003
Moisture %: -

Sample ID: **MW-4-4**
Sample Type: Field Sample

Element Name	CAS No	Unit	RL	Result	C	M	Q	Batch	D-Date	A-Date	DF	Method
ARSENIC	7440-38-2	µg/L	5	<5	U	F		03M1360E	04/23/03	04/23/03	1	200.9
CALCIUM	7440-70-2	µg/L	200	24500		P		03M1359M	04/23/03	04/23/03	1	200.7
IRON	7439-89-6	µg/L	50	243	U	P		03M1359M	04/23/03	04/23/03	1	200.7
MAGNESIUM	7439-95-4	µg/L	100	11800		P		03M1359M	04/23/03	04/23/03	1	200.7
POTASSIUM	7440-09-7	µg/L	400	1920	J	P		03M1359M	04/23/03	04/23/03	1	200.7
SODIUM	7440-23-5	µg/L	2000	37000		P		03M1359M	04/23/03	04/23/03	1	200.7

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

Note: RL: PQL (EQL) or CRDL D-Date: Digestion Date; A-Date: Analysis Date; DF: Dilution Factor

C Qualifier: U - Not Detected or less than IDL
B - Less than RL (PQL, EQL or CRDL), but greater than IDL.

Q Qualifier: N - Spike recovery out of control
* - Duplicate analysis out of control
W - Post digestion spike for GFAA out of control
E - Serial dilution difference out of control

M Qualifier: P - ICP A - FLAA F - GFAA CV - Cold Vapor

6/18/03

Applied P & Ch Laboratory

Metal Analysis Results

Client Name:	GEOFON, Inc.	Project No:	04-4428.10	Collection Date:	04/21/2003
Project ID:	JPL	Service ID:	32809	Collected by:	
		Lab Sample ID:	03-2809-7	Received Date:	04/21/2003
Sample ID:	**MW-4-5**	Sample Matrix	Water	Moisture %:	-
Sample Type:	Field Sample				

Element Name	CAS No	Unit	RL	Result	C	M	Q	Batch	D-Date	A-Date	DF	Method
ARSENIC	7440-38-2	µg/L	5	< 5	U	F		03M1360E	04/23/03	04/23/03	1	200.9
CALCIUM	7440-70-2	µg/L	200	16400		P		03M1359M	04/23/03	04/23/03	1	200.7
IRON	7439-89-6	µg/L	50	1280		P		03M1359M	04/23/03	04/23/03	1	200.7
MAGNESIUM	7439-95-4	µg/L	100	11200		P		03M1359M	04/23/03	04/23/03	1	200.7
POTASSIUM	7440-09-7	µg/L	400	1930	J	P		03M1359M	04/23/03	04/23/03	1	200.7
SODIUM	7440-23-5	µg/L	2000	37000		P		03M1359M	04/23/03	04/23/03	1	200.7

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

Note: RL: PQL (EQL) or CRDL D-Date: Digestion Date; A-Date: Analysis Date; DF: Dilution Factor

C Qualifier: U - Not Detected or less than IDL
B - Less than RL (PQL, EQL or CRDL), but greater than IDL.

Q Qualifier: N - Spike recovery out of control
* - Duplicate analysis out of control
W - Post digestion spike for GFAA out of control
E - Serial dilution difference out of control

M Qualifier: P - ICP A - FLAA F - GFAA
CV - Cold Vapor

6/18/03

Applied P & Ch Laboratory

Metal Analysis Results

Client Name:	GEOFON, Inc.	Project No:	04-4428.10	Collection Date:	04/21/2003
Project ID:	JPL	Service ID:	32809	Collected by:	
		Lab Sample ID:	03-2809-8	Received Date:	04/21/2003
Sample ID:	**SOURCE-2Q03**	Sample Matrix	Water	Moisture %:	-
Sample Type:	Field Sample				

Element Name	CAS No	Unit	RL	Result	C	M	Q	Batch	D-Date	A-Date	DF	Method
ARSENIC	7440-38-2	µg/L	5	< 5	U	F		03M1360E	04/23/03	04/23/03	1	200.9
CALCIUM	7440-70-2	µg/L	200	< 200	U	P		03M1359M	04/23/03	04/23/03	1	200.7
IRON	7439-89-6	µg/L	50	< 50	U	P		03M1359M	04/23/03	04/23/03	1	200.7
MAGNESIUM	7439-95-4	µg/L	100	< 100	U	P		03M1359M	04/23/03	04/23/03	1	200.7
POTASSIUM	7440-09-7	µg/L	400	66.7 UJ	B	P		03M1359M	04/23/03	04/23/03	1	200.7
SODIUM	7440-23-5	µg/L	2000	341 U	B	P		03M1359M	04/23/03	04/23/03	1	200.7

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

Note: RL: PQL (EQL) or CRDL D-Date: Digestion Date; A-Date: Analysis Date; DF: Dilution Factor

C Qualifier: U - Not Detected or less than IDL B - Less than RL (PQL, EQL or CRDL), but greater than IDL.

Q Qualifier: N - Spike recovery out of control * - Duplicate analysis out of control

W - Post digestion spike for GFAA out of control E - Serial dilution difference out of control

M Qualifier: P - ICP A - FLAA F - GFAA CV - Cold Vapor

6/18/03

LDC #: 10414B4

SDG #: 03-2809

Laboratory: Applied P & Ch Laboratory

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 6/16/03

Page: 1 of 1

Reviewer: MA

2nd Reviewer:

METHOD: Metals (EPA Method 200.7 & 200.9)

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: 4/21/03
II.	Calibration	SW	
III.	Blanks	SW	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Matrix Spike Analysis	A	3 MS/MSD/bg
VI.	Duplicate Sample Analysis	A	
VII.	Laboratory Control Samples (LCS)	A	LCS/LCSD
VIII.	Internal Standard (ICP-MS)	N	
IX.	Furnace Atomic Absorption QC	A	MSA was not performed
X.	ICP Serial Dilution	SW	
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	SW	(1, 6)
XIV.	Field Blanks	SW	EB=2, SB=8

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

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

Notes:

LDC #: 10414B4
SDG #: 03-2809

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Page: 1 of 1
Reviewer: MB
2nd reviewer: ✓

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-8	W	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
9-11	↓	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
ICP Trace		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___

Comments: Mercury by CVAA if performed

LDC #: 104184
SDG #: 03-2809

VALIDATION FINDINGS WORKSHEET
Calibration

Page: 1 of 1
Reviewer: MH
2nd Reviewer:

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

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

Y N N/A Were all instruments calibrated daily, each set-up time, and were the proper number of standards used?

Y N N/A Were all initial and continuing calibration verification percent recoveries (%R) within the control limits of 90-110% for all analytes except mercury (80-120%) and cyanide (85-115%)?

LEVEL IV ONLY:

Y N N/A Was a midrange cyanide standard distilled?

Y N N/A Are all correlation coefficients ≥0.995?

Y N N/A Were recalculated results acceptable? See Level IV Initial and Continuing Calibration Recalculation Worksheet for recalculations.

#	Date	Calibration ID	Analyte	%R	Associated Samples	Qualification of Data
1	4/23/03	ccv (1417)	Ag	110.2 (90-110)	2, 3, 5-8	J (+) / P

Comments:

CAL4SW

LDC #: 104184
SDG #: 03-2809

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Page: 1 of 1
Reviewer: MH
2nd Reviewer: A

METHOD: Trace Metals (EPA SW 846 Method 6010/7000) Soil preparation factor applied: _____
Sample Concentration units, unless otherwise noted: ug/L Associated Samples: All

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Blank Action Limit	Sample Identification: 1	2	3	6	8						Analyte
Al															Al
Sb															Sb
As															As
Ba															Ba
Be															Be
Cd															Cd
Ca			241.36	1206.8											Ca
Cr															Cr
Co															Co
Cu															Cu
Fe			86.02	430.1	231		274	243							Fe
Pb															Pb
Mg			99.01	495.05											Mg
Mn															Mn
Hg															Hg
Ni															Ni
K		49.3	145.94	728.7		80.7			66.7						K
Se															Se
Ag															Ag
Na			714.37	3571.85		398			341						Na
Tl															Tl
V															V
Zn															Zn
B															B
Mo															Mo
Sr															Sr

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the dentifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".
Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC #: 10414B4
SDG #: 03-2809

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Reviewer: MH
2nd Reviewer:

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

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

(Y) N N/A If analyte concentrations were > 50X the IDL, was an ICP serial dilution analyzed?
Y (N) N/A Were ICP serial dilution percent differences (%D) ≤10%?
Y N (N/A) Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LEVEL IV ONLY:

Y N (N/A) Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Diluted Sample ID	Matrix	Analyte	%D	Associated Samples	Qualifications
1	4	Aq	K	16.3	All	J (+) / A

Comments:

LDC #: 10414B4
SDG #: 03-2809

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: MH
2nd reviewer:

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

(Y) N N/A Were field duplicate pairs identified in this SDG?
Y N N/A Were target analytes detected in the field duplicate pairs?

Analyte	Concentration (ug/L)		RPD (Limits)	Difference (Limits)	Qualifications
	1	6			
Aluminum					
Antimony					
Arsenic					
Barium					
Beryllium					
Cadmium					
Calcium	24500	24500	0		
Chromium					
Cobalt					
Copper					
Iron	231	243	5		
Lead					
Magnesium	11900	11800	1		
Manganese					
Mercury					
Nickel					
Potassium	1930	1920	1		
Selenium					
Silver					
Sodium	37500	37000	1		
Thallium					
Vanadium					
Zinc					
Cyanide					
Boron					
Molybdenum					
Strontium					
Silicon					

Notes:

LDC #: 104484
SDG #: 03-2809

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 1
Reviewer: MA
2nd reviewer: A

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

(Y) N N/A Were field blanks identified in this SDG?
(Y) N N/A Were target analytes detected in the field blanks?

Sample: 2 Field Blank / Trip Blank / Rinsate / (Other) ZB (circle one)

Analyte	Concentration Units (ug/L)
K	80.7
Na	398

Sample: 8 Field Blank / Trip Blank / Rinsate / (Other) SB (circle one)

Analyte	Concentration Units (ug/L)
K	66.7
Na	341

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NASA JPL

Collection Date: April 22, 2003

LDC Report Date: June 17, 2003

Matrix: Water

Parameters: Metals

Validation Level: EPA Level III

Laboratory: Applied P & Ch Laboratory

Sample Delivery Group (SDG): 03-2819

Sample Identification

EB-3-4/22/03
MW-19-1
MW-19-2
MW-19-3
MW-19-4
MW-19-5

Introduction

This data review covers 6 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Methods 200.7 and 200.9 for Metals. The metals analyzed were Arsenic, Calcium, Iron, Magnesium, Potassium, and Sodium.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (February 1994) as there are no current guidelines for the methods stated above.

A table summarizing all data qualification flags 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 specified protocols or is of technical advisory nature.

Blanks are summarized in Section III.

Field duplicates are summarized in Section XIII.

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. Calibration

An initial calibration was performed.

The frequency and analysis criteria of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met with the following exceptions:

Date	Lab. Reference/ID	Analyte	%R (Limits)	Associated Samples	Flag	A or P
4/23/03	CCV (14:17)	Arsenic	110.2 (90-110)	EB-3-4/22/03 MW-19-1 MW-19-2	J (all detects)	P
4/23/03	CCV (15:33)	Arsenic	110.2 (90-110)	MW-19-3 MW-19-4 MW-19-5	J (all detects)	P

III. Blanks

Method blanks were reviewed for each matrix as applicable.

Data qualification by the initial, continuing and preparation blanks (ICB/CCB/PBs) was based on the maximum contaminant concentration in the ICB/CCB/PBs in the analysis of each analyte. No contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Calcium	118 ug/L	All samples in SDG 03-2819
ICB/CCB	Calcium Iron Magnesium Potassium Sodium	201.41 ug/L 29.33 ug/L 79.39 ug/L 28.08 ug/L 270.76 ug/L	All samples in SDG 03-2819

Sample concentrations were compared to the maximum contaminant concentrations detected in the ICB/CCB/PBs. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated method blanks with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
EB-3-4/22/03	Calcium Iron Magnesium Potassium Sodium	204 ug/L 53.1 ug/L 24.7 ug/L 46.6 ug/L 446 ug/L	204U ug/L 53.1U ug/L 24.7U ug/L 46.6U ug/L 446U ug/L
MW-19-4	Iron	105 ug/L	105U ug/L

IV. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

V. Matrix Spike Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VI. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

VII. Laboratory Control Samples (LCS)

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

VIII. Internal Standards (ICP-MS)

ICP-MS was not utilized in this SDG.

IX. Furnace Atomic Absorption QC

Raw data were not reviewed for this SDG.

X. ICP Serial Dilution

ICP serial dilution was not required by the method.

XI. Sample Result Verification

Raw data were not reviewed for this SDG.

XII. Overall Assessment of Data

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

XIII. Field Duplicates

No field duplicates were identified in this SDG.

XIV. Field Blanks

Sample EB-3-4/22/03 was identified as an equipment blank. No metal contaminants were found in this blank with the following exceptions:

Equipment Blank ID	Analyte	Concentration (ug/L)
EB-3-4/22/03	Calcium	204
	Iron	53.1
	Magnesium	24.7
	Potassium	46.6
	Sodium	446

NASA JPL
Metals - Data Qualification Summary - SDG 03-2819

SDG	Sample	Analyte	Flag	A or P	Reason
03-2819	EB-3-4/22/03 MW-19-1 MW-19-2 MW-19-3 MW-19-4 MW-19-5	Arsenic	J (all detects)	P	Calibration verification (%R)

NASA JPL
Metals - Laboratory Blank Data Qualification Summary - SDG 03-2819

SDG	Sample	Analyte	Modified Final Concentration	A or P
03-2819	EB-3-4/22/03	Calcium Iron Magnesium Potassium Sodium	204U ug/L 53.1U ug/L 24.7U ug/L 46.6U ug/L 446U ug/L	A
03-2819	MW-19-4	Iron	105U ug/L	A

Applied P & Ch Laboratory

Metal Analysis Results

Client Name:	GEOFON, Inc.	Project No:	04-4428.10	Collection Date:	04/22/2003
Project ID:	JPL	Service ID:	32819	Collected by:	
		Lab Sample ID:	03-2819-1	Received Date:	04/22/2003
Sample ID:	**EB-3-4/22/03**	Sample Matrix	Water	Moisture %:	-
Sample Type:	Field Sample				

Element Name	CAS No	Unit	RL	Result	C	M	Q	Batch	D-Date	A-Date	DF	Method
ARSENIC	7440-38-2	µg/L	5	< 5	U	F		03M1360E	04/23/03	04/23/03	1	200.9
CALCIUM	7440-70-2	µg/L	200	204		P		03M1374L	04/25/03	04/25/03	1	200.7
IRON	7439-89-6	µg/L	50	53.1		P		03M1374L	04/25/03	04/25/03	1	200.7
MAGNESIUM	7439-95-4	µg/L	100	24.7	B	P		03M1374L	04/25/03	04/25/03	1	200.7
POTASSIUM	7440-09-7	µg/L	400	46.6	B	P		03M1374L	04/25/03	04/25/03	1	200.7
SODIUM	7440-23-5	µg/L	2000	446	B	P		03M1374L	04/25/03	04/25/03	1	200.7

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

Note: RL: PQL (EQL) or CRDL D-Date: Digestion Date; A-Date: Analysis Date; DF: Dilution Factor

C Qualifier: U - Not Detected or less than IDL B - Less than RL (PQL, EQL or CRDL), but greater than IDL.

Q Qualifier: N - Spike recovery out of control * - Duplicate analysis out of control

W - Post digestion spike for GFAA out of control E - Serial dilution difference out of control

M Qualifier: P - ICP A - FLAA F - GFAA CV - Cold Vapor

6/18/03

Applied P & Ch Laboratory

Metal Analysis Results

Client Name: GEOFON, Inc.
Project ID: JPL

Project No: 04-4428.10
Service ID: 32819
Lab Sample ID: 03-2819-2
Sample Matrix Water

Collection Date: 04/22/2003
Collected by:
Received Date: 04/22/2003
Moisture %: –

Sample ID: **MW-19-1**
Sample Type: Field Sample

Element Name	CAS No	Unit	RL	Result	C	M	Q	Batch	D-Date	A-Date	DF	Method
ARSENIC	7440-38-2	µg/L	5	< 5	U	F		03M1360E	04/23/03	04/23/03	1	200.9
CALCIUM	7440-70-2	µg/L	200	33500		P		03M1374L	04/25/03	04/25/03	1	200.7
IRON	7439-89-6	µg/L	50	2500		P		03M1374L	04/25/03	04/25/03	1	200.7
MAGNESIUM	7439-95-4	µg/L	100	10400		P		03M1374L	04/25/03	04/25/03	1	200.7
POTASSIUM	7440-09-7	µg/L	400	2190		P		03M1374L	04/25/03	04/25/03	1	200.7
SODIUM	7440-23-5	µg/L	2000	11800		P		03M1374L	04/25/03	04/25/03	1	200.7

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

Note: RL: PQL (EQL) or CRDL D-Date: Digestion Date; A-Date: Analysis Date; DF: Dilution Factor
C Qualifier: U - Not Detected or less than IDL B - Less than RL (PQL, EQL or CRDL), but greater than IDL.
Q Qualifier: N - Spike recovery out of control * - Duplicate analysis out of control
W - Post digestion spike for GFAA out of control E - Serial dilution difference out of control
M Qualifier: P - ICP A - FLAA F - GFAA CV - Cold Vapor

6/18/03

Applied P & Ch Laboratory

Metal Analysis Results

Client Name:	GEOFON, Inc.	Project No:	04-4428.10	Collection Date:	04/22/2003
Project ID:	JPL	Service ID:	32819	Collected by:	
		Lab Sample ID:	03-2819-3	Received Date:	04/22/2003
Sample ID:	**MW-19-2**	Sample Matrix	Water	Moisture %:	–
Sample Type:	Field Sample				

Element Name	CAS No	Unit	RL	Result	C	M	Q	Batch	D-Date	A-Date	DF	Method
ARSENIC	7440-38-2	µg/L	5	< 5	U	F		03M1360E	04/23/03	04/23/03	1	200.9
CALCIUM	7440-70-2	µg/L	200	112000		P		03M1374L	04/25/03	04/25/03	1	200.7
IRON	7439-89-6	µg/L	50	3150		P		03M1374L	04/25/03	04/25/03	1	200.7
MAGNESIUM	7439-95-4	µg/L	100	37900		P		03M1374L	04/25/03	04/25/03	1	200.7
POTASSIUM	7440-09-7	µg/L	400	2820		P		03M1374L	04/25/03	04/25/03	1	200.7
SODIUM	7440-23-5	µg/L	2000	28500		P		03M1374L	04/25/03	04/25/03	1	200.7

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

Note: RL: PQL (EQL) or CRDL D-Date: Digestion Date; A-Date: Analysis Date; DF: Dilution Factor

C Qualifier: U - Not Detected or less than IDL B - Less than RL (PQL, EQL or CRDL), but greater than IDL.

Q Qualifier: N - Spike recovery out of control * - Duplicate analysis out of control

W - Post digestion spike for GFAA out of control E - Serial dilution difference out of control

M Qualifier: P - ICP A - FLAA F - GFAA CV - Cold Vapor

6/18/03

Applied P & Ch Laboratory

Metal Analysis Results

Client Name:	GEOFON, Inc.	Project No:	04-4428.10	Collection Date:	04/22/2003
Project ID:	JPL	Service ID:	32819	Collected by:	
		Lab Sample ID:	03-2819-4	Received Date:	04/22/2003
Sample ID:	MW-19-3	Sample Matrix	Water	Moisture %:	–
Sample Type:	Field Sample				

Element Name	CAS No	Unit	RL	Result	C	M	Q	Batch	D-Date	A-Date	DF	Method
ARSENIC	7440-38-2	µg/L	5	<5	U	F		03M1360E	04/23/03	04/23/03	1	200.9
CALCIUM	7440-70-2	µg/L	200	106000		P		03M1374L	04/25/03	04/25/03	1	200.7
IRON	7439-89-6	µg/L	50	236		P		03M1374L	04/25/03	04/25/03	1	200.7
MAGNESIUM	7439-95-4	µg/L	100	35000		P		03M1374L	04/25/03	04/25/03	1	200.7
POTASSIUM	7440-09-7	µg/L	400	3020		P		03M1374L	04/25/03	04/25/03	1	200.7
SODIUM	7440-23-5	µg/L	2000	29700		P		03M1374L	04/25/03	04/25/03	1	200.7

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

Note: RL: PQL (EQL) or CRDL D-Date: Digestion Date; A-Date: Analysis Date; DF: Dilution Factor

C Qualifier: U - Not Detected or less than IDL B - Less than RL (PQL, EQL or CRDL), but greater than IDL.

Q Qualifier: N - Spike recovery out of control * - Duplicate analysis out of control

W - Post digestion spike for GFAA out of control E - Serial dilution difference out of control

M Qualifier: P - ICP A - FLAA F - GFAA CV - Cold Vapor

6/18/03

Applied P & Ch Laboratory

Metal Analysis Results

Client Name: GEOFON, Inc.
Project ID: JPL

Project No: 04-4428.10
Service ID: 32819
Lab Sample ID: 03-2819-5
Sample Matrix Water

Collection Date: 04/22/2003
Collected by:
Received Date: 04/22/2003
Moisture %: -

Sample ID: **MW-19-4**
Sample Type: Field Sample

Element Name	CAS No	Unit	RL	Result	C	M	Q	Batch	D-Date	A-Date	DF	Method
ARSENIC	7440-38-2	µg/L	5	<5	U	F		03M1360E	04/23/03	04/23/03	1	200.9
CALCIUM	7440-70-2	µg/L	200	34000		P		03M1374L	04/25/03	04/25/03	1	200.7
IRON	7439-89-6	µg/L	50	105		P		03M1374L	04/25/03	04/25/03	1	200.7
MAGNESIUM	7439-95-4	µg/L	100	17500		P		03M1374L	04/25/03	04/25/03	1	200.7
POTASSIUM	7440-09-7	µg/L	400	2060		P		03M1374L	04/25/03	04/25/03	1	200.7
SODIUM	7440-23-5	µg/L	2000	20800		P		03M1374L	04/25/03	04/25/03	1	200.7

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

Note: RL: PQL (EQL) or CRDL D-Date: Digestion Date; A-Date: Analysis Date; DF: Dilution Factor
C Qualifier: U - Not Detected or less than IDL B - Less than RL (PQL, EQL or CRDL), but greater than IDL.
Q Qualifier: N - Spike recovery out of control * - Duplicate analysis out of control
W - Post digestion spike for GFAA out of control E - Serial dilution difference out of control
M Qualifier: P - ICP A - FLAA F - GFAA CV - Cold Vapor

6/18/03

Applied P & Ch Laboratory

Metal Analysis Results

Client Name:	GEOFON, Inc.	Project No:	04-4428.10	Collection Date:	04/22/2003
Project ID:	JPL	Service ID:	32819	Collected by:	
		Lab Sample ID:	03-2819-6	Received Date:	04/22/2003
Sample ID:	**MW-19-5**	Sample Matrix	Water	Moisture %:	–
Sample Type:	Field Sample				

Element Name	CAS No	Unit	RL	Result	C	M	Q	Batch	D-Date	A-Date	DF	Method
ARSENIC	7440-38-2	µg/L	5	< 5	U	F		03M1360E	04/23/03	04/23/03	1	200.9
CALCIUM	7440-70-2	µg/L	200	44800		P		03M1374L	04/25/03	04/25/03	1	200.7
IRON	7439-89-6	µg/L	50	616		P		03M1374L	04/25/03	04/25/03	1	200.7
MAGNESIUM	7439-95-4	µg/L	100	27700		P		03M1374L	04/25/03	04/25/03	1	200.7
POTASSIUM	7440-09-7	µg/L	400	2770		P		03M1374L	04/25/03	04/25/03	1	200.7
SODIUM	7440-23-5	µg/L	2000	30100		P		03M1374L	04/25/03	04/25/03	1	200.7

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

Note: RL: PQL (EQL) or CRDL D-Date: Digestion Date; A-Date: Analysis Date; DF: Dilution Factor

C Qualifier: U - Not Detected or less than IDL B - Less than RL (PQL, EQL or CRDL), but greater than IDL.

Q Qualifier: N - Spike recovery out of control * - Duplicate analysis out of control

W - Post digestion spike for GFAA out of control E - Serial dilution difference out of control

M Qualifier: P - ICP A - FLAA F - GFAA CV - Cold Vapor

6/18/03

LDC #: 10414D4 **VALIDATION COMPLETENESS WORKSHEET** Date: 6/6/03
SDG #: 03-2819 Level III Page: 1 of 1
Laboratory: Applied P & Ch Laboratory Reviewer: MB
2nd Reviewer:

METHOD: Metals (EPA Method 200.7 & 200.9)

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: 4/22/03
II.	Calibration	SW	
III.	Blanks	SW	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Matrix Spike Analysis	A	3 MS/MSD/Dup for As from SDG 03-2809
VI.	Duplicate Sample Analysis	A	
VII.	Laboratory Control Samples (LCS)	A	LCS/LCSD
VIII.	Internal Standard (ICP-MS)	N	Not utilized
IX.	Furnace Atomic Absorption QC	A	MSA was not performed
X.	ICP Serial Dilution	N	Not required
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	SW	EB=1

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

Validated Samples:

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

Notes:

LDC #: 1041404
SDG #: 03-2819

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: MB
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-6	Aq	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
ICP Trace		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___

Comments: Mercury by CVAA if performed

LDC #: 04404
SDG #: 03-2879

VALIDATION FINDINGS WORKSHEET
Calibration

Page: 1 of 1
Reviewer: MH
2nd Reviewer:

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

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

Y N N/A Were all instruments calibrated daily, each set-up time, and were the proper number of standards used?

Y N N/A Were all initial and continuing calibration verification percent recoveries (%R) within the control limits of 90-110% for all analytes except mercury (80-120%) and cyanide (85-115%)?

LEVEL IV ONLY:

Y N N/A Was a midrange cyanide standard distilled?

Y N N/A Are all correlation coefficients ≥0.995?

Y N N/A Were recalculated results acceptable? See Level IV Initial and Continuing Calibration Recalculation Worksheet for recalculations.

#	Date	Calibration ID	Analyte	%R	Associated Samples	Qualification of Data
1	4/23/03	ccv (1417)	As	110.2 (90-110)	1-3	J (+) / P
2	4/23/03	ccv (1533)	As	110.2 (90-110)	4-6	J (+) / P

Comments:

LDC #: 104404
SDG #: 03-2819

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Page: 1 of 1
Reviewer: MH
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/7000) Soil preparation factor applied: _____
Sample Concentration units, unless otherwise noted: ug/L Associated Samples: A11

Analyte	Maximum PB* (mg/Kg)	Maximum PB* (ug/L)	Maximum ICB/CCB* (ug/L)	Blank Action Limit	Sample Identification: 1	5									
Al															Al
Sb															Sb
As															As
Ba															Ba
Be															Be
Cd															Cd
Ca		118	201.4	1007.05	204										Ca
Cr															Cr
Co															Co
Cu															Cu
Fe			29.33	146.65	53.1	105									Fe
Pb															Pb
Mg			99.39	396.95	24.7										Mg
Mn															Mn
Hg															Hg
Ni															Ni
K			28.08	140.4	46.6										K
Se															Se
Ag															Ag
Na			270.96	1353.8	446										Na
Tl															Tl
V															V
Zn															Zn
B															B
Mo															Mo
Sr															Sr

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the dentifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".
Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC #: 104404
SDG #: 03-2819

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 1
Reviewer: MM
2nd reviewer:

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

(Y) N N/A Were field blanks identified in this SDG?
(Y) N N/A Were target analytes detected in the field blanks?

Sample: 1 Field Blank / Trip Blank / Rinsate / (Other) ER (circle one)

Analyte	Concentration Units (ug/L)
Ca	204
Fe	53.1
Mg	24.7
K	46.6
Na	446

Sample: _____ Field Blank / Trip Blank / Rinsate / Other_____ (circle one)

Analyte	Concentration Units ( )

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NASA JPL

Collection Date: April 23, 2003

LDC Report Date: June 17, 2003

Matrix: Water

Parameters: Metals

Validation Level: EPA Level III

Laboratory: Applied P & Ch Laboratory

Sample Delivery Group (SDG): 03-2843

Sample Identification

DUPE-2-2Q03
EB-4-4/23/03
MW-14-1
MW-14-2
MW-14-3
MW-14-4
MW-14-5

Introduction

This data review covers 7 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Methods 200.7 and 200.9 for Metals. The metals analyzed were Arsenic, Calcium, Iron, Magnesium, Potassium, and Sodium.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (February 1994) as there are no current guidelines for the methods stated above.

A table summarizing all data qualification flags 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 specified protocols or is of technical advisory nature.

Blanks are summarized in Section III.

Field duplicates are summarized in Section XIII.

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. Calibration

An initial calibration was performed.

The frequency and analysis criteria of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable.

Data qualification by the initial, continuing and preparation blanks (ICB/CCB/PBs) was based on the maximum contaminant concentration in the ICB/CCB/PBs in the analysis of each analyte. No contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Calcium	118 ug/L	All samples in SDG 03-2843
ICB/CCB	Calcium Iron Magnesium Potassium Sodium	201.41 ug/L 29.33 ug/L 79.39 ug/L 28.08 ug/L 270.76 ug/L	All samples in SDG 03-2843

Sample concentrations were compared to the maximum contaminant concentrations detected in the ICB/CCB/PBs. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated method blanks with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
DUPE-2-2Q03	Iron	19.2 ug/L	19.2U ug/L
EB-4-4/23/03	Calcium Iron Magnesium Potassium Sodium	98.0 ug/L 1.9 ug/L 15.1 ug/L 27.8 ug/L 430 ug/L	98.0U ug/L 1.9U ug/L 15.1U ug/L 27.8U ug/L 430U ug/L

Sample	Analyte	Reported Concentration	Modified Final Concentration
MW-14-1	Iron	32.4 ug/L	32.4U ug/L
MW-14-2	Iron	5.3 ug/L	5.3U ug/L
MW-14-3	Iron	16.0 ug/L	16.0U ug/L
MW-14-4	Iron	21.2 ug/L	21.2U ug/L
MW-14-5	Iron	55.7 ug/L	55.7U ug/L

IV. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

V. Matrix Spike Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VI. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

VII. Laboratory Control Samples (LCS)

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

VIII. Internal Standards (ICP-MS)

ICP-MS was not utilized in this SDG.

IX. Furnace Atomic Absorption QC

Raw data were not reviewed for this SDG.

X. ICP Serial Dilution

ICP serial dilution was not required by the method.

XI. Sample Result Verification

Raw data were not reviewed for this SDG.

XII. Overall Assessment of Data

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

XIII. Field Duplicates

Samples DUPE-2-2Q03 and MW-14-3 were identified as field duplicates. No metals were detected in any of the samples with the following exceptions:

Analyte	Concentration (ug/L)		RPD
	DUPE-2-2Q03	MW-14-3	
Calcium	96500	97600	1
Iron	19.2	16.0	18
Magnesium	39800	41500	4
Potassium	3630	3610	1
Sodium	36600	38100	4

XIV. Field Blanks

Sample EB-4-4/23/03 was identified as an equipment blank. No metal contaminants were found in this blank with the following exceptions:

Equipment Blank ID	Analyte	Concentration (ug/L)
EB-4-4/23/03	Calcium	98.0
	Iron	1.9
	Magnesium	15.1
	Potassium	27.8
	Sodium	430

NASA JPL
Metals - Data Qualification Summary - SDG 03-2843

No Sample Data Qualified in this SDG

NASA JPL
Metals - Laboratory Blank Data Qualification Summary - SDG 03-2843

SDG	Sample	Analyte	Modified Final Concentration	A or P
03-2843	DUPE-2-2Q03	Iron	19.2U ug/L	A
03-2843	EB-4-4/23/03	Calcium Iron Magnesium Potassium Sodium	98.0U ug/L 1.9U ug/L 15.1U ug/L 27.8U ug/L 430U ug/L	A
03-2843	MW-14-1	Iron	32.4U ug/L	A
03-2843	MW-14-2	Iron	5.3U ug/L	A
03-2843	MW-14-3	Iron	16.0U ug/L	A
03-2843	MW-14-4	Iron	21.2U ug/L	A
03-2843	MW-14-5	Iron	55.7U ug/L	A

Applied P & Ch Laboratory

Metal Analysis Results

Client Name:	GEOFON, Inc.	Project No:	04-4428.10	Collection Date:	04/23/2003
Project ID:	JPL	Service ID:	32843	Collected by:	Leo Williamson
		Lab Sample ID:	03-2843-1	Received Date:	04/23/2003
Sample ID:	**DUPE-2-2Q03**	Sample Matrix	Water	Moisture %:	–
Sample Type:	Field Sample				

Element Name	CAS No	Unit	RL	Result	C	M	Q	Batch	D-Date	A-Date	DF	Method
ARSENIC	7440-38-2	µg/L	5	< 5	U	F		03M1402E	04/29/03	04/29/03	1	200.9
CALCIUM	7440-70-2	µg/L	200	96500		P		03M1374L	04/25/03	04/25/03	1	200.7
IRON	7439-89-6	µg/L	50	19.2	B	P		03M1374L	04/25/03	04/25/03	1	200.7
MAGNESIUM	7439-95-4	µg/L	100	39800		P		03M1374L	04/25/03	04/25/03	1	200.7
POTASSIUM	7440-09-7	µg/L	400	3630		P		03M1374L	04/25/03	04/25/03	1	200.7
SODIUM	7440-23-5	µg/L	2000	36600		P		03M1374L	04/25/03	04/25/03	1	200.7

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

Note: RL: PQL (EQL) or CRDL D-Date: Digestion Date; A-Date: Analysis Date; DF: Dilution Factor

C Qualifier: U - Not Detected or less than IDL B - Less than RL (PQL, EQL or CRDL), but greater than IDL.

Q Qualifier: N - Spike recovery out of control * - Duplicate analysis out of control

W - Post digestion spike for GFAA out of control E - Serial dilution difference out of control

M Qualifier: P - ICP A - FLAA F - GFAA CV - Cold Vapor

6/18/03

Applied P & Ch Laboratory

Metal Analysis Results

Client Name:	GEOFON, Inc.	Project No:	04-4428.10	Collection Date:	04/23/2003
Project ID:	JPL	Service ID:	32843	Collected by:	Leo Williamson
		Lab Sample ID:	03-2843-2	Received Date:	04/23/2003
Sample ID:	**EB-4-4/23/03**	Sample Matrix	Water	Moisture %:	–
Sample Type:	Field Sample				

Element Name	CAS No	Unit	RL	Result	C	M	Q	Batch	D-Date	A-Date	DF	Method
ARSENIC	7440-38-2	µg/L	5	< 5	U	F		03M1402E	04/29/03	04/29/03	1	200.9
CALCIUM	7440-70-2	µg/L	200	98.0 U	B	P		03M1374L	04/25/03	04/25/03	1	200.7
IRON	7439-89-6	µg/L	50	1.9	B	P		03M1374L	04/25/03	04/25/03	1	200.7
MAGNESIUM	7439-95-4	µg/L	100	15.1	B	P		03M1374L	04/25/03	04/25/03	1	200.7
POTASSIUM	7440-09-7	µg/L	400	27.8	B	P		03M1374L	04/25/03	04/25/03	1	200.7
SODIUM	7440-23-5	µg/L	2000	430	B	P		03M1374L	04/25/03	04/25/03	1	200.7

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

Note: RL: PQL (EQL) or CRDL D-Date: Digestion Date; A-Date: Analysis Date; DF: Dilution Factor

C Qualifier: U - Not Detected or less than IDL B - Less than RL (PQL, EQL or CRDL), but greater than IDL.

Q Qualifier: N - Spike recovery out of control * - Duplicate analysis out of control

W - Post digestion spike for GFAA out of control E - Serial dilution difference out of control

M Qualifier: P - ICP A - FLAA F - GFAA CV - Cold Vapor

6/18/03

Applied P & Ch Laboratory

Metal Analysis Results

Client Name:	GEOFON, Inc.	Project No:	04-4428.10	Collection Date:	04/23/2003
Project ID:	JPL	Service ID:	32843	Collected by:	Leo Williamson
		Lab Sample ID:	03-2843-3	Received Date:	04/23/2003
Sample ID:	**MW-14-1**	Sample Matrix	Water	Moisture %:	–
Sample Type:	Field Sample				

Element Name	CAS No	Unit	RL	Result	C	M	Q	Batch	D-Date	A-Date	DF	Method
ARSENIC	7440-38-2	µg/L	5	<5	U	F		03M1402E	04/29/03	04/29/03	1	200.9
CALCIUM	7440-70-2	µg/L	200	142000		P		03M1374L	04/25/03	04/25/03	1	200.7
IRON	7439-89-6	µg/L	50	32.4	B	P		03M1374L	04/25/03	04/25/03	1	200.7
MAGNESIUM	7439-95-4	µg/L	100	45000		P		03M1374L	04/25/03	04/25/03	1	200.7
POTASSIUM	7440-09-7	µg/L	400	3130		P		03M1374L	04/25/03	04/25/03	1	200.7
SODIUM	7440-23-5	µg/L	2000	36200		P		03M1374L	04/25/03	04/25/03	1	200.7

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

Note: RL: PQL (EQL) or CRDL D-Date: Digestion Date; A-Date: Analysis Date; DF: Dilution Factor

C Qualifier: U - Not Detected or less than IDL B - Less than RL (PQL, EQL or CRDL), but greater than IDL.

Q Qualifier: N - Spike recovery out of control * - Duplicate analysis out of control

W - Post digestion spike for GFAA out of control E - Serial dilution difference out of control

M Qualifier: P - ICP A - FLAA F - GFAA CV - Cold Vapor

6/18/03

Applied P & Ch Laboratory

Metal Analysis Results

Client Name:	GEOFON, Inc.	Project No:	04-4428.10	Collection Date:	04/23/2003
Project ID:	JPL	Service ID:	32843	Collected by:	Leo Williamson
		Lab Sample ID:	03-2843-4	Received Date:	04/23/2003
Sample ID:	MW-14-2	Sample Matrix	Water	Moisture %:	–
Sample Type:	Field Sample				

Element Name	CAS No	Unit	RL	Result	C	M	Q	Batch	D-Date	A-Date	DF	Method
ARSENIC	7440-38-2	µg/L	5	< 5	U	F		03M1402E	04/29/03	04/29/03	1	200.9
CALCIUM	7440-70-2	µg/L	200	128000		P		03M1374L	04/25/03	04/25/03	1	200.7
IRON	7439-89-6	µg/L	50	5.3 U	B	P		03M1374L	04/25/03	04/25/03	1	200.7
MAGNESIUM	7439-95-4	µg/L	100	42700		P		03M1374L	04/25/03	04/25/03	1	200.7
POTASSIUM	7440-09-7	µg/L	400	2920		P		03M1374L	04/25/03	04/25/03	1	200.7
SODIUM	7440-23-5	µg/L	2000	29900		P		03M1374L	04/25/03	04/25/03	1	200.7

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

Note: RL: PQL (EQL) or CRDL D-Date: Digestion Date; A-Date: Analysis Date; DF: Dilution Factor

C Qualifier: U - Not Detected or less than IDL; B - Less than RL (PQL, EQL or CRDL), but greater than IDL.

Q Qualifier: N - Spike recovery out of control; * - Duplicate analysis out of control; W - Post digestion spike for GFAA out of control; E - Serial dilution difference out of control

M Qualifier: P - ICP A - FLAA F - GFAA CV - Cold Vapor

6/18/03

Applied P & Ch Laboratory

Metal Analysis Results

Client Name:	GEOFON, Inc.	Project No:	04-4428.10	Collection Date:	04/23/2003
Project ID:	JPL	Service ID:	32843	Collected by:	Leo Williamson
		Lab Sample ID:	03-2843-5	Received Date:	04/23/2003
Sample ID:	**MW-14-3**	Sample Matrix	Water	Moisture %:	–
Sample Type:	Field Sample				

Element Name	CAS No	Unit	RL	Result	C	M	Q	Batch	D-Date	A-Date	DF	Method
ARSENIC	7440-38-2	µg/L	5	< 5	U	F		03M1402E	04/29/03	04/29/03	1	200.9
CALCIUM	7440-70-2	µg/L	200	97600		P		03M1374L	04/25/03	04/25/03	1	200.7
IRON	7439-89-6	µg/L	50	16.0	B	P		03M1374L	04/25/03	04/25/03	1	200.7
MAGNESIUM	7439-95-4	µg/L	100	41500		P		03M1374L	04/25/03	04/25/03	1	200.7
POTASSIUM	7440-09-7	µg/L	400	3610		P		03M1374L	04/25/03	04/25/03	1	200.7
SODIUM	7440-23-5	µg/L	2000	38100		P		03M1374L	04/25/03	04/25/03	1	200.7

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

Note: RL: PQL (EQL) or CRDL D-Date: Digestion Date; A-Date: Analysis Date; DF: Dilution Factor

C Qualifier: U - Not Detected or less than IDL; B - Less than RL (PQL, EQL or CRDL), but greater than IDL.

Q Qualifier: N - Spike recovery out of control; * - Duplicate analysis out of control; W - Post digestion spike for GFAA out of control; E - Serial dilution difference out of control

M Qualifier: P - ICP A - FLAA F - GFAA CV - Cold Vapor

Applied P & Ch Laboratory

Metal Analysis Results

Client Name:	GEOFON, Inc.	Project No:	04-4428.10	Collection Date:	04/23/2003
Project ID:	JPL	Service ID:	32843	Collected by:	Leo Williamson
		Lab Sample ID:	03-2843-6	Received Date:	04/23/2003
Sample ID:	MW-14-4	Sample Matrix	Water	Moisture %:	–
Sample Type:	Field Sample				

Element Name	CAS No	Unit	RL	Result	C	M	Q	Batch	D-Date	A-Date	DF	Method
ARSENIC	7440-38-2	µg/L	5	<5	U	F		03M1402E	04/29/03	04/29/03	1	200.9
CALCIUM	7440-70-2	µg/L	200	50300		P		03M1374L	04/25/03	04/25/03	1	200.7
IRON	7439-89-6	µg/L	50	21.2 µ	B	P		03M1374L	04/25/03	04/25/03	1	200.7
MAGNESIUM	7439-95-4	µg/L	100	16900		P		03M1374L	04/25/03	04/25/03	1	200.7
POTASSIUM	7440-09-7	µg/L	400	2230		P		03M1374L	04/25/03	04/25/03	1	200.7
SODIUM	7440-23-5	µg/L	2000	25500		P		03M1374L	04/25/03	04/25/03	1	200.7

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

Note: RL: PQL (EQL) or CRDL D-Date: Digestion Date; A-Date: Analysis Date; DF: Dilution Factor

C Qualifier: U - Not Detected or less than IDL B - Less than RL (PQL, EQL or CRDL), but greater than IDL.

Q Qualifier: N - Spike recovery out of control * - Duplicate analysis out of control

W - Post digestion spike for GFAA out of control E - Serial dilution difference out of control

M Qualifier: P - ICP A - FLAA F - GFAA CV - Cold Vapor

6/18/03

Applied P & Ch Laboratory

Metal Analysis Results

Client Name:	GEOFON, Inc.	Project No:	04-4428.10	Collection Date:	04/23/2003
Project ID:	JPL	Service ID:	32843	Collected by:	Leo Williamson
		Lab Sample ID:	03-2843-7	Received Date:	04/23/2003
Sample ID:	**MW-14-5**	Sample Matrix	Water	Moisture %:	-
Sample Type:	Field Sample				

Element Name	CAS No	Unit	RL	Result	C	M	Q	Batch	D-Date	A-Date	DF	Method
ARSENIC	7440-38-2	µg/L	5	< 5	U	F		03M1402E	04/29/03	04/29/03	1	200.9
CALCIUM	7440-70-2	µg/L	200	17100		P		03M1374L	04/25/03	04/25/03	1	200.7
IRON	7439-89-6	µg/L	50	55.7	U	P		03M1374L	04/25/03	04/25/03	1	200.7
MAGNESIUM	7439-95-4	µg/L	100	10800		P		03M1374L	04/25/03	04/25/03	1	200.7
POTASSIUM	7440-09-7	µg/L	400	2150		P		03M1374L	04/25/03	04/25/03	1	200.7
SODIUM	7440-23-5	µg/L	2000	28200		P		03M1374L	04/25/03	04/25/03	1	200.7

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

Note: RL: PQL (EQL) or CRDL D-Date: Digestion Date; A-Date: Analysis Date; DF: Dilution Factor

C Qualifier: U - Not Detected or less than IDL B - Less than RL (PQL, EQL or CRDL), but greater than IDL.

Q Qualifier: N - Spike recovery out of control * - Duplicate analysis out of control

W - Post digestion spike for GFAA out of control E - Serial dilution difference out of control

M Qualifier: P - ICP A - FLAA F - GFAA CV - Cold Vapor

6/18/03

LDC #: 10414E4 **VALIDATION COMPLETENESS WORKSHEET** Date: 6/16/03
SDG #: 03-2843 Level III Page: 1 of 1
Laboratory: Applied P & Ch Laboratory Reviewer: MA
2nd Reviewer: A

METHOD: Metals (EPA Method 200.7 & 200.9)

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: 4/23/03
II.	Calibration	A	
III.	Blanks	SW	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Matrix Spike Analysis	A	1 MS/MSD/Dup for As from SDG 03-2933
VI.	Duplicate Sample Analysis	A	
VII.	Laboratory Control Samples (LCS)	A	LCS/LCSD
VIII.	Internal Standard (ICP-MS)	N	Not Utilized
IX.	Furnace Atomic Absorption QC	A	MSA was not performed
X.	ICP Serial Dilution	N	Not required
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	SW	(1, 5)
XIV.	Field Blanks	SW	EB = 2

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

Validated Samples: A

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

Notes:

LDC #: 10414E4
SDG #: 03-2843

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: MB
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-7	Aq	Al, Sb, **As**, Ba, Be, Cd, **Ca**, Cr, Co, Cu, **Fe**, Pb, **Mg**, Mn, Hg, Ni, **K**, Se, Ag, **Na**, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
ICP Trace		Al, Sb, As, Ba, Be, Cd, **Ca**, Cr, Co, Cu, **Fe**, Pb, **Mg**, Mn, Hg, Ni, **K**, Se, Ag, **Na**, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___ ___
GFAA		Al, Sb, **As**, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, ___

Comments: Mercury by CVAA if performed

ELEMENTS.4

LDC #: 10414E4
SDG #: 03-2843

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Reviewer: MH
2nd Reviewer:

METHOD: Trace Metals (EPA SW 846 Method 6010/7000) Soil preparation factor applied:
Sample Concentration units, unless otherwise noted: ug/L Associated Samples: All

Analyte	Maximum PB* (mg/Kg)	Maximum PB* (ug/L)	Maximum ICB/CCB* (ug/L)	Blank Action Limit	Sample Identification 1	2	3	4	5	6	7				
Al															Al
Sb															Sb
As															As
Ba															Ba
Be															Be
Cd															Cd
Ca		118	201.41	1007.05		98.0									Ca
Cr															Cr
Co															Co
Cu															Cu
Fe			59.33	146.65	19.2	1.9	32.4	5.3	16.0	31.2	55.7				Fe
Pb															Pb
Mg			79.39	396.95		15.1									Mg
Mn															Mn
Hg															Hg
Ni															Ni
K			28.08	140.4		27.8									K
Se															Se
Ag															Ag
Na			270.76	1353.8		430									Na
Tl															Tl
V															V
Zn															Zn
B															B
Mo															Mo
Sr															Sr

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".
Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC #: 10414E4
SDG #: 03-2843

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: MH
2nd reviewer: A

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

(Y) N N/A Were field duplicate pairs identified in this SDG?
(Y) N N/A Were target analytes detected in the field duplicate pairs?

Analyte	Concentration (ug/L)		RPD (Limits)	Difference (Limits)	Qualifications
	1	5			
Aluminum					
Antimony					
Arsenic					
Barium					
Beryllium					
Cadmium					
Calcium	96500	97600	1		
Chromium					
Cobalt					
Copper					
Iron	19.2	16.0	18		
Lead					
Magnesium	39800	41500	4		
Manganese					
Mercury					
Nickel					
Potassium	3630	3610	1		
Selenium					
Silver					
Sodium	36600	38100	4		
Thallium					
Vanadium					
Zinc					
Cyanide					
Boron					
Molybdenum					
Strontium					
Silicon					

Notes:

LDC #: 10414 E4
SDG #: 03-2843

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 1
Reviewer: MH
2nd reviewer:

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

(Y) N N/A Were field blanks identified in this SDG?
(Y) N N/A Were target analytes detected in the field blanks?

Sample: 2 Field Blank / Trip Blank / Rinsate / (Other) EB (circle one)

Analyte	Concentration Units (ug/L)
Ca	98.0
Fe	1.9
Mg	15.1
K	29.8
Na	430

Sample: _____ Field Blank / Trip Blank / Rinsate / Other_____ (circle one)

Analyte	Concentration Units ( )

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: NASA JPL

Collection Date: April 24, 2003

LDC Report Date: June 17, 2003

Matrix: Water

Parameters: Metals

Validation Level: EPA Level III

Laboratory: Applied P & Ch Laboratory

Sample Delivery Group (SDG): 03-2866

Sample Identification

DUPE-3-2Q03
EB-5-4/24/03
MW-20-1
MW-20-2
MW-20-3
MW-20-4
MW-20-5

Introduction

This data review covers 7 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Methods 200.7 and 200.9 for Metals. The metals analyzed were Arsenic, Calcium, Iron, Magnesium, Potassium, and Sodium.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (February 1994) as there are no current guidelines for the methods stated above.

A table summarizing all data qualification flags 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 specified protocols or is of technical advisory nature.

Blanks are summarized in Section III.

Field duplicates are summarized in Section XIII.

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. Calibration

An initial calibration was performed.

The frequency and analysis criteria of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable.

Data qualification by the initial, continuing and preparation blanks (ICB/CCB/PBs) was based on the maximum contaminant concentration in the ICB/CCB/PBs in the analysis of each analyte. No contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Potassium Sodium	66.4 ug/L 525 ug/L	All samples in SDG 03-2866
ICB/CCB	Iron Magnesium Potassium Sodium	2.29 ug/L 24.40 ug/L 79.72 ug/L 1295.55 ug/L	All samples in SDG 03-2866

Sample concentrations were compared to the maximum contaminant concentrations detected in the ICB/CCB/PBs. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated method blanks with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
EB-5-4/24/03	Potassium Sodium	106 ug/L 962 ug/L	106U ug/L 962U ug/L

IV. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

V. Matrix Spike Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VI. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

VII. Laboratory Control Samples (LCS)

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

VIII. Internal Standards (ICP-MS)

ICP-MS was not utilized in this SDG.

IX. Furnace Atomic Absorption QC

Raw data were not reviewed for this SDG.

X. ICP Serial Dilution

ICP serial dilution was not required by the method.

XI. Sample Result Verification

Raw data were not reviewed for this SDG.

XII. Overall Assessment of Data

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

XIII. Field Duplicates

Samples DUPE-3-2Q03 and MW-20-1 were identified as field duplicates. No metals were detected in any of the samples with the following exceptions:

Analyte	Concentration (ug/L)		RPD
	DUPE-3-2Q03	MW-20-1	
Calcium	51400	52100	1

Analyte	Concentration (ug/L)		RPD
	DUPE-3-2Q03	MW-20-1	
Iron	49.4	56.3	13
Magnesium	15700	16100	3
Potassium	2310	2380	3
Sodium	15100	15800	5

XIV. Field Blanks

Sample EB-5-4/24/03 was identified as an equipment blank. No metal contaminants were found in this blank with the following exceptions:

Equipment Blank ID	Analyte	Concentration (ug/L)
EB-5-4/24/03	Iron	26.0
	Potassium	106
	Sodium	962

NASA JPL
Metals - Data Qualification Summary - SDG 03-2866

No Sample Data Qualified in this SDG

NASA JPL
Metals - Laboratory Blank Data Qualification Summary - SDG 03-2866

SDG	Sample	Analyte	Modified Final Concentration	A or P
03-2866	EB-5-4/24/03	Potassium Sodium	106U ug/L 962U ug/L	A

Applied P & Ch Laboratory

Metal Analysis Results

Client Name:	GEOFON, Inc.	Project No:	04-4428.10	Collection Date:	04/24/2003
Project ID:	JPL	Service ID:	32866	Collected by:	Leo Williamson
		Lab Sample ID:	03-2866-1	Received Date:	04/24/2003
Sample ID:	**DUPE-3-2Q03**	Sample Matrix	Water	Moisture %:	–
Sample Type:	Field Sample				

Element Name	CAS No	Unit	RL	Result	C	M	Q	Batch	D-Date	A-Date	DF	Method
ARSENIC	7440-38-2	µg/L	5	< 5	U	F		03M1402E	04/29/03	04/29/03	1	200.9
CALCIUM	7440-70-2	µg/L	200	51400		P		03M1385L	04/28/03	04/28/03	1	200.7
IRON	7439-89-6	µg/L	50	49.4	B	P		03M1385L	04/28/03	04/28/03	1	200.7
MAGNESIUM	7439-95-4	µg/L	100	15700		P		03M1385L	04/28/03	04/28/03	1	200.7
POTASSIUM	7440-09-7	µg/L	400	2310		P		03M1385L	04/28/03	04/28/03	1	200.7
SODIUM	7440-23-5	µg/L	2000	15100		P		03M1385L	04/28/03	04/28/03	1	200.7

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

Note: RL: PQL (EQL) or CRDL D-Date: Digestion Date; A-Date: Analysis Date; DF: Dilution Factor

C Qualifier: U - Not Detected or less than IDL; B - Less than RL (PQL, EQL or CRDL), but greater than IDL.

Q Qualifier: N - Spike recovery out of control; * - Duplicate analysis out of control; W - Post digestion spike for GFAA out of control; E - Serial dilution difference out of control

M Qualifier: P - ICP A - FLAA F - GFAA CV - Cold Vapor

6/18/03

Applied P & Ch Laboratory

Metal Analysis Results

Client Name:	GEOFON, Inc.	Project No:	04-4428.10	Collection Date:	04/24/2003
Project ID:	JPL	Service ID:	32866	Collected by:	Leo Williamson
		Lab Sample ID:	03-2866-2	Received Date:	04/24/2003
Sample ID:	**EB-5-4/24/03**	Sample Matrix	Water	Moisture %:	–
Sample Type:	Field Sample				

Element Name	CAS No	Unit	RL	Result	C	M	Q	Batch	D-Date	A-Date	DF	Method
ARSENIC	7440-38-2	µg/L	5	< 5	U	F		03M1402E	04/29/03	04/29/03	1	200.9
CALCIUM	7440-70-2	µg/L	200	< 200	U	P		03M1385L	04/28/03	04/28/03	1	200.7
IRON	7439-89-6	µg/L	50	26.0	B	P		03M1385L	04/28/03	04/28/03	1	200.7
MAGNESIUM	7439-95-4	µg/L	100	< 100	U	P		03M1385L	04/28/03	04/28/03	1	200.7
POTASSIUM	7440-09-7	µg/L	400	106 U	B	P		03M1385L	04/28/03	04/28/03	1	200.7
SODIUM	7440-23-5	µg/L	2000	962 U	B	P		03M1385L	04/28/03	04/28/03	1	200.7

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

Note: RL: PQL (EQL) or CRDL D-Date: Digestion Date; A-Date: Analysis Date; DF: Dilution Factor

C Qualifier: U - Not Detected or less than IDL B - Less than RL (PQL, EQL or CRDL), but greater than IDL.

Q Qualifier: N - Spike recovery out of control * - Duplicate analysis out of control

W - Post digestion spike for GFAA out of control E - Serial dilution difference out of control

M Qualifier: P - ICP A - FLAA F - GFAA CV - Cold Vapor

6/18/03

Applied P & Ch Laboratory

Metal Analysis Results

Client Name:	GEOFON, Inc.	Project No:	04-4428.10	Collection Date:	04/24/2003
Project ID:	JPL	Service ID:	32866	Collected by:	Leo Williamson
		Lab Sample ID:	03-2866-3	Received Date:	04/24/2003
Sample ID:	**MW-20-1**	Sample Matrix	Water	Moisture %:	–
Sample Type:	Field Sample				

Element Name	CAS No	Unit	RL	Result	C	M	Q	Batch	D-Date	A-Date	DF	Method
ARSENIC	7440-38-2	µg/L	5	< 5	U	F		03M1402E	04/29/03	04/29/03	1	200.9
CALCIUM	7440-70-2	µg/L	200	52100		P		03M1385L	04/28/03	04/28/03	1	200.7
IRON	7439-89-6	µg/L	50	56.3		P		03M1385L	04/28/03	04/28/03	1	200.7
MAGNESIUM	7439-95-4	µg/L	100	16100		P		03M1385L	04/28/03	04/28/03	1	200.7
POTASSIUM	7440-09-7	µg/L	400	2380		P		03M1385L	04/28/03	04/28/03	1	200.7
SODIUM	7440-23-5	µg/L	2000	15800		P		03M1385L	04/28/03	04/28/03	1	200.7

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

Note: RL: PQL (EQL) or CRDL D-Date: Digestion Date; A-Date: Analysis Date; DF: Dilution Factor

C Qualifier: U - Not Detected or less than IDL B - Less than RL (PQL, EQL or CRDL), but greater than IDL.

Q Qualifier: N - Spike recovery out of control * - Duplicate analysis out of control

W - Post digestion spike for GFAA out of control E - Serial dilution difference out of control

M Qualifier: P - ICP A - FLAA F - GFAA CV - Cold Vapor

Applied P & Ch Laboratory

Metal Analysis Results

Client Name:	GEOFON, Inc.	Project No:	04-4428.10	Collection Date:	04/24/2003
Project ID:	JPL	Service ID:	32866	Collected by:	Leo Williamson
		Lab Sample ID:	03-2866-4	Received Date:	04/24/2003
Sample ID:	**MW-20-2**	Sample Matrix	Water	Moisture %:	–
Sample Type:	Field Sample				

Element Name	CAS No	Unit	RL	Result	C	M	Q	Batch	D-Date	A-Date	DF	Method
ARSENIC	7440-38-2	µg/L	5	< 5	U	F		03M1402E	04/29/03	04/29/03	1	200.9
CALCIUM	7440-70-2	µg/L	200	39400		P		03M1385L	04/28/03	04/28/03	1	200.7
IRON	7439-89-6	µg/L	50	65.8		P		03M1385L	04/28/03	04/28/03	1	200.7
MAGNESIUM	7439-95-4	µg/L	100	13100		P		03M1385L	04/28/03	04/28/03	1	200.7
POTASSIUM	7440-09-7	µg/L	400	1780		P		03M1385L	04/28/03	04/28/03	1	200.7
SODIUM	7440-23-5	µg/L	2000	13000		P		03M1385L	04/28/03	04/28/03	1	200.7

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

Note: RL: PQL (EQL) or CRDL D-Date: Digestion Date; A-Date: Analysis Date; DF: Dilution Factor

C Qualifier: U - Not Detected or less than IDL B - Less than RL (PQL, EQL or CRDL), but greater than IDL.

Q Qualifier: N - Spike recovery out of control * - Duplicate analysis out of control

W - Post digestion spike for GFAA out of control E - Serial dilution difference out of control

M Qualifier: P - ICP A - FLAA F - GFAA CV - Cold Vapor

6/18/03

Applied P & Ch Laboratory

Metal Analysis Results

Client Name:	GEOFON, Inc.	Project No:	04-4428.10	Collection Date:	04/24/2003
Project ID:	JPL	Service ID:	32866	Collected by:	Leo Williamson
		Lab Sample ID:	03-2866-5	Received Date:	04/24/2003
Sample ID:	**MW-20-3**	Sample Matrix	Water	Moisture %:	–
Sample Type:	Field Sample				

Element Name	CAS No	Unit	RL	Result	C	M	Q	Batch	D-Date	A-Date	DF	Method
ARSENIC	7440-38-2	µg/L	5	<5	U	F		03M1402E	04/29/03	04/29/03	1	200.9
CALCIUM	7440-70-2	µg/L	200	36900		P		03M1385L	04/28/03	04/28/03	1	200.7
IRON	7439-89-6	µg/L	50	30.2	B	P		03M1385L	04/28/03	04/28/03	1	200.7
MAGNESIUM	7439-95-4	µg/L	100	12800		P		03M1385L	04/28/03	04/28/03	1	200.7
POTASSIUM	7440-09-7	µg/L	400	2340		P		03M1385L	04/28/03	04/28/03	1	200.7
SODIUM	7440-23-5	µg/L	2000	54200		P		03M1385L	04/28/03	04/28/03	1	200.7

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

Note: RL: PQL (EQL) or CRDL D-Date: Digestion Date; A-Date: Analysis Date; DF: Dilution Factor

C Qualifier: U - Not Detected or less than IDL B - Less than RL (PQL, EQL or CRDL), but greater than IDL.

Q Qualifier: N - Spike recovery out of control * - Duplicate analysis out of control

W - Post digestion spike for GFAA out of control E - Serial dilution difference out of control

M Qualifier: P - ICP A - FLAA F - GFAA CV - Cold Vapor

6/18/03

Applied P & Ch Laboratory

Metal Analysis Results

Client Name:	GEOFON, Inc.	Project No:	04-4428.10	Collection Date:	04/24/2003
Project ID:	JPL	Service ID:	32866	Collected by:	Leo Williamson
		Lab Sample ID:	03-2866-6	Received Date:	04/24/2003
Sample ID:	**MW-20-4**	Sample Matrix	Water	Moisture %:	–
Sample Type:	Field Sample				

Element Name	CAS No	Unit	RL	Result	C	M	Q	Batch	D-Date	A-Date	DF	Method
ARSENIC	7440-38-2	µg/L	5	< 5	U	F		03M1402E	04/29/03	04/29/03	1	200.9
CALCIUM	7440-70-2	µg/L	200	10300		P		03M1385L	04/28/03	04/28/03	1	200.7
IRON	7439-89-6	µg/L	50	673		P		03M1385L	04/28/03	04/28/03	1	200.7
MAGNESIUM	7439-95-4	µg/L	100	2700		P		03M1385L	04/28/03	04/28/03	1	200.7
POTASSIUM	7440-09-7	µg/L	400	1110		P		03M1385L	04/28/03	04/28/03	1	200.7
SODIUM	7440-23-5	µg/L	2000	54300		P		03M1385L	04/28/03	04/28/03	1	200.7

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

Note: RL: PQL (EQL) or CRDL D-Date: Digestion Date; A-Date: Analysis Date; DF: Dilution Factor

C Qualifier: U - Not Detected or less than IDL B - Less than RL (PQL, EQL or CRDL), but greater than IDL.

Q Qualifier: N - Spike recovery out of control * - Duplicate analysis out of control

W - Post digestion spike for GFAA out of control E - Serial dilution difference out of control

M Qualifier: P - ICP A - FLAA F - GFAA CV - Cold Vapor

6/18/03

Applied P & Ch Laboratory

Metal Analysis Results

Client Name:	GEOFON, Inc.	Project No:	04-4428.10	Collection Date:	04/24/2003
Project ID:	JPL	Service ID:	32866	Collected by:	Leo Williamson
		Lab Sample ID:	03-2866-7	Received Date:	04/24/2003
Sample ID:	MW-20-5	Sample Matrix	Water	Moisture %:	–
Sample Type:	Field Sample				

Element Name	CAS No	Unit	RL	Result	C	M	Q	Batch	D-Date	A-Date	DF	Method
ARSENIC	7440-38-2	µg/L	5	<5	U	F		03M1402E	04/29/03	04/29/03	1	200.9
CALCIUM	7440-70-2	µg/L	200	4840		P		03M1385L	04/28/03	04/28/03	1	200.7
IRON	7439-89-6	µg/L	50	50.6		P		03M1385L	04/28/03	04/28/03	1	200.7
MAGNESIUM	7439-95-4	µg/L	100	1020		P		03M1385L	04/28/03	04/28/03	1	200.7
POTASSIUM	7440-09-7	µg/L	400	1580		P		03M1385L	04/28/03	04/28/03	1	200.7
SODIUM	7440-23-5	µg/L	2000	64400		P		03M1385L	04/28/03	04/28/03	1	200.7

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

Note: RL: PQL (EQL) or CRDL D-Date: Digestion Date; A-Date: Analysis Date; DF: Dilution Factor

C Qualifier: U - Not Detected or less than IDL B - Less than RL (PQL, EQL or CRDL), but greater than IDL.

Q Qualifier: N - Spike recovery out of control * - Duplicate analysis out of control

W - Post digestion spike for GFAA out of control E - Serial dilution difference out of control

M Qualifier: P - ICP A - FLAA F - GFAA CV - Cold Vapor

6/18/03

LDC #: 10414F4

SDG #: 03-2866

Laboratory: Applied P & Ch Laboratory

VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 6/16/03

Page: 1 of 1

Reviewer: MH

2nd Reviewer: A

METHOD: Metals (EPA Method 200.7 & 200.9)

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: 4/24/03
II.	Calibration	A	
III.	Blanks	SW	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Matrix Spike Analysis	A	3 MS/MSD/Dup for As from SDG 03-2933
VI.	Duplicate Sample Analysis	A	
VII.	Laboratory Control Samples (LCS)	A	LCS/LCSD
VIII.	Internal Standard (ICP-MS)	N	Not utilized
IX.	Furnace Atomic Absorption QC	A	MSA was not performed
X.	ICP Serial Dilution	N	Not required.
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	SW	(1,3)
XIV.	Field Blanks	SW	FB=2

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

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

Notes: _____

LDC #: 10414F4
SDG #: 03-2866

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Page: 1 of 1
Reviewer: MB
2nd reviewer: [signature]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-7	Aq	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___

Analysis Method

ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
ICP Trace		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___

Comments: Mercury by CVAA if performed

LDC #: 10414F4
SDG #: 03-2866

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Page: 1 of 1
Reviewer: MH
2nd Reviewer: A

METHOD: Trace Metals (EPA SW 846 Method 6010/7000) Soil preparation factor applied: _____
Sample Concentration units, unless otherwise noted: ug/L Associated Samples: All

					Sample Identification										
Analyte	Maximum PB* (mg/Kg)	Maximum PB* (ug/L)	Maximum ICB/CCB* (ug/L)	Blank Action Limit	2										
Al															Al
Sb															Sb
As															As
Ba															Ba
Be															Be
Cd															Cd
Ca															Ca
Cr															Cr
Co															Co
Cu															Cu
Fe			2.29	11.45											Fe
Pb															Pb
Mg			24.40	122											Mg
Mn															Mn
Hg															Hg
Ni															Ni
K		66.4	79.72	398.6	106										K
Se															Se
Ag															Ag
Na		525	1295.55	6477.75	962										Na
Tl															Tl
V															V
Zn															Zn
B															B
Mo															Mo
Sr															Sr

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected. "U".
Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC #: 10414 F4
SDG #: 03-2866

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: MH
2nd reviewer:

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

(Y) N N/A Were field duplicate pairs identified in this SDG?
(Y) N N/A Were target analytes detected in the field duplicate pairs?

Analyte	Concentration (ug/L) 1	3	RPD (Limits)	Difference (Limits)	Qualifications
Aluminum					
Antimony					
Arsenic					
Barium					
Beryllium					
Cadmium					
Calcium	51400	52100	1		
Chromium					
Cobalt					
Copper					
Iron	49.4	56.3	13		
Lead					
Magnesium	15700	16100	3		
Manganese					
Mercury					
Nickel					
Potassium	2310	2380	3		
Selenium					
Silver					
Sodium	15100	15800	5		
Thallium					
Vanadium					
Zinc					
Cyanide					
Boron					
Molybdenum					
Strontium					
Silicon					

Notes:

LDC #: 10414F4
SDG #: 03-2866

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 1
Reviewer: MH
2nd reviewer: A

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

(Y) N N/A Were field blanks identified in this SDG?
(Y) N N/A Were target analytes detected in the field blanks?

Sample: 2 Field Blank / Trip Blank / Rinsate / Other EB (circle one)

Analyte	Concentration Units (ug/L)
Fe	26.0
K	106
Na	962

Sample: _____ Field Blank / Trip Blank / Rinsate / Other_____ (circle one)

Analyte	Concentration Units ( )