

Request for Quote (RFQ) for Modified Analysis

Date: August 27, 2008

Subject: Modification Reference Number: 1629.0
Title: ICP-AES Metals with Boron and Molybdenum
Sample Matrix: Water and Soil
Fraction Affected: Metals
Statement of Work: ILM05.4

Purpose:

The Contractor Laboratory is requested to perform the following modified analyses under the Inorganic Statement of Work (SOW) ILM05.4, based on the additional specifications listed below. Unless specifically modified by this modification, all analyses, Quality Control (QC), and reporting requirements specified in SOW ILM05.4 remain unchanged and in full force and effect. The number of samples requested in this modification is not guaranteed.

Please note that accepting a modified analysis request is voluntary, and that the Laboratory is not required to accept the modified analysis. There will be no adverse effect to the Laboratory for not accepting the modified analysis request. However, once the Laboratory accepts the request for modified analysis, it shall perform the analysis in accordance with this modification and as specified in SOW ILM05.4.

The Laboratory is requested to review the modification described herein, determine whether or not it shall accept the requested modified analyses, and complete the attached response form. The Laboratory shall provide comments in response to the required changes in the designated area, in order to ensure that the modified analysis can be completed in accordance with the specifications described herein.

Notice to Contractors: Acceptance of Modified Analysis samples will not count against the monthly capacity.

Modification to the SOW Specifications:

The contract Laboratory shall analyze aqueous/water and soil/sediment samples for target analytes and the additional analytes Boron (B, CASRN 7440-42-8) and Molybdenum (Mo, CASRN 7439-98-7) by ICP-AES as indicated on the Traffic Report/Chain of Custody Record.

Analyte	Water CRQL (ug/L)	Soil CRQL (mg/kg)	Water Spike level (ug/L)	Soil Spike level (mg/kg)
B	50	5.0	250	25
Mo	5	0.5	25	2.5

The Laboratory must submit Method Detection Limits (MDL) for Boron and Molybdenum that are less than one-half the CRQLs.

The Laboratory shall not use borosilicate glassware to digest the samples for metals analysis or prepare any sample dilutions to avoid contaminating samples with Boron. Polymer digestion vessels shall be used instead.

Post-digestion Spike requirements are per the SOW.

The Laboratory shall add Boron and Molybdenum to the ICV/CCV solutions at appropriate concentrations.

The Laboratory shall add Boron and Molybdenum to the CRI solution at the requested aqueous CRQLs.

The Laboratory shall add Boron and Molybdenum to the LCSW at the levels requested for Matrix Spike if they are not already present in the solution. The Laboratory is not required to add Boron and Molybdenum to the LCSS if they are not already present.

The Laboratory is not required to add Boron and Molybdenum to the ICSA/ICSAB solutions. The Laboratory shall use a true value of zero (0) and acceptance windows of +/- 2 times the CRQL, unless a non-zero value for these analytes has been determined for the solution(s).

The Laboratory shall add Boron and Molybdenum to Forms 1, 2A, 2B, 3, 4A, 5A, (5B), 6, 8, 9, 10A, 11, and 13

Reporting Requirements:

Hardcopy and electronic data reporting are required as specified per SOW ILM05.4. All hardcopy and electronic data shall be adjusted to incorporate modified specifications. This includes attaching a copy of the requirements for modified analysis to the SDG Narrative. If specific problems occur with incorporation of the modified analysis into the hardcopy and/or electronic deliverable, the Laboratory shall contact the DASS Manager within the Sample

Management Office (SMO) at (703) 818-4233 or via email at CCSSUPPORT@fedcsc.com for resolution.

All samples and/or fractions assigned to an SDG shall be analyzed under the same Modified Analysis requirements as established in this memorandum. The Laboratory shall not include data from multiple Modified Analyses in one SDG.

The Laboratory shall include the Modification Reference Number 1629.0 on each hardcopy data form under the "NRAS No:" header appearing on each form as well as the "NRAS No." field on the Record type 21 of the electronic deliverable (if diskette deliverable is required). The Laboratory shall also document the Modification Reference Number and Solicitation Number on the SDG Coversheet.

Clarifications/Revisions to the RFQ for Modified Analysis:

Laboratory Name:

Laboratory Comments:

[REDACTED]

From: [REDACTED]
Sent: Thursday, September 04, 2008 11:13 AM
To: [REDACTED]
Cc: sizys.dan@epa.gov; Harris.Carroll@epamail.epa.gov; thaung.khin-cho@epa.gov; kwedar.john@epa.gov
Subject: Region 03 | Case [REDACTED] Lab CHEM | Issue Multiple | FINAL

Summary Start

-Discrepancies with tags, jars, and/or TR/COC-

Issue 1: The TR/COC lists the analysis TAL TM+B+M for the ground, surface, and potable well water samples; however, the Scheduling Notification Form lists that the analysis is ICP-AES (Al, Ca, Fe, Mg, K, Na)+B+Mo/Hg, ICP-AES TM+B+Mo/Hg, and ICP-MS Metals for water samples. The laboratory is not sure what analyses should be performed on the water samples.

Resolution 1: Per Region 3, the laboratory will perform the following analyses on the water samples. The laboratory will note the issue in the Case/SDG Narrative and proceed with the analysis of the samples.

<u>Matrix</u>	<u>Analysis</u>
Ground Water	ICP-AES TM+B+Mo by MA 1629.0 and Hg
Surface Water	ICP-AES TM+B+Mo by MA 1629.0 and Hg
Potable Well	ICP-AES (Al, Ca, Fe, Mg, K, Na)+B+Mo by MA 1629.0, Hg, and ICP-MS Metals

Issue 2: The laboratory received several water samples that have a container labeled for Dissolved Metals; however, the laboratory is not scheduled to receive any Dissolved Metals samples.
Resolution 2: Per Region 3, the laboratory will perform the following analyses on the Dissolved Metals water samples. The laboratory will note the issue in the Case/SDG Narrative and proceed with the analysis of the samples.

<u>Matrix</u>	<u>Analysis (filtered)</u>
Ground Water	ICP-AES (Al, Ca, Fe, Mg, K, Na)+B+Mo by MA 1629.0, Hg, and ICP-MS Metals
Surface Water	ICP-AES TM+B+Mo by MA 1629.0 and Hg

SMO will note that the laboratory accepted the laboratory's bid price of \$ [REDACTED] for ICP-AES 5-10 Metals (plus B and Mo), \$ [REDACTED] for ICP-AES 11-22 Metals (plus B and Mo), \$ [REDACTED] for ICP-MS 11-16 Metals, and \$ [REDACTED] for Mercury for the added Dissolved Metal fraction (bid sheet attached).

-Incorrect/duplicated sample numbers-

Issue 3: The laboratory received water samples that have the same Sample ID for the Total and Dissolved Metals fraction.

Resolution 3: In accordance with previous direction from Region 3, the laboratory will note the issue in the Case/SDG Narrative and proceed with the analysis of the samples using the following instructions: The Total Metals sample will keep the CLP sample ID listed on the TR/COC. The SMO coordinator will assign a new CLP sample ID for the Dissolved/Filtered Metals sample, and notify the Region and the laboratory of the new sample ID.

Total Fraction

[REDACTED]

Dissolved Fraction

[REDACTED]

9/4/2008

219

10257

[REDACTED]

[REDACTED]

-Laboratory problems-

Issue 4: The laboratory received 2 containers for most of the soil samples received for the Case. The laboratory would like to perform the requested analyses from the 1st container and use the 2nd container as extra volume if needed. Are the laboratory's proposed actions acceptable to the Region?

Resolution 4: Per Region 3, the laboratory's proposed actions are acceptable. The laboratory will note the issue in the Case/SDG Narrative and proceed with the analysis of the samples.

Summary End

Please let me know if you have any further questions or problems.

Thanks,

Colin

Computer Sciences Corporation (CSC)

9/4/08, 11:45 AM, Phone conversation between Dan Slizys (Region 3) and [REDACTED] (SMO). Dan indicated that the laboratory's proposed actions are acceptable for issue 4.

From: [REDACTED]
Sent: Thursday, September 04, 2008 11:12 AM
To: 'slizys.dan@epa.gov'; Harris.Carroll@epamail.epa.gov
Cc: thaung.khin-cho@epa.gov; kwedar.john@epa.gov
Subject: NEW ISSUE | Case [REDACTED] Lab CHEM | Issue Multiple |

Dan/Carroll,

CHEM is reporting the following issues for Case [REDACTED] (TR/COCs attached). Issues 1, 2, and 3 have been resolved. Please advise on issue 4.

-Discrepancies with tags, jars, and/or TR/COC-

Issue 1: The TR/COC lists the analysis TAL TM+B+M for the ground, surface, and potable well water samples; however, the Scheduling Notification Form lists that the analysis is ICP-AES (Al, Ca, Fe, Mg, K, Na)+B+Mo/Hg, ICP-AES TM+B+Mo/Hg, and ICP-MS Metals for water samples. The laboratory is not sure what analyses should be performed on the water samples.

9/4/2008

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
ENVIRONMENTAL SCIENCE CENTER
701 MAPES ROAD
FORT MEADE, MARYLAND 20755-5350

DATE : September 30, 2008

SUBJECT: Region III Data QA Review

FROM : Colleen Walling *Colleen K. Walling*
Region III ESAT RPO (3EA20)

TO : Christine Wagner
Regional Project Manager (3HS32)

Attached is the inorganic data validation report for the Battlefield Gulf Club site (Case # [REDACTED] SDG # [REDACTED] completed by the Region III Environmental Services Assistance Team (ESAT) contractor under the direction of Region III EAID.

If you have any questions regarding this review, please call me at (410) 305-2763.

Attachment

cc: [REDACTED] (TETRA TECH EMI)

TO File #: [REDACTED]

TDF#: [REDACTED]

OFFICE OF ANALYTICAL SERVICES AND QUALITY ASSURANCE

Lockheed Martin Enterprise Solutions & Services
ESAT Region 3
US EPA Environmental Science Center
701 Mapes Road Ft. Meade, MD 20755-5350
Telephone 410-305-3037 Facsimile 410-305-3597

DATE: September 30, 2008

SUBJECT: Level IM2 Inorganic Data Validation for Case [REDACTED]
SDG: [REDACTED]
Site: Battlefield Golf Club

FROM: [REDACTED]
Inorganic Data Reviewer

Through: [REDACTED]
Senior Data Review Chemist

TO: Colleen Walling
ESAT Region 3 Project Officer

OVERVIEW

Case [REDACTED] Sample Delivery Group (SDG) [REDACTED] consisted of seventeen (17) filtrate aqueous samples analyzed for dissolved metals by the ICP-MS method. The sample set included one (1) field duplicate pair. All samples were submitted to ChemTech Consulting Group (CHEM) for analyses. Samples were analyzed in accordance with Contract Laboratory Program (CLP) Statement of Work (SOW) ILM05.4 through the Routine Analytical Services (RAS) program.

SUMMARY

Data were validated according to the Region III Modifications to the National Functional Guidelines for Inorganic Data Review, level IM2. Areas of concern with respect to data usability are listed below.

Data in this Case have been impacted by outliers present in the laboratory blanks as well as matrix spike analysis. Details for these outliers are discussed under "Minor Problems", specific samples affected are outlined in "Table 1A" and qualified analytical results for all samples are summarized on the Data Summary Forms (DSFs).

MINOR PROBLEMS

Preparation (PB) and Continuing Calibration (CCB) Blanks had reported results greater than the Method Detection Limits (MDLs) for the analytes listed below. Positive results for these analytes in affected samples which are less than or equal to five times ($\leq 5X$) the blank concentrations may be biased high and have been qualified "B" on the DSFs.

<u>Blank</u>	<u>Affected Analytes</u>
PB	nickel (Ni), vanadium (V)
CCB	antimony (Sb), arsenic (As), cadmium (Cd), chromium (Cr), cobalt (Co), copper (Cu), lead (Pb), silver (Ag), thallium (Tl)

CCBs had negative values greater than the absolute value of the MDL for selenium (Se). Quantitation limits for this analyte in all samples may be biased low and have been qualified "UL" on the DSFs.

The matrix spike recovery was low ($<75\%$ but $>30\%$) for silver (Ag). The low recovery may be attributed to matrix interferences or analyte lost during the digestion process. Positive results reported for this analyte in affected samples may be biased low. The "L" qualifier has been superseded by "B" on the DSFs. Quantitation limits for this analyte in affected samples in this SDG may be biased low and have been qualified "UL" on the DSFs.

NOTES

Positive results which are less than the Contract Required Quantitation Limits (CRQLs) but greater than MDLs have been qualified "J" on the DSFs unless superseded by "B".

The post digestion spike recovery was high ($>125\%$) for Ag. No data were qualified based on this outlier.

Reported results for field duplicate pair [REDACTED] were within control limits (20% RPD, \pm CRQL) for all analytes except for Cu, Pb and zinc (Zn).

The following EPA sample numbers were designated for both total metals and dissolved metals on the chain-of-custody records. The Sample Management Office (SMO) assigned new sample numbers for the dissolved metal samples. The total metal samples retain the original sample numbers listed below.

Original Sample Number

[REDACTED]

New Sample Member

[REDACTED]

Original Sample Number

New Sample Member

[REDACTED]

[REDACTED]

Data for Case [REDACTED] DG [REDACTED] were reviewed in accordance with Region III Modifications to the National Functional Guidelines for Evaluating Inorganic Analyses, April 1993.

ATTACHMENTS

INFORMATION REGARDING REPORT CONTENT

- TABLES 1A SUMMARY OF QUALIFIERS ON DATA SUMMARY FORMS AFTER DATA VALIDATION
- TABLE 1B CODES USED IN COMMENTS COLUMN OF TABLES 1A
- APPENDIX A GLOSSARY OF DATA QUALIFIER CODES
- APPENDIX B DATA SUMMARY FORM(S)
- APPENDIX C CHAIN OF CUSTODY RECORD(S)
- APPENDIX D LABORATORY CASE NARRATIVE(S)

DCN: [REDACTED]

TABLE 1A
 SUMMARY OF QUALIFIERS ON DATA SUMMARY
 FORM AFTER DATA VALIDATION

Case [REDACTED] SDG [REDACTED]

<u>ANALYTE</u>	<u>SAMPLES AFFECTED</u>	<u>POSITIVE VALUES</u>	<u>NON-DETECTED VALUES</u>	<u>BIAS</u>	<u>COMMENTS*</u>
Sb	[REDACTED]	B		High	CCB (0.333 J ug/L)
	[REDACTED]	B		High	CCB (0.280 J ug/L)
As	[REDACTED]	B		High	CCB (0.293 J ug/L)
Cd	[REDACTED]	B		High	CCB (0.183 J ug/L)
Cr	[REDACTED]	B		High	CCB (0.220 J ug/L)
	[REDACTED]	B		High	CCB (0.187 J ug/L)
Co	[REDACTED]	B		High	CCB (0.10 J ug/L)
Cu	All Samples Except [REDACTED]	B		High	CCB (0.107 J ug/L)
	[REDACTED]	B		High	CCB (0.107 J ug/L)
Pb	[REDACTED]	B		High	CCB (0.150 J ug/L)
	[REDACTED]	B		High	CCB (0.123 J ug/L)
Ni	[REDACTED]	B		High	PB (0.137 J ug/L)

* See explanation of comments in Table 1B

**TABLE 1A
SUMMARY OF QUALIFIERS ON DATA SUMMARY
FORM AFTER DATA VALIDATION**

Case [REDACTED] SDG [REDACTED]

<u>ANALYTE</u>	<u>SAMPLES AFFECTED</u>	<u>POSITIVE VALUES</u>	<u>NON-DETECTED VALUES</u>	<u>BIAS</u>	<u>COMMENTS*</u>
Se	[REDACTED]		UL	Low	CBN (- 0.220 J ug/L)
	All Samples Except [REDACTED]		UL	Low	CBN (- 0.517 J ug/L)
Ag	[REDACTED]	B		High	CCB (0.117 J ug/L) MSL (49%)
	[REDACTED]	B		High	CCB (0.177 J ug/L) MSL (49%)
	[REDACTED]		UL	Low	MSL (49%)
TI	[REDACTED]	B		High	CCB (0.117 J ug/L)
V	[REDACTED]	B		High	PB (0.236 J ug/L)

* See explanation of comments in Table 1B

**TABLE 1B
CODES USED IN COMMENTS COLUMN**

- CCB = Continuing calibration blanks had reported results greater than the MDLs [results are in parenthesis]. Reported results which are less than or equal to five times ($\leq 5X$) the blank concentration may be biased high.
- PB = The preparation blank had reported results greater than the MDLs [results are in parenthesis]. Reported results which are less than or equal to five times ($\leq 5X$) the blank concentration may be biased high.
- CBN = Continuing calibration blanks had reported negative results greater than absolute value of MDL [results are in parenthesis]. Quantitation limits may be biased low.
- MSL = The matrix spike recovery was low ($>30\%$ but $<75\%$) [the %recovery is in parenthesis]. Reported results and quantitation limits may be biased low.

Appendix A

Glossary of Data Qualifier Codes

GLOSSARY OF DATA QUALIFIER CODES (INORGANIC)

CODES RELATED TO IDENTIFICATION

(confidence concerning presence or absence of analytes):

U = Not detected. The associated number indicates approximate sample concentration necessary to be detected.

(NO CODE) = Confirmed identification.

B = Not detected substantially above the level reported in laboratory or field blanks.

R = Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.

CODES RELATED TO QUANTITATION

(can be used for both positive results and sample quantitation limits):

J = Analyte Present. Reported value may not be accurate or precise.

K = Analyte present. Reported value may be biased high. Actual value is expected to be lower.

L = Analyte present. Reported value may be biased low. Actual value is expected to be higher.

UJ = Not detected, quantitation limit may be inaccurate or imprecise.

UL = Not detected, quantitation limit is probably higher.

OTHER CODE

Q = No analytical result.

Appendix B

Data Summary Forms (DSFs)

DATA SUMMARY FORM: INORGANIC

Case #: [REDACTED]

SDG: [REDACTED]

Number of Soil Samples: 0

Site: BATTLEFIELD GOLF CLUB

Number of Water Samples: 17

Lab.: CHEM

Dissolved Metals

Sample Number:	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]						
Sampling Location:	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]						
Matrix:	Water	Water	Water	Water	Water						
Units:	ug/L	ug/L	ug/L	ug/L	ug/L						
Date Sampled:	8/28/2008	8/29/2008	8/29/2008	8/28/2008	8/28/2008						
Time Sampled:	12:40	11:15	10:00	14:06	15:50						
Dilution Factor:	1.0	1.0	1.0	1.0	1.0						
ANALYTE	CRQL	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
*ARSENIC	1	1.3	B	6.6		2.5		3.2		2.3	
BERYLLIUM	1			0.11	J	0.13	J			0.20	J
*CHROMIUM	2	0.73	B	1.5	J	1.7	J	1.2	J	1.2	J
COPPER	2	0.69	J	0.55	B	0.39	B	0.37	B	0.43	B
MANGANESE	1	137		126		92.1		157		250	
SELENIUM	5		UL		UL		UL		UL		UL
THALLIUM	1	0.17	B	0.15	B						
ZINC	2	10.5		55.7		5.4		16.1		6.3	

CRQL = Contract Required Quantitation Limit

*Action Level Exists

SEE NARRATIVE FOR CODE DEFINITIONS

To calculate sample quantitation limits: (CRQL * Dilution Factor)

Revised 09/99

DATA SUMMARY FORM: INORGANIC

Case #:
 Site: BATTLEFIELD GOLF CLUB
 Lab.: CHEM
 Dissolved Metals

Sample Number :		Water									
Sampling Location :		ug/L									
Matrix :		8/28/2008		8/28/2008		8/29/2008		8/29/2008		8/29/2008	
Units :		17:47		18:10		09:10		10:50		11:50	
Date Sampled :		1.0		1.0		1.0		1.0		1.0	
Time Sampled :		1.0		1.0		1.0		1.0		1.0	
Dilution Factor :		1.0		1.0		1.0		1.0		1.0	
ANALYTE	CRQL	Result	Flag								
ANTIMONY	2	0.20	B	0.21	B						
BARIUM	10	84.6		40.1		18.7		46.2		50.7	
*CADMIUM	1					0.13	B				
COBALT	1	1.1		50.4		12.1		24.3		2.9	
*LEAD	1	0.20	B	0.12	B	0.15	B	0.10	B	0.10	B
*NICKEL	1	2.8		69.5		17.5		35.4		5.4	
SILVER	1	0.053	B	0.037	B		UL		UL		UL
VANADIUM	5	1.6	J	1.9	J	1.6	J	2.2	J	1.4	J

CRQL = Contract Required Quantitation Limit *Action Level Exists
 To calculate sample quantitation limits: (CRQL * Dilution Factor)

SEE NARRATIVE FOR CODE DEFINITIONS

Revised 09/99

DATA SUMMARY FORM: INORGANIC

Case #: [REDACTED] SDG: [REDACTED]
 Site: BATTLEFIELD GOLF CLUB
 Lab.: CHEM
 Dissolved Metals

Sample Number :		[REDACTED]		[REDACTED]		[REDACTED]		[REDACTED]		[REDACTED]	
Sampling Location :		[REDACTED]		[REDACTED]		[REDACTED]		[REDACTED]		[REDACTED]	
Field QC:		[REDACTED]		[REDACTED]		[REDACTED]		[REDACTED]		[REDACTED]	
Matrix :		Water	Water	Water	Water	Water	Water	Water	Water	Sup. of	Water
Units :		ug/L	ug/L								
Date Sampled :		8/28/2008	8/28/2008	8/28/2008	8/28/2008	8/29/2008	8/29/2008	8/29/2008	8/29/2008	8/29/2008	8/29/2008
Time Sampled :		13:48	13:05	13:25	15:55	13:50	13:50	13:50	13:50	13:50	13:50
Dilution Factor :		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
ANALYTE	CRQL	Result	Flag								
ANTIMONY	2									0.23	B
BARIUM	10	105		39.0		72.3		20.4		18.3	
*CADMIUM	1									0.14	J
COBALT	1	0.48	B	1.6		3.6		12.3		3.0	
*LEAD	1							0.52	B	0.27	B
*NICKEL	1	0.66	B	2.3		2.1		22.0		7.8	
SILVER	1		UL		UL		UL		UL	0.12	B
VANADIUM	5	3.6	J	1.1	B	0.89	B	1.2	B	1.1	B

CRQL = Contract Required Quantitation Limit

*Action Level Exists

SEE NARRATIVE FOR CODE DEFINITIONS

To calculate sample quantitation limits: (CRQL * Dilution Factor)

Revised 09/99

DATA SUMMARY FORM: INORGANIC

Case #: [REDACTED] SDG: [REDACTED]
 Site: BATTLEFIELD GOLF CLUB
 Lab.: CHEM
 Dissolved Metals

Sample Number :	[REDACTED]										
Sampling Location :	[REDACTED]										
Field QC:		Dup. of									
Matrix :		Water		Water							
Units :		ug/L		ug/L							
Date Sampled :		8/29/2008		8/29/2008							
Time Sampled :		13:50		14:50							
Dilution Factor :		1.0		1.0							
ANALYTE	CRQL	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
ANTIMONY	2										
ARSENIC											
BARIUM	10	19.0		18.1							
BISMUTH											
*CADMIUM	1										
CHROMIUM											
COBALT	1	3.3		3.1							
COPPER											
*LEAD	1	1.2		0.14	B						
MANGANESE											
*NICKEL	1	7.9		5.7							
SELENIUM											
SILVER	1	0.067	B	0.043	B						
TUNGSTEN											
VANADIUM	5	1.1	B	1.1	B						
ZINC											

CRQL = Contract Required Quantitation Limit *Action Level Exists
 To calculate sample quantitation limits: (CRQL * Dilution Factor)

SEE NARRATIVE FOR CODE DEFINITIONS

Revised 09/99

Appendix C

Chain-of-Custody Records



**USEPA Contract Laboratory Program
Inorganic Traffic Report & Chain of Custody Record**

Case No: [REDACTED]
DAS No: [REDACTED]

R

Region: 3	Date Shipped: 9/2/2008	Chain of Custody Record	Sampler Signature: [REDACTED]
Project Code: [REDACTED]	Carrier Name: FedEx	Retinquished By: [REDACTED]	Received By: [REDACTED]
Account Code: VAN000306614	Airbill: 96194297974	(Date / Time)	(Date / Time)
CERCLIS ID: ALM	Shipped to: ChemTech Consulting Group (CHEMED)	2	
Spill ID: ALM	284 Sheffield Street	3	
Site Name/State: Battlefield GolfVA	Mountainside NJ 07092	4	
Project Leader: [REDACTED]	(908) 789-8900		
Action: Preliminary Assessment			
Sampling Co: Tetra Tech EM Inc.			

INORGANIC SAMPLE NO.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/ Bottles	STATION LOCATION	SAMPLE COLLECT DATE/TIME	ORGANIC SAMPLE NO.	QC Type
[REDACTED]	Ground Water/	M/G	TAL DM+B+M (14), TAL TM+B+M (14)	777 (HNO3), 891 (HNO3) (2)	[REDACTED]	S: 8/29/2008 12:40		--
[REDACTED]	Ground Water/	M/G	TAL DM+B+M (14), TAL TM+B+M (14)	778 (HNO3), 892 (HNO3) (2)	[REDACTED]	S: 8/29/2008 11:15		--
[REDACTED]	Ground Water/	M/G	TAL DM+B+M (14), TAL TM+B+M (14)	779 (HNO3), 893 (HNO3) (2)	[REDACTED]	S: 8/29/2008 10:00		--
[REDACTED]	Ground Water/	M/G	TAL DM+B+M (14), TAL TM+B+M (14)	780 (HNO3), 894 (HNO3) (2)	[REDACTED]	S: 8/29/2008 14:06		--
[REDACTED]	Ground Water/	M/G	TAL DM+B+M (14), TAL TM+B+M (14)	781 (HNO3), 895 (HNO3) (2)	[REDACTED]	S: 8/29/2008 15:50		--
[REDACTED]	Ground Water/	M/G	TAL DM+B+M (14), TAL TM+B+M (14)	782 (HNO3), 896 (HNO3) (2)	[REDACTED]	S: 8/29/2008 17:47		--
[REDACTED]	Ground Water/	M/G	TAL DM+B+M (14), TAL TM+B+M (14)	783 (HNO3), 897 (HNO3) (2)	[REDACTED]	S: 8/29/2008 18:10		--
[REDACTED]	Ground Water/	M/G	TAL DM+B+M (14), TAL TM+B+M (14)	784 (HNO3), 898 (HNO3) (2)	[REDACTED]	S: 8/29/2008 9:10		--
[REDACTED]	Ground Water/	M/G	TAL DM+B+M (14), TAL TM+B+M (14)	785 (HNO3), 899 (HNO3) (2)	[REDACTED]	S: 8/29/2008 10:50		--
[REDACTED]	Ground Water/	M/G	TAL DM+B+M (14), TAL TM+B+M (14)	786 (HNO3), 900 (HNO3) (2)	[REDACTED]	S: 8/29/2008 11:50		--
[REDACTED]	Ground Water/	M/G	TAL DM+B+M (14), TAL TM+B+M (14)	787 (HNO3), 901 (HNO3) (2)	[REDACTED]	S: 8/29/2008 13:48		--

Shipment for Case Complete? Y	Sample(s) to be used for laboratory QC:	Additional Sample Signatures:	Chain of Custody Seal Number:

Analysis Key: L = Low, M = Low/Medium, H = High
 Type/Designator: Composite = C, Grab = G
 TAL DM+B+M = TAL Diss Metals+Boron+Moly, TAL MB+B+ = TAL Metals + Boron + Molydenium, TAL TM+B+M = TAL Total Metals+Boron+Moly

TR Number: [REDACTED]

PR provides preliminary results. Requests for preliminary results will increase analytical costs.
 Send Copy to: Sample Management Office, Alt: [REDACTED] CSC, 86000 Conference Center Dr., Chantilly, VA 20151-3819, Phone 703/818-4200, Fax 703/818-4602

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EPA USEPA Contract Laboratory Program
Inorganic Contract Traffic Report & Chain of Custody Record

Case No: [REDACTED]
 DAS No: [REDACTED]

Region: 3	Date Shipped: 9/2/2008	Carrier Name: FedEx	Shipped to: ChemTech Consulting Group (CHEMED)
Project Code: [REDACTED]	Airbill: 96194297974	284 Sheffield Street	Mountainside NJ 07092
Account Code: VAN0003006614		(908) 789-8900	
Spill ID: ALM			
Site Name/State: Battifield Golf/VA			
Project Leader: [REDACTED]			
Action: Preliminary Assessment			
Sampling Co: Tetra Tech EM Inc.			

INORGANIC SAMPLE No.	MATRIX SAMPLER	CONC/TYPE	ANALYSIS/TURNAROUND	TAG No./PRESERVATIVE/Batches	STATION LOCATION	SAMPLE COLLECT DATE/TIME	ORGANIC SAMPLE No.	QC Type
----------------------	----------------	-----------	---------------------	------------------------------	------------------	--------------------------	--------------------	---------

[REDACTED]	Ground Water/	M/G	TAL DM+B+M (14), TAL TM+B+M (14)	788 (HNO3), 902 (HNO3) (2)	[REDACTED]	S: 8/28/2008 13:05		
[REDACTED]	Ground Water/	M/G	TAL DM+B+M (14), TAL TM+B+M (14)	789 (HNO3), 903 (HNO3) (2)	[REDACTED]	S: 8/28/2008 13:25		
[REDACTED]	Ground Water/	M/G	TAL DM+B+M (14), TAL TM+B+M (14)	790 (HNO3), 904 (HNO3) (2)	[REDACTED]	S: 8/29/2008 15:55		
[REDACTED]	Ground Water/	M/G	TAL DM+B+M (14), TAL TM+B+M (14)	791 (HNO3), 905 (HNO3) (2)	[REDACTED]	S: 8/29/2008 13:50		
[REDACTED]	Ground Water/	M/G	TAL DM+B+M (14), TAL TM+B+M (14)	792 (HNO3), 906 (HNO3) (2)	[REDACTED]	S: 8/29/2008 13:50		
[REDACTED]	Ground Water/	M/G	TAL DM+B+M (14), TAL TM+B+M (14)	793 (HNO3), 907 (HNO3) (2)	[REDACTED]	S: 8/29/2008 14:50		
[REDACTED]	Ground Water/	M/G	TAL DM+B+M (14), TAL TM+B+M (14)	794 (HNO3), 908 (HNO3) (2)	[REDACTED]	S: 8/29/2008 12:51		
[REDACTED]	Surface Water/	M/G	TAL DM+B+M (14), TAL TM+B+M (14)	795 (HNO3), 909 (HNO3) (2)	[REDACTED]	S: 8/29/2008 15:40		
[REDACTED]	Surface Water/	M/G	TAL DM+B+M (14), TAL TM+B+M (14)	796 (HNO3) (1)	[REDACTED]	S: 8/25/2008 9:27		
[REDACTED]	Potable Well/	M/G	TAL TM+B+M (14)	797 (HNO3) (1)	[REDACTED]	S: 8/25/2008 9:59		
[REDACTED]	Potable Well/	M/G	TAL TM+B+M (14)	798 (HNO3) (1)	[REDACTED]	S: 8/26/2008 16:45		

Shipment for Case Complete? Y	Sample(s) to be used for laboratory QC:	Additional Sample Signature(s):	Chain of Custody Seal Number:
Analyst's Key: TAL DM+B+M = TAL Diss Metals+Bottom+Moist, TAL MBI+B+ = TAL Metals + Bottom + Moisture, TAL TM+B+M = TAL Total Metals+Bottom+Moist	Concentration: L = Low, M = Low/Medium, H = High	Type/Designate: Composite = C, Grab = G	Shipment Lead? _____

TR Number: [REDACTED]

PR provides preliminary results. Requests for preliminary results will increase analytical costs.
 Send Copy to: Sample Management Office, Alt#: [REDACTED] CSC, 15000 Conference Center Dr., Chantilly, VA 20151-3819, Phone 703/818-4200, Fax 703/818-4602

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U.S. EPA Region III Analytical Request Form

ASQAB USE ONLY	
RAS#	Analytical TAT
DAS#	14
NSF#	

Date: 8/21/2008 **Site Activity:** Removal Assessment

Site Name: Battlefield Golf Club **Street Address:** 1001 South Centerville Turnpike

City: Chesapeake **State:** VA **Latitude:** 36.68982 **Longitude:** 76.17790

Program: Superfund **Acct #:** 2008T03 N 302DDC6C A31LM RS00 **CERCLIS #:** VAN000308614

Site ID: **Spill ID:** A31LM **Operable Unit:**

Site Specific QA Plan Submitted: No Yes **Title:** Battlefield Golf Club Fly Ash Assessment SAP **Date Approved:** 8/20/2008

EPA Project Leader: CHRIS WAGNER **Phone#:** **Cell Phone #:** 804-337-3049 **E-mail:** Wagner.Christine@epa.gov

Request Preparer: **Phone#:** **Cell Phone #:** **E-mail:**

Site Leader: **Phone#:** **Cell Phone #:** **E-mail:**

Contractor: Terra Tech EM Inc **EPA CO/PO:** Lorie Murray/Karen Wodarczyk **Method:** ILM05.4 ICPAES+Hg

#Samples	Matrix: soil	Parameter: TAL Metals + Boron + Molybdenum + Hg	Method: ILM05.4 ICPAES+Hg
#Samples	Matrix: groundwater	Parameter: TAL Metals + Boron + Molybdenum + Hg	Method: ILM05.4 ICPAES+Hg
#Samples	Matrix: potable water	Parameter: TAL metals Low(w/o Al,Ca,Fe,K,Mg,Na)&B,Mo,Hg	Method: ILM05.4 ICPMS & Hg
#Samples	Matrix: potable water	Parameter: Al, Ca, Fe, K, Mg, Na	Method: ILM05.4 ICPAES
#Samples	Matrix: groundwater	Parameter: TAL metals Low(w/o Al,Ca,Fe,K,Mg,Na)&B,Mo,Hg	Method: ILM05.4 ICPAES
#Samples	Matrix: groundwater	Parameter: Al, Ca, Fe, K, Mg, Na	Method: ILM05.4 ICPAES
#Samples	Matrix:	Parameter:	Method:

Ship Date From: 8/29/2008 **Ship Date To:** 9/3/2008 **Org. Validation Level**

Unvalidated Data Requested: No Yes **IF Yes, TAT Needed:** 24hrs 48hrs 72hrs Other (Specify) **14 days**

Validated Data Package Due: 14 days 21 days 30days 42 days Other (Specify)

Electronic Data Deliverables Required: No Yes (EDDs will be provided in Region 3 EDD Format)

Special Instructions: See attached DLs.

Appendix D

Laboratory Case Narrative

USEPA - CLP

COVER PAGE

Lab Name CHEMTECH CONSULTING GROUP Contract: EPW06047

Lab Code: CHEM Case No.: [REDACTED] NRAS No.: _____ SDG No.: [REDACTED]

SOW No.: ILM05.4

EPA Sample No.

[REDACTED]

Lab Sample ID

[REDACTED]

		ICP-AES	ICP-MS
Were ICP-AES and ICP-MS interelement corrections applied?	(Yes/No)	_____	<u>YES</u>
Were ICP-AES and ICP-MS background corrections applied?	(Yes/No)	_____	<u>YES</u>
If yes, were raw data generated before application of background corrections?	(Yes/No)	_____	<u>NO</u>

Comments:

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on diskette (or via an alternate means of electronic transmission, if approved in advance by USEPA) has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature:

Signature: [REDACTED]
Date: 5/16/08

Name: [REDACTED]
Title: EPA PROJECT MANAGER

CHEMTECH
284 Sheffield Street
Mountainside, NJ 07092

SDG NARRATIVE

USEPA
SDG # [REDACTED]
CASE # [REDACTED]
CONTRACT # EPW06047
LAB NAME: CHEMTECH CONSULTING GROUP
LAB CODE: CHEM
CHEMTECH PROJECT # [REDACTED]

A. Number of Samples and Date of Receipt

17 Water Samples was delivered to the laboratory intact on 09/09/2008.

B. Parameters

Test requested for Metals CLP MS.

C. Cooler Temp

Indicator Bottle: Presence/Absence
Cooler: 4°C

D. Detail Documentation (related to Sample Handling Shipping, Analytical Problem, Temp of Cooler etc):

Issue 1: The TR/COC lists the analysis TAL TM+B+M for the ground, surface, and potable well water samples; however, the Scheduling Notification Form lists that the analysis is ICP-AES (Al, Ca, Fe, Mg, K, Na)+B+Mo/Hg, ICP-AES TM+B+Mo/Hg, and ICP-MS Metals for water samples. The laboratory is not sure what analyses should be performed on the water samples.

Issue 2: The laboratory received several water samples that have a container labeled for Dissolved Metals; however, the laboratory is not scheduled to receive any Dissolved Metals samples.

Issue 3: The laboratory received water samples that have the same Sample ID for the Total and Dissolved Metals fraction.

Issue 4: The laboratory received 2 containers for most of the soil samples received for the Case. The laboratory would like to perform the requested analyses from the 1st container and use the 2nd container as extra volume if needed. Are the laboratory's proposed actions acceptable to the Region?

SAMPLE LOG-IN SHEET

Lab Name CHEMTECH CONSULTING GROUP

Page 1 of 1

Received By (Print Name)		Log-in Date 9/9/2008	
Received By (Signature)			
Case Number	Sample Delivery Group No.	NRAS Number	
Remarks:		Corresponding	
1. Custody Seal(s) <input checked="" type="checkbox"/> Present <input type="checkbox"/> Absent* <input checked="" type="checkbox"/> Intact <input type="checkbox"/> Broken			
2. Custody Seal Nos. _____			
3. Traffic Reports/Chain Of Custody Reports or Packing Lists <input checked="" type="checkbox"/> Present <input type="checkbox"/> Absent*			
4. Airbill <input checked="" type="checkbox"/> Airbill <input type="checkbox"/> Sticker <input checked="" type="checkbox"/> Present <input type="checkbox"/> Absent*			
5. Airbill No. <u>961942977974</u>			
6. Sample Tags <input checked="" type="checkbox"/> Present <input type="checkbox"/> Absent* Sample Tag # <input checked="" type="checkbox"/> Listed <input type="checkbox"/> Not Listed On TR/Chain-of-Custody			
7. Sample Condition <input checked="" type="checkbox"/> Intact <input type="checkbox"/> Broken* <input type="checkbox"/> Leaking			
8. Cooler Temperature Indicator Bottle <input checked="" type="checkbox"/> Present <input type="checkbox"/> Absent*			
9. Cooler Temperature <u>4°C</u>			
10. Does information on custody records, traffic reports, and sample tags agree? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No*			
11. Date Received at Lab <u>9-3-08</u>			
12. Time Received <u>9:30 AM</u>			
Sample Transfer			
Fraction <u>METALS</u>	Fraction		
Area # <u>Q52</u>	Area #		
By	By <u>9/16/08</u>		
On <u>9-16-08</u>	On		
* Contact SMO and attach record of resolution			
Reviewed By	Logbook No.		
Date <u>9-16-08</u>	Logbook Page No. <u>16/08</u>		

Lisa
Penix/ESC/R3/USEPA/US
10/08/2008 11:58 AM

To Christine Wagner/R3/USEPA/US@EPA
cc Donna Santiago/R3/USEPA/US@EPA, Robert
Lausch/R3/USEPA/US@EPA, Victor
Yastrop/ESC/R3/USEPA/US@EPA, [REDACTED]
bcc [REDACTED]
Subject [REDACTED] - Validated Electronic Data for Battlefield Golf Club

Christine Wagner
US EPA Region 3
1650 Arch Street
Philadelphia, PA 19103-2029

October 8, 2008

Dear Christine,

Attached to this message you will find electronic files containing the **validation report and validated** inorganic data for the Battlefield Golf Club site, Case # [REDACTED] SDG [REDACTED]. The validation of this case was completed by the Region III Environmental Services Assistance Team (ESAT). A hardcopy of the validation report will follow via Fed Ex.

Please contact ESAT's PO, Colleen Walling by phone at 410-305-2763 or e-mail at Walling.Colleen@epa.gov if additional assistance is needed.

Sincerely,

Lisa D. Penix

TO # [REDACTED]

TDF # [REDACTED]

[REDACTED].pdf [REDACTED] Validated_DSf.xls [REDACTED] Validated_EDD.xls

Lisa D. Penix
ESAT Region 3
Lockheed Martin Enterprise Solutions & Services
EPA Environmental Science Center
701 Mapes Road
Fort Meade, MD 20755
Telephone (410) 305 - 3020
Fax (410) 305 - 3095
email: Penix.Lisa@epamail.epa.gov



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
ENVIRONMENTAL SCIENCE CENTER
701 MAPES ROAD
FORT MEADE, MARYLAND 20755-5350

DATE : October 8, 2008

SUBJECT: Region III Data QA Review

FROM : Colleen Walling *Colleen C. Walling*
Region III ESAT RPO (3EA20)

TO : Christine Wagner
Regional Project Manager (3HS32)

Attached is the inorganic data validation report for the Battlefield Gulf Club site (Case # [REDACTED] SDG # [REDACTED] completed by the Region III Environmental Services Assistance Team (ESAT) contractor under the direction of Region III EAID.

If you have any questions regarding this review, please call me at (410) 305-2763.

Attachment

cc: [REDACTED] (TTEMI)

TO File #: [REDACTED] TDF#: [REDACTED]

OFFICE OF ANALYTICAL SERVICES AND QUALITY ASSURANCE



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Lockheed Martin Enterprise Solutions & Services
ESAT Region 3
US EPA Environmental Science Center
701 Mapes Road Ft. Meade, MD 20755-5350
Telephone 410-305-3037 Facsimile 410-305-3597



Date: October 3, 2008

Subject: Inorganic Data Validation (IM2 Level)
Case: [REDACTED]
SDG: [REDACTED]
Site: Battlefield Golf Club

From: [REDACTED]
Inorganic Data Reviewer
[REDACTED]
Senior Oversight Chemist

To: Colleen Walling
ESAT Region 3 Project Officer

OVERVIEW

Case [REDACTED] Sample Delivery Group (SDG) [REDACTED] consisted of six (6) aqueous samples analyzed for selected total metals by ICP-MS. The sample set included one (1) field duplicate pair. Samples were analyzed by ChemTech Consulting Group (CHEM) according to the Contract Laboratory Program (CLP) Statement of Work (SOW) ILM05.4 through the Routine Analytical Services (RAS) program.

SUMMARY

Data were validated according to Region III Modifications to the National Functional Guidelines for Inorganic Data Review, Level IM2. Areas of concern with respect to data usability are listed below.

Data in this case have been impacted by outliers present in the laboratory blanks and matrix spike analyses. Details of these outliers are discussed under "Minor Problems," specific samples affected are outlined in "Table 1A" and qualified analytical results for all samples are summarized on the Data Summary Forms (DSFs).

MINOR PROBLEMS

Continuing calibration blanks (CCBs) had reported results greater than the Method Detection Limits (MDLs) for antimony (Sb), arsenic (As), chromium (Cr), cobalt (Co), silver (Ag), thallium (Tl) and vanadium (V). Positive results for these analytes in affected samples which are less than or equal to five times ($\leq 5X$) the blank concentration may be biased high and have been qualified "B" on the DSFs.

A CCB had a negative result greater than the absolute value of the MDL for selenium (Se). The quantitation limits for this analyte in all samples may be biased low and have been qualified "UL" on the DSFs.

The matrix spike recovery was low (<75% but >30%) for Ag. Low recovery may be attributed to matrix interferences or analyte lost during the digestion process. The "L" qualifier for this outlier has been superseded by "B" in samples reporting positive results on the DSFs. The quantitation limit for Ag in sample [REDACTED] may be biased low and has been qualified "UL" on the DSF.

NOTES

Results for field duplicate pair [REDACTED] were within the control limit of $\pm 20\%$ relative percent differences for all analytes except copper (Cu) and lead (Pb).

The post-digestion spike recovery was high (>125%) for Ag; however, data are not qualified based on the post-digestion spike recovery.

Reported results between MDLs and Contract Required Quantitation Limits (CRQLs) were qualified "J" unless superseded by "B" on the DSFs.

Data for Case [REDACTED] SDG [REDACTED] were reviewed in accordance with the National Functional Guidelines for Evaluating Inorganic Analyses with Modifications for use within Region III.

ATTACHMENTS

INFORMATION REGARDING REPORT CONTENT

Table 1A is a summary of qualifiers applied to the laboratory-generated results during data validation.

Table 1A	Summary of qualifiers on data summary forms after data validation
Table 1B	Codes used in comments column of Table 1A
Appendix A	Glossary of Data Qualifier Codes
Appendix B	Data Summary Form(s)
Appendix C	Chain of Custody Records
Appendix D	Laboratory Case Narrative

DCN: [REDACTED]

**TABLE 1A
SUMMARY OF QUALIFIERS ON DATA SUMMARY
FORM AFTER DATA VALIDATION**

Case [REDACTED] SDG [REDACTED]

<u>ANALYTE</u>	<u>SAMPLES AFFECTED</u>	<u>POSITIVE VALUES</u>	<u>NON- DETECTED VALUES</u>	<u>BIAS</u>	<u>COMMENTS*</u>
Sb	[REDACTED]	B		High	CCB (0.320 J ug/L)
As	[REDACTED]	B		High	CCB (0.283 J ug/L)
Cr	[REDACTED]	B		High	CCB (0.153 J ug/L)
Co	[REDACTED]	B		High	CCB (0.103 J ug/L)
Se	All samples		UL	Low	CBN (-0.220 J ug/L)
Ag	All samples except [REDACTED]	B		High	CCB (0.087 J ug/L) >MDL<CRQL MSL (49%)
	[REDACTED]		UL	Low	MSL (49%)
Tl	[REDACTED]	B		High	CCB (0.100 J ug/L)
V	[REDACTED]	B		High	CCB (0.217 J ug/L)

* See explanation of comments in Table 1B

TABLE 1B
CODES USED IN COMMENTS COLUMN

CCB	=	Continuing calibration blanks had results >MDLs [results are in parenthesis]. Positive results which are $\leq 5X$ blank concentrations may be biased high.
CBN	=	Continuing calibration blank had a negative result with the absolute value > MDL [result is in parenthesis]. The quantitation limit may be biased low.
>MDL<CRQL	=	Reported results are greater than MDLs but less than CRQLs and are considered estimated
MSL	=	Matrix Spike recovery was low (<75% but >30%) [percent recovery is in parenthesis]. Positive results and quantitation limits may be biased low.

Appendix A

Glossary of Data Qualifier Codes

GLOSSARY OF DATA QUALIFIER CODES (INORGANIC)

CODES RELATED TO IDENTIFICATION

(confidence concerning presence or absence of analytes):

U = Not detected. The associated number indicates approximate sample concentration necessary to be detected.

(NO-CODE) = Confirmed identification.

B = Not detected substantially above the level reported in laboratory or field blanks.

R = Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.

CODES RELATED TO QUANTITATION

(can be used for both positive results and sample quantitation limits):

J = Analyte Present. Reported value may not be accurate or precise.

K = Analyte present. Reported value may be biased high. Actual value is expected to be lower.

L = Analyte present. Reported value may be biased low. Actual value is expected to be higher.

UJ = Not detected, quantitation limit may be inaccurate or imprecise.

UL = Not detected, quantitation limit is probably higher.

OTHER CODES

Q = No analytical result.

Appendix B
Data Summary Forms

DATA SUMMARY FORM: INORGANIC

Case #: [REDACTED] SDG: [REDACTED]
 Site: BATTLEFIELD GOLF CLUB
 Lab.: CHEM

Number of Soil Samples : 0
 Number of Water Samples : 6

ANALYTE	CRQL	Result	Flag								
ANTIMONY	2			0.44	B	1.2	B	0.23	B	0.22	B
*ARSENIC	1	1.5		1.6		1.4	B	1.6		1.5	
BARIUM	10	1.5	J	27.9		77.9		77.0		84.1	
BERYLLIUM	1									0.11	J
*CADMIUM	1			0.16	J	0.13	J				
*CHROMIUM	2	0.60	B	0.76	B	0.82	J	0.74	B	0.90	J
COBALT	1					0.14	B				
COPPER	2	33.1		48.4		441		327		133	
*LEAD	1	2.6		1.9		10.3		1.9		8.4	
MANGANESE	1	4.3		120		257		247		213	
*NICKEL	1	0.57	J	3.6		1.1		1.1		2.0	
SELENIUM	5		UL								
SILVER	1		UL	0.070	B	0.067	B	0.050	B	0.047	B
THALLIUM	1					0.11	B				
VANADIUM	5	0.89	B	1.4	J	0.64	B	0.99	B	1.3	J
ZINC	2	21.4		31.2		17.4		16.8		140	

CRQL = Contract Required Quantitation Limit *Action Level Exists
 To calculate sample quantitation limits: (CRQL * Dilution Factor)

SEE NARRATIVE FOR CODE DEFINITIONS
 Revised 09/99

DATA SUMMARY FORM: INORGANIC

Case #: [REDACTED] SDG: [REDACTED]
 Site: BATTLEFIELD GOLF CLUB
 Lab.: CHEM

Sample Number :	[REDACTED]										
Sampling Location :	[REDACTED]										
Matrix :	Water										
Units :	ug/L										
Date Sampled :	8/28/2008										
Time Sampled :	11:13										
Dilution Factor :	1.0										
ANALYTE	CRQL	Result	Flag								
ANTIMONY	2										
*ARSENIC	1	1.4	B								
BARIUM	10	14.0									
BERYLLIUM	1										
*CADMIUM	1										
*CHROMIUM	2	1.9	J								
COBALT	1	0.14	B								
COPPER	2	54.4									
*LEAD	1	6.4									
MANGANESE	1	261									
*NICKEL	1	1.1									
SELENIUM	5		UL								
SILVER	1	0.040	B								
THALLIUM	1										
VANADIUM	5	1.2	J								
ZINC	2	1360									

CRQL = Contract Required Quantitation Limit *Action Level Exists
 To calculate sample quantitation limits: (CRQL * Dilution Factor)

SEE NARRATIVE FOR CODE DEFINITIONS
 Revised 09/99

Appendix C

Chain of Custody Records

EPA USEPA Contract Laboratory Program
Inorganic Traffic Report & Chain of Custody Record

Case No: [REDACTED]
 DAS No: [REDACTED]

Region: 3	Date Shipped: 9/2/2008	Carrier Name: FedEx	Shipped to: Chem Tech Consulting Group (CHEMED) 284 Sheffield Street Mountaintside NJ 07092 (908) 788-8900
Project Code: [REDACTED]	Carrier Name: FedEx	Airbill: 961942977974	
Account Code: VAN000306614			
CERCLIS ID: [REDACTED]			
Spill ID: ALM			
Site Name/State: Battellefield GolfVA			
Project Leader: [REDACTED]			
Action: Preliminary Assessment			
Sampling Co: Tetra Tech EM Inc.			

INORGANIC SAMPLE NO.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/ Bottles	STATION LOCATION	SAMPLE COLLECT DATE/TIME	ORGANIC SAMPLE NO.	QC Type
[REDACTED]	Ground Water/	M/G	TAL DM+B+M (14), TAL TM+B+M (14)	788 (HNO3), 902 (HNO3) (2)	[REDACTED]	S: 8/29/2008 13:05		
[REDACTED]	Ground Water/	M/G	TAL DM+B+M (14), TAL TM+B+M (14)	789 (HNO3), 903 (HNO3) (2)	[REDACTED]	S: 8/29/2008 13:25		
[REDACTED]	Ground Water/	M/G	TAL DM+B+M (14), TAL TM+B+M (14)	790 (HNO3), 904 (HNO3) (2)	[REDACTED]	S: 8/29/2008 15:55		
[REDACTED]	Ground Water/	M/G	TAL DM+B+M (14), TAL TM+B+M (14)	791 (HNO3), 905 (HNO3) (2)	[REDACTED]	S: 8/29/2008 13:50		
[REDACTED]	Ground Water/	M/G	TAL DM+B+M (14), TAL TM+B+M (14)	792 (HNO3), 906 (HNO3) (2)	[REDACTED]	S: 8/29/2008 13:50		
[REDACTED]	Ground Water/	M/G	TAL DM+B+M (14), TAL TM+B+M (14)	793 (HNO3), 907 (HNO3) (2)	[REDACTED]	S: 8/29/2008 14:50		
[REDACTED]	Surface Water/	M/G	TAL DM+B+M (14), TAL TM+B+M (14)	794 (HNO3), 908 (HNO3) (2)	[REDACTED]	S: 8/29/2008 12:51		
[REDACTED]	Surface Water/	M/G	TAL DM+B+M (14), TAL TM+B+M (14)	795 (HNO3), 909 (HNO3) (2)	[REDACTED]	S: 8/29/2008 15:40		
[REDACTED]	Potable Well/	M/G	TAL TM+B+M (14)	796 (HNO3) (1)	[REDACTED]	S: 8/25/2008 9:27		
[REDACTED]	Potable Well/	M/G	TAL TM+B+M (14)	797 (HNO3) (1)	[REDACTED]	S: 8/25/2008 9:59		
[REDACTED]	Potable Well/	M/G	TAL TM+B+M (14)	798 (HNO3) (1)	[REDACTED]	S: 8/26/2008 16:45		

Shipment for Case Complete? Y	Sample(s) to be used for laboratory QC:	Additional Sample Signature(s):	Chain of Custody Seal Number:

Analysis Key: L = Low, M = Low/Medium, H = High
 Type/Designate: Composite = C, Grab = G
 Shipment Lead? _____

IR Number: [REDACTED]

PR provides preliminary results. Requests for preliminary results will increase analytical costs.
 Send Copy to: Sample Management Office, Attn: [REDACTED], CSC, 15000 Conference Center Dr., Chantilly, VA 20151-3819; Phone 703/818-4200; Fax 703/818-4602

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USEPA Contract Laboratory Program
Inorganic Traffic Report & Chain of Custody Record

Case No: [REDACTED]
 DAS No: [REDACTED]

Region: 3	Date Shipped: 9/2/2008	Chain of Custody Record Relinquished By: [REDACTED] (Date / Time) 1. [REDACTED] (Date / Time) 2. [REDACTED] 3. [REDACTED] 4. [REDACTED]	Sampler Signature: [REDACTED] Received By: [REDACTED] (Date / Time)
Project Code: [REDACTED]	Carrier Name: FedEx		
Account Code: VAN0003006614	Airbill: 991942977974		
CERCLIS ID: ALM	Shipped to: Chem Tech Consulting Group (CHEMED) 284 Sheffield Street Mountainside NJ 07092 (908) 789-8900		
Site Name/State: Battletield Golf/VA	Action: Preliminary Assessment		
Project Leader: [REDACTED]	Sampling Co: Tetra Tech EM Inc.		

INORGANIC SAMPLE NO.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNOVER	TAG No./ PRESERVATIVE/ Batches	STATION LOCATION	SAMPLE COLLECT DATE/TIME	ORGANIC SAMPLE NO.	QC Type
[REDACTED]	Potable Well/	M/G	TAL TM+B+M (14)	855 (HNO3) (1)	[REDACTED]	S: 8/27/2008 16:13		
[REDACTED]	Potable Well/	M/G	TAL TM+B+M (14)	856 (HNO3) (1)	[REDACTED]	S: 8/28/2008 9:45		
[REDACTED]	Potable Well/	M/G	TAL TM+B+M (14)	857 (HNO3) (1)	[REDACTED]	S: 8/28/2008 10:23		
[REDACTED]	Potable Well/	M/G	TAL TM+B+M (14)	858 (HNO3) (1)	[REDACTED]	S: 8/28/2008 10:29		
[REDACTED]	Potable Well/	M/G	TAL TM+B+M (14)	859 (HNO3) (1)	[REDACTED]	S: 8/29/2008 11:19		
[REDACTED]	Potable Well/	M/G	TAL TM+B+M (14)	860 (HNO3) (1)	[REDACTED]	S: 8/29/2008 11:19		
[REDACTED]	Potable Well/	M/G	TAL TM+B+M (14)	861 (HNO3) (1)	[REDACTED]	S: 8/29/2008 11:30		
[REDACTED]	Potable Well/	M/G	TAL TM+B+M (14)	862 (HNO3) (1)	[REDACTED]	S: 8/28/2008 11:13		
[REDACTED]	Soil (>12")	M/G	TAL Met+B+ (14)	863 (Ice Only), 864 (Ice Only) (2)	[REDACTED]	S: 8/25/2008 10:18		
[REDACTED]	Soil (>12")	M/G	TAL Met+B+ (14)	865 (Ice Only), 866 (Ice Only) (2)	[REDACTED]	S: 8/25/2008 11:35		
[REDACTED]	Soil (>12")	M/G	TAL Met+B+ (14)	867 (Ice Only), 868 (Ice Only) (2)	[REDACTED]	S: 8/25/2008 12:15		

Shipment for Case Complete? Y	Sample(s) to be used for laboratory QC:	Additional Sampler Signature(s):	Chain of Custody Seal Number:
Analysis Key: TAL DM+B+M = TAL Diss Metals+Boron+Moly, TAL Met+B+ = TAL Metals + Boron + Molydenum, TAL TM+B+M = TAL Total Metals+Boron+Moly	Concentration: L = Low, M = Low/Medium, H = High	Type/Designate: Composite = C, Grab = G	Shipment Lead? _____

TR Number: [REDACTED]

PR provides preliminary results. Requests for preliminary results will increase analytical costs.
 Send Copy to: Sample Management Office, Attn: [REDACTED] CSC, 15000 Conference Center Dr., Chantilly, VA 20151-3819; Phone 703/618-4200; Fax 703/618-4602

REGIONAL COPY

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U.S. EPA Region III Analytical Request Form

ASQAB USE ONLY	
RAS#	
DAS#	Analytical TAT
NSR#	14

Date: 8/21/2008 Site Activity: Removal Assessment

Site Name: Battlefield Golf Club Street Address: 1001 South Centerville Turnpike

City: Chesapeake State: VA Latitude: 36.68982 Longitude: 76.17790

Program: Superfund Acct #: 2008T03 N 302DC6C A3LM RS00 CERCLIS #: VAN000306614

Site ID: Spill ID: A3LM Operable Unit:

Site Specific QA Plan Submitted: No Yes Title: Battlefield Golf Club Fly Ash Assessment SAP Date Approved: 8/20/2008

EPA Project Leader: CHRIS WAGNER Phone#: Call Phone #: 804-337-3049 E-mail: Wagner.Christine@epa.gov

Request Preparer: Phone#: Cell Phone #: E-mail: E-mail: E-mail:

Site Leader: Phone#: Call Phone #: E-mail: E-mail:

Contractor: Tetra Tech EM Inc EPA CO/PO: Lorrie Murray/Karen Wodarczyk Method: ILM05.4 ICPAES+Hg

#Samples	Matrix: soil	Parameter: TAL Metals + Boron + Molybdenum + Hg	Method: ILM05.4 ICPAES+Hg
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#Samples	Matrix: groundwater	Parameter: TAL Metals + Boron + Molybdenum + Hg	Method: ILM05.4 ICPAES+Hg
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#Samples	Matrix: potable water	Parameter: TAL metals Low(w/o Al,Ca,Fe,K,Mg,Na)&B,Mo,Hg	Method: ILM05.4 ICPMS & Hg
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#Samples	Matrix: potable water	Parameter: Al, Ca, Fe, K, Mg, Na	Method: ILM05.4 ICPAES
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#Samples	Matrix: groundwater	Parameter: TAL metals Low(w/o Al,Ca,Fe,K,Mg,Na)&B,Mo,Hg	Method: ILM05.4 ICPMS & Hg
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#Samples	Matrix: groundwater	Parameter: Al, Ca, Fe, K, Mg, Na	Method: ILM05.4 ICPAES
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#Samples	Matrix:	Parameter:	Method:
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Ship Date From: 8/29/2008	Ship Date To: 9/3/2008	Org. Validation Level	Inorg. Validation Level IM2
---------------------------	------------------------	-----------------------	-----------------------------

Unvalidated Data Requested: No Yes If Yes, TAT Needed: 24hrs 48hrs 72hrs 7days Other (Specify) **14 days**

Validated Data Package Due: 14 days 21 days 30days 42 days Other (Specify)

Electronic Data Deliverables Required: No Yes (EDDs will be provided in Region 3 EDD Format)

Special Instructions: See attached DLs.

Appendix D

Laboratory Case Narrative

CHEMTECH

284 Sheffield Street
Mountainside, NJ 07092

SDG NARRATIVE

USEPA
SDG # [REDACTED]
CASE # [REDACTED]
CONTRACT # EPW06047
LAB NAME: CHEMTECH CONSULTING GROUP
LAB CODE: CHEM
CHEMTECH PROJECT # [REDACTED]

A. Number of Samples and Date of Receipt

6 Water Samples was delivered to the laboratory intact on 09/04/2008.

B. Parameters

Test requested for Metals CLP MS.

C. Cooler Temp

Indicator Bottle: Presence/Absence
Cooler: 4°C

**D. Detail Documentation (related to Sample Handling
Shipping, Analytical Problem, Temp of Cooler etc):**

Issue 1: The TR/COC lists the analysis TAL TM+B+M for the ground, surface, and potable well water samples; however, the Scheduling Notification Form lists that the analysis is ICP-AES (Al, Ca, Fe, Mg, K, Na)+B+Mo/Hg, ICP-AES TM+B+Mo/Hg, and ICP-MS Metals for water samples. The laboratory is not sure what analyses should be performed on the water samples.

Issue 2: The laboratory received several water samples that have a container labeled for Dissolved Metals; however, the laboratory is not scheduled to receive any Dissolved Metals samples.

Issue 3: The laboratory received water samples that have the same Sample ID for the Total and Dissolved Metals fraction.

Issue 4: The laboratory received 2 containers for most of the soil samples received for the Case. The laboratory would like to perform the requested analyses from the 1st container and use the 2nd container as extra volume if needed. Are the laboratory's proposed actions acceptable to the Region?

CHEMTECH

284 Sheffield Street
Mountainside, NJ 07092

E. Corrective Action taken for above:

Resolution 1: Per Region 3, the laboratory will perform the following analyses on the water samples. The laboratory will note the issue in the Case/SDG Narrative and proceed with the analysis of the samples.

<u>Matrix</u>	<u>Analysis</u>
Ground Water	ICP-AES TM+B+Mo by MA 1629.0 and Hg
Surface Water	ICP-AES TM+B+Mo by MA 1629.0 and Hg
Potable Well	ICP-AES (Al, Ca, Fe, Mg, K, Na)+B+Mo by MA 1629.0, Hg, and ICP-MS Metals

Resolution 2: Per Region 3, the laboratory will perform the following analyses on the Dissolved Metals water samples. The laboratory will note the issue in the Case/SDG Narrative and proceed with the analysis of the samples.

<u>Matrix</u>	<u>Analysis (filtered)</u>
Ground Water	ICP-AES (Al, Ca, Fe, Mg, K, Na)+B+Mo by MA 1629.0, Hg, and ICP-MS Metals
Surface Water	ICP-AES TM+B+Mo by MA 1629.0 and Hg

SMO will note that the laboratory accepted the laboratory's bid price of \$ [redacted] for ICP-AES 5-10 Metals (plus B and Mo), \$ [redacted] for ICP-AES 11-22 Metals (plus B and Mo), \$ [redacted] for ICP-MS 11-16 Metals, and \$ [redacted] for Mercury for the added Dissolved Metal fraction (bid sheet attached).

Resolution 3: In accordance with previous direction from Region 3, the laboratory will note the issue in the Case/SDG Narrative and proceed with the analysis of the samples using the following instructions: The Total Metals sample will keep the CLP sample ID listed on the TR/COC. The SMO coordinator will assign a new CLP sample ID for the Dissolved/Filtered Metals sample, and notify the Region and the laboratory of the new sample ID.

<u>Total Fraction</u>	<u>Dissolved Fraction</u>
[redacted]	[redacted]

Resolution 4: Per Region 3, the laboratory's proposed actions are acceptable. The laboratory will note the issue in the Case/SDG Narrative and proceed with the analysis of the samples.

CHEMTECH

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Mountainside, NJ 07092

F. Analytical Techniques:

All analyses were based on CLP Methodology by method ILM05.4

G. Calculation:

Calculation example for ICP-MS Water Sample:

Results reported in Ug/L = Results in ppb X Dilution Factor (if any) X Fraction of Sample Amount Taken in ICP Water- Prep

Fraction of Sample Amount Taken in ICP-MS Water- Prep = 100/100 or 50/50 =1
(if 100 ml Initial Volume taken and Final Volume was made to 100 ml or 50 ml Initial Volume and Final Volume made to 50 ml in ICP-MS Water Digestion procedure)

H. QA/ QC

Calibrations met requirements. Interference check met requirements. Blank analyses did not indicate any presence of contamination. Laboratory Control sample was within control limits. Spike sample did meet requirements except for the Silver. Duplicate sample did meet requirements. Serial Dilution did meet requirements.

I certify that the data package is in compliance with the terms and conditions of the contract both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Director or his designee, as verified by the following signature.

Signature  Name: 
Date 9/10/07 Title: Project Manager

DATA SUMMARY FORM: INORGANIC

Case # : ██████████
 Site : ██████████
 Lab. : ██████████

SDG : ██████████
 BATTLEFIELD GOLF CLUB
 CHEM

Number of Soil Samples : 0
 Number of Water Samples : 6

Sample Number :		██████████		██████████		██████████		██████████		██████████	
Sampling Location :		██████████		██████████		██████████		██████████		██████████	
Field QC :		██████████		██████████		██████████		██████████		██████████	
Matrix :		Water		Water		Dup. of MC02J4		Dup. of MC02J3		Water	
Units :		ug/L		ug/L		Water		Water		Water	
Date Sampled :		8/25/2008		8/28/2008		8/29/2008		8/29/2008		8/29/2008	
Time Sampled :		09:27		10:29		11:19		11:19		11:30	
Dilution Factor :		1.0		1.0		1.0		1.0		1.0	
ANALYTE	CRQL	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
ANTIMONY	2			0.44	B	1.2	B	0.23	B	0.22	B
*ARSENIC	1	1.5		1.6		1.4	B	1.6		1.5	
BARIUM	10	1.5	J	27.9		77.9		77.0		84.1	
BERYLLIUM	1									0.11	J
*CADMIUM	1			0.16	J	0.13	J				
*CHROMIUM	2	0.60	B	0.76	B	0.82	J	0.74	B	0.90	J
COBALT	1					0.14	B				
COPPER	2	33.1		48.4		441		327		133	
*LEAD	1	2.6		1.9		10.3		1.9		8.4	
MANGANESE	1	4.3		120		257		247		213	
*NICKEL	1	0.57	J	3.6		1.1		1.1		2.0	
SELENIUM	5		UL		UL		UL		UL		UL
SILVER	1		UL	0.070	B	0.067	B	0.050	B	0.047	B
THALLIUM	1					0.11	B				
VANADIUM	5	0.89	B	1.4	J	0.64	B	0.99	B	1.3	J
ZINC	2	21.4		31.2		17.4		16.8		140	

CRQL = Contract Required Quantitation Limit *Action Level Exists SEE NARRATIVE FOR CODE DEFINITIONS
 To calculate sample quantitation limits: (CRQL * Dilution Factor) Revised 09/99

DATA SUMMARY FORM: INORGANIC

Case #: [REDACTED] SDG: [REDACTED]
 Site : BATTLEFIELD GOLF CLUB
 Lab. : CHEM

Sample Number :		[REDACTED]					
Sampling Location :		[REDACTED]					
Matrix :		Water					
Units :		ug/L					
Date Sampled :		8/28/2008					
Time Sampled :		11:13					
Dilution Factor :		1.0					
ANALYTE	CRQL	Result	Flag	Result	Flag	Result	Flag
ANTIMONY	2						
*ARSENIC	1	1.4	B				
BARIUM	10	14.0					
BERYLLIUM	1						
*CADMIUM	1						
*CHROMIUM	2	1.9	J				
COBALT	1	0.14	B				
COPPER	2	54.4					
*LEAD	1	6.4					
MANGANESE	1	261					
*NICKEL	1	1.1					
SELENIUM	5		UL				
SILVER	1	0.040	B				
THALLIUM	1						
VANADIUM	5	1.2	J				
ZINC	2	1360					

CRQL = Contract Required Quantitation Limit *Action Level Exists SEE NARRATIVE FOR CODE DEFINITIONS
 To calculate sample quantitation limits: (CRQL * Dilution Factor) Revised 09/99

SAMPLE	CHEMICAL	CAS RN	FRACTION	VALUE_T	STAT_TYI	DURATIO	TEMPER	RESULT
	ALUMINU			ACTUAL				
	ANTIMON			ACTUAL				2
	ARSENIC			ACTUAL				1.5
	BARIUUM			ACTUAL				1.5
	BERYLLIUM			ACTUAL				1
	CADMIUM			ACTUAL				1
	CALCIUM			ACTUAL				
	CHROMIUM			ACTUAL				0.6
	COBALT			ACTUAL				1
	COPPER			ACTUAL				33.1
	IRON			ACTUAL				
	LEAD			ACTUAL				2.6
	MAGNESIUM			ACTUAL				
	MANGANESE			ACTUAL				4.3
	NICKEL			ACTUAL				0.57
	POTASSIUM			ACTUAL				
	SELENIUM			ACTUAL				5
	SILVER			ACTUAL				1
	SODIUM			ACTUAL				
	THALLIUM			ACTUAL				1
	VANADIUM			ACTUAL				0.89
	ZINC			ACTUAL				21.4
	ALUMINU			ACTUAL				
	ANTIMON			ACTUAL				0.44
	ARSENIC			ACTUAL				1.6
	BARIUUM			ACTUAL				27.9
	BERYLLIUM			ACTUAL				1
	CADMIUM			ACTUAL				0.16
	CALCIUM			ACTUAL				
	CHROMIUM			ACTUAL				0.76
	COBALT			ACTUAL				1
	COPPER			ACTUAL				48.4
	IRON			ACTUAL				
	LEAD			ACTUAL				1.9
	MAGNESIUM			ACTUAL				
	MANGANESE			ACTUAL				120
	NICKEL			ACTUAL				3.6
	POTASSIUM			ACTUAL				
	SELENIUM			ACTUAL				5
	SILVER			ACTUAL				0.07
	SODIUM			ACTUAL				
	THALLIUM			ACTUAL				1
	VANADIUM			ACTUAL				1.4
	ZINC			ACTUAL				31.2
	ALUMINU			ACTUAL				
	ANTIMON			ACTUAL				1.2
	ARSENIC			ACTUAL				1.4
	BARIUUM			ACTUAL				77.9
	BERYLLIUM			ACTUAL				1
	CADMIUM			ACTUAL				0.13
	CALCIUM			ACTUAL				

CHROMIUM	ACTUAL	0.82
COBALT	ACTUAL	0.14
COPPER	ACTUAL	441
IRON	ACTUAL	
LEAD	ACTUAL	10.3
MAGNESIUM	ACTUAL	
MANGANESE	ACTUAL	257
NICKEL	ACTUAL	1.1
POTASSIUM	ACTUAL	
SELENIUM	ACTUAL	5
SILVER	ACTUAL	0.067
SODIUM	ACTUAL	
THALLIUM	ACTUAL	0.11
VANADIUM	ACTUAL	0.64
ZINC	ACTUAL	17.4
ALUMINUM	ACTUAL	
ANTIMONY	ACTUAL	0.23
ARSENIC	ACTUAL	1.6
BARIUM	ACTUAL	77
BERYLLIUM	ACTUAL	1
CADMIUM	ACTUAL	1
CALCIUM	ACTUAL	
CHROMIUM	ACTUAL	0.74
COBALT	ACTUAL	1
COPPER	ACTUAL	327
IRON	ACTUAL	
LEAD	ACTUAL	1.9
MAGNESIUM	ACTUAL	
MANGANESE	ACTUAL	247
NICKEL	ACTUAL	1.1
POTASSIUM	ACTUAL	
SELENIUM	ACTUAL	5
SILVER	ACTUAL	0.05
SODIUM	ACTUAL	
THALLIUM	ACTUAL	1
VANADIUM	ACTUAL	0.99
ZINC	ACTUAL	16.8
ALUMINUM	ACTUAL	
ANTIMONY	ACTUAL	0.22
ARSENIC	ACTUAL	1.5
BARIUM	ACTUAL	84.1
BERYLLIUM	ACTUAL	0.11
CADMIUM	ACTUAL	1
CALCIUM	ACTUAL	
CHROMIUM	ACTUAL	0.9
COBALT	ACTUAL	1
COPPER	ACTUAL	133
IRON	ACTUAL	
LEAD	ACTUAL	8.4
MAGNESIUM	ACTUAL	
MANGANESE	ACTUAL	213
NICKEL	ACTUAL	2

POTASSIUM	ACTUAL	
SELENIUM	ACTUAL	5
SILVER	ACTUAL	0.047
SODIUM	ACTUAL	
THALLIUM	ACTUAL	1
VANADIUM	ACTUAL	1.3
ZINC	ACTUAL	140
ALUMINUM	ACTUAL	
ANTIMONY	ACTUAL	2
ARSENIC	ACTUAL	1.4
BARIUM	ACTUAL	14
BERYLLIUM	ACTUAL	1
CADMIUM	ACTUAL	1
CALCIUM	ACTUAL	
CHROMIUM	ACTUAL	1.9
COBALT	ACTUAL	0.14
COPPER	ACTUAL	54.4
IRON	ACTUAL	
LEAD	ACTUAL	6.4
MAGNESIUM	ACTUAL	
MANGANESE	ACTUAL	261
NICKEL	ACTUAL	1.1
POTASSIUM	ACTUAL	
SELENIUM	ACTUAL	5
SILVER	ACTUAL	0.04
SODIUM	ACTUAL	
THALLIUM	ACTUAL	1
VANADIUM	ACTUAL	1.2
ZINC	ACTUAL	1360