Appendix F Data Validation Reports – October through December 2012

CGS Chesapeake GeoSciences, Inc.

5405 Twin Knolls Road, Suite 1 • Columbia, MD 21045 • ph: 410.740.1911 • fax: 410.740.3299 • www.cgs.us.com

May 8, 2013

Mr. Christopher Ralston
Program Administrator
Oil Control Program
Maryland Department of the Environment
1800 Washington Boulevard, Suite 620
Baltimore, Maryland 21230-1719

RE: Laboratory Data Validation
Monrovia BP/Former Green Valley Citgo
11791 Fingerboard Road
Monrovia, Frederick County, MD 21770
MDE-OCP Case No. **2005-0834FR**
Remedial Management Services Contract
CGS Project No. CG-12-0788.05

Dear Mr. Ralston:

Chesapeake GeoSciences, Inc. (CGS) is pleased to provide you with the attached Data Validation Report for the Monrovia BP/Former Green Valley Citgo site in Monrovia, MD. The samples that were validated include water samples collected from domestic supply wells at residences near the former Green Valley Citgo from October through December 2012 and on March 12, 2013. The samples were analyzed by Enviro-Chem Laboratories, Inc. for total and dissolved chromium and lead, and for hexavalent chromium (chromate).

CGS contracted Laboratory Data Consultants, Inc. to perform the third party data validation. The analytical data for this project were validated according to review procedure IM2 guidelines for inorganics, as described in *EPA Region III Innovative Approaches to Data Validation (EPA, 1995)*. The attached table summarizes the qualified sample results, defines the qualifiers, and gives the reason for the qualifier. All instances of reported qualifiers are based on advisory/technical validation criteria and not protocol/contractual deviations (i.e. samples being analyzed outside of the allowable holding time). The qualified hexavalent chromium sample results listed were due to matrix spike and matrix spike duplicate sample percentage of recoveries being below the acceptable limit. This indicates that the results may be biased low (or that the detection/reporting limit may be higher than noted). One dissolved chromium sample result was qualified due to the laboratory (internal) duplicate sample result being greater than the allowable difference between the sample and duplicate results.

All of the validated laboratory data were determined to be usable for their intended purpose. The minor outliers identified above did not result in any data being rejected. The data fall within the limits of precision and accuracy prescribed in each analytical method and the EPA Region III Guidelines.A copy of the data validation report is attached.

Please contact me at (410) 740-1911 (x102) or via electronic mail at sdaniel@cgs.us.com if you have any questions regarding this submittal or the project itself. Thank you.

Sincerely,

Chesapeake GeoSciences, Inc.

Sean P. Daniel
Operations Manager

Attachments:

- Data Validation Results Summary
- Laboratory Data Consultants, Data Validation Report 29503

Monrovia BP/Former Green Valley Citgo
MDE Case No. **2005-0834FR**
Data Validation Results Summary – Qualified Results Only
Total & Dissolved Lead & Chromium (EPA 200.8) and Hexavalent Chromium/Chromate (EPA 218.7)

Sample ID	**Flagged Analysis Reported Concentration (ug/L)**	**Flagged Analysis**	**Validation Qualifiers**	**Reason for Qualifier**
3997Farm-FirstDraw	0.020 U	Method 218.7 Hexavalent Chromium	**UL / A**	1
3997Farm-Flushed	**0.152**	Method 218.7 Hexavalent Chromium	**L / A**	1
3740Blueberry-FirstDraw	0.020 U	Method 218.7 Hexavalent Chromium	**UL / A**	1
3740Blueberry-Flushed	0.020 U	Method 218.7 Hexavalent Chromium	**UL / A**	1
3995Farm-FirstDraw	0.020 U	Method 218.7 Hexavalent Chromium	**UL / A**	1
3995Farm-Flushed	0.020 U	Method 218.7 Hexavalent Chromium	**UL / A**	1
11712Serene-FirstDraw	0.020 U	Method 218.7 Hexavalent Chromium	**UL / A**	1
11712Serene-Flushed	0.020 U	Method 218.7 Hexavalent Chromium	**UL / A**	1
3996Farm-FirstDraw	0.020 U	Method 218.7 Hexavalent Chromium	**UL / A**	1
3996Farm-Flushed	0.020 U	Method 218.7 Hexavalent Chromium	**UL / A**	1
11712Serene-FlushedDB	0.020 U	Method 218.7 Hexavalent Chromium	**UL / A**	1
3993Farm-FirstDraw	0.020 U	Method 218.7 Hexavalent Chromium	**UL / A**	1
3993Farm-Flushed	0.020 U	Method 218.7 Hexavalent Chromium	**UL / A**	1
3998Rye-FirstDraw	0.020 U	Method 218.7 Hexavalent Chromium	**UL / A**	1
3998Rye-Flushed	0.020 U	Method 218.7 Hexavalent Chromium	**UL / A**	1
3998Rye-FlushedDB	0.020 U	Method 218.7 Hexavalent Chromium	**UL / A**	1
3985Farm-FirstDraw	0.020 U	Method 218.7 Hexavalent Chromium	**UL / A**	2
3985Farm-Flushed	0.020 U	Method 218.7 Hexavalent Chromium	**UL / A**	2
3933Rosewood-FirstDraw	0.020 U	Method 218.7 Hexavalent Chromium	**UL / A**	2
3933Rosewood-Flushed	0.020 U	Method 218.7 Hexavalent Chromium	**UL / A**	2
11894Barley-FirstDraw	0.020 U	Method 218.7 Hexavalent Chromium	**UL / A**	2
11894Barley-Flushed	**0.026**	Method 218.7 Hexavalent Chromium	**L / A**	2
3991Farm-FirstDraw	0.020 U	Method 218.7 Hexavalent Chromium	**UL / A**	2
3991Farm-Flushed	**0.023**	Method 218.7 Hexavalent Chromium	**L / A**	2
	6.3	Method 200.8 Dissolved Chromium	**J / A**	3
3833Greenridge-FirstDraw	0.020 U	Method 218.7 Hexavalent Chromium	**UL / A**	4
3833Greenridge-Flushed	0.020 U	Method 218.7 Hexavalent Chromium	**UL / A**	4

Table Notes:

J - Indicates an estimated value.
L - Indicates the reported value may be biased low.
UL - Indicates the compound or element was analyzed for but not detected. The sample detection limit is probably higher.
A -Indicates the finding is based upon technical validation criteria.
U - Analyte Not Detected Above Specified Reporting Limit
Bold - Detected analyte concentration
ug/L - micrograms per liter or parts per billion (ppb)
1 - Matrix spike/Matrix spike duplicate (Percents of recovery (%R) of 68.6%/70.5% are below acceptable limit of 85%)
2 - Matrix spike/Matrix spike duplicate (%R of 71%/69.3% are below the acceptable limit of 85%)
3 – Laboratory duplicate sample analysis result (difference of 2.0 mg/L is greater than 1.0 mg/L acceptable limit)
4 - Matrix spike/Matrix spike duplicate (%R of 54.4%/57.6% are below the acceptable limit of 85%)

Laboratory Data Consultants, Inc.

7750 El Camino Real, Ste. 2L Carlsbad, CA 92009

Phone 760.634.0437 **Web** www.lab-data.com **Fax** 760.634.0439

Chesapeake GeoScience, Inc.
5405 Twin Knolls Rd, Suite 1
Columbia, MD 21045
ATTN: Mr. Sean P. Daniel

April 26, 2013

SUBJECT: Green Valley Citgo Project, Data Validation

Dear Mr. Daniel,

Enclosed are the final validation reports for the fraction listed below. These SDGs were received on April 10, 2013. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project # 29503:

SDG #	**Fraction**
ECL026876/ECL026908/ECL026926/ECL026927 ECL026945/ECL026962/ECL026972/ECL026973/ECL026987 ECL027052/ECL027072/ECL027120/ECL027121 ECL027154/ECL027163 ECL027334 ECL028223	Metals

The data validation was performed under EPA Region III, Level IM2. The analyses were validated using the following documents, as applicable to each method:

- EPA Region III Innovative Approaches for Data Validation, EPA June 1995

Please feel free to contact us if you have any questions.

Sincerely,

Pei Geng

Pei Geng
Project Manager/Senior Chemist

360 Pages-SF

Attachment 1

IV

LDC #29503 (Chesapeake GeoSciences, Inc- Columbia, MD / Green Valley Citgo Project)

LDC	SDG#	DATE REC'D	(3) DATE DUE	Cr, Pb (200.8)		Diss Cr, Pb (200.8)		Diss CrVI (218.7)																													
Matrix:	Water/Soil-Product			W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	ECL026876/ECL026908/ECL026926/ECL026927	04/10/13	05/01/13	9	0	9	0	9	0																												
B	ECL026945/ECL026962/ECL026972/ECL026973/ECL026987	04/10/13	05/01/13	16	0	16	0	16	0																												
C	ECL027052/ECL027072/ECL027120/ECL027121	04/10/13	05/01/13	15	0	15	0	15	0																												
D	ECL027154/ECL027163	04/10/13	05/01/13	8	0	8	0	8	0																												
E	ECL027334	04/10/13	05/01/13	2	0	2	0	2	0																												
F	ECL028223	04/10/13	05/01/13	6	0	6	0	6	0																												
Total	A/PG			56	0	56	0	56	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	168

Shaded cells indicate Level IV validation (all other cells are Level III validation). These sample counts do not include MS, MSD, or DUP's.

LDC Report# 29503A4

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Green Valley Citgo Project
Collection Date:	October 16 through October 19, 2012
LDC Report Date:	April 30, 2013
Matrix:	Water
Parameters:	Chromium & Lead
Validation Level:	EPA Region III, Level IM2
Laboratory:	Enviro-Chem Laboratories, Inc.
Sample Delivery Group (SDG):	ECL026876/ECL026908/ECL026926/ECL026927

Sample Identification

11711 Serene-First Draw
11711 Serene-Flushed
3923 Rosewood-First Draw
3923 Rosewood-Flushed
4016 Middleton-First Draw
4016 Middleton-Flush
3989 Farm-First Draw
3989 Farm-Flushed
3989 Farm-FB
11711 Serene-First DrawF
11711 Serene-FlushedF
3923 Rosewood-First DrawF
3923 Rosewood-FlushedF
4016 Middleton-First DrawF
4016 Middleton-FlushF
3989 Farm-First DrawF
3989 Farm-FlushedF
3989 Farm-FBF
3989 Farm-FBFDUP
3989 Farm-FBFMS

Samples appended with “F” were analyzed as dissolved

Introduction

This data review covers 20 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 200.8 for Chromium and Lead.

This review follows the EPA Region III Innovative Approaches for Data Validation (EPA June 1995).

A qualification summary table is provided at the end of this report if data has been qualified. 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.

The following are definitions of the data qualifiers:

U	Indicates the compound or element was analyzed for but not detected at or above the stated limit.
J	Indicates an estimated value.
K	Indicates the reported value may be biased high.
L	Indicates the reported value may be biased low.
R	Quality control indicates the data is not usable.
NJ	Presumptive evidence of presence of the compound at an estimated quantity.
UJ	Indicates the compound or element was analyzed for but not detected. The sample detection limit is an estimated value.
UL	Indicates the compound or element was analyzed for but not detected. The sample detection limit is probably higher.
B	Indicates the compound or element was analyzed for but not detected substantially above the level reported in laboratory or field blanks.
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. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5%.

III. Calibration

The initial and continuing calibrations were performed at the required frequency.

The calibration standards criteria were met.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No chromium or lead contaminants were found in the initial, continuing and preparation blanks.

Sample 3989 Farm-FB and 3989 Farm-FBF was identified as field blanks. No chromium or lead contaminants were found.

V. ICP Interference Check Sample (ICS) Analysis

ICP interference check sample (ICS) analysis was not required by the method.

VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VII. Duplicate Sample Analysis

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

VIII. Laboratory Control Samples (LCS)

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

IX. Internal Standards (ICP-MS)

All internal standard percent recoveries (%R) were within QC limits.

X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

XI. ICP Serial Dilution

ICP serial dilution was not performed for this SDG.

XII. Sample Result Verification

All sample result verifications were acceptable.

XIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

XIV. Field Duplicates

No field duplicates were identified in this SDG.

Green Valley Citgo Project
Chromium & Lead - Data Qualification Summary - SDG ECL026876/ECL026908/ECL026926/ECL026927

No Sample Data Qualified in this SDG

Green Valley Citgo Project
Chromium & Lead - Laboratory Blank Data Qualification Summary - SDG ECL026876/ECL026908/ECL026926/ECL026927

No Sample Data Qualified in this SDG

Green Valley Citgo Project
Chromium & Lead - Field Blank Data Qualification Summary - SDG ECL026876/ECL026908/ECL026926/ECL026927

No Sample Data Qualified in this SDG

LDC #: 29503A4

VALIDATION COMPLETENESS WORKSHEET

SDG #: ECL026876/ECL026908/ECL026926/ECL02692Level IV
Laboratory: Enviro-Chem Laboratories, Inc. ECL026927

Date: 4-18-13
Page: 1 of 1
Reviewer: MG
2nd Reviewer: V

METHOD: Chromium & Lead (EPA Method 200.8)

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: 10-16-12 through 10-19-12
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	N	not required
VI.	Matrix Spike Analysis	A	MS
VII.	Duplicate Sample Analysis	A	DUP
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
X.	Furnace Atomic Absorption QC	N	not utilized
XI.	ICP Serial Dilution	N	not performed
XII.	Sample Result Verification	A	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	N	
XV	Field Blanks	ND	FB = 9, 16

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

Validated Samples:
all water

1	1	11711 Serene-First Draw	11	1	3923 Rosewood-First DrawF	21			31		
2	1	11711 Serene-Flushed	12	1	3923 Rosewood-FlushedF	22			32		
3	1	3923 Rosewood-First Draw	13	2	4016 Middleton-First DrawF	23			33		
4	1	3923 Rosewood-Flushed	14	2	3989 Farm-First DrawF	24			34		
5	2	4016 Middleton-First Draw	15	2	3989 Farm-FlushedF	25			35		
6	2	4016 Middleton-Flush	16	2	3989 Farm-FBF	26			36		
7	2	3989 Farm-First Draw	17	2	3989 Farm-FBFDUP	27			37		
8	2	3989 Farm-Flushed	18	2	#16 MS	28			38		
9	2	3989 Farm-FB	19	1	11711 Serene-Flushed F	29	1	PBW1	39		
10	1	11711 Serene-First DrawF	20	2	4016 Middleton-FlushF	30	2	PBW2	40		

Notes: Samples appended with "F" were analyzed as dissolved

LDC #: 29503A4

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: MG
2nd Reviewer: ✓

Method: Metals (EPA SW 846 Method 6010B/7000/6020)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. ICP/MS Tune				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?	✓			
Were %RSD of isotopes in the tuning solution ≤5%?	✓			
III. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits?	✓			
Were all initial calibration correlation coefficients > 0.995?	✓			
IV. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
V. ICP Interference Check Sample				
Were ICP interference check samples performed daily?		✓		
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?			✓	
VI. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	✓			
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were ≤ 5X the RL, including when only one of the duplicate sample values were < 5X the RL.	✓			
VII. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	✓			

LDC #: 29503A4

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: MG
2nd Reviewer: V

Validation Area	Yes	No	NA	Findings/Comments
VIII. Furnace Atomic Absorption QC				
If MSA was performed, was the correlation coefficients > 0.995?			✓	
Do all applicable analysies have duplicate injections? (Level IV only)			✓	
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)			✓	
Were analytical spike recoveries within the 85-115% QC limits?			✓	
IX. ICP Serial Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?		✓		
Were all percent differences (%Ds) < 10%?			✓	
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.			✓	
X. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)				
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?	✓			
If the %Rs were outside the criteria, was a reanalysis performed?			✓	
XI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
XII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
XV. Field blanks				
Field blanks were identified in this SDG.	✓			
Target analytes were detected in the field blanks.		✓		

LDC #: 29503A4

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

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

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1→16 19,20	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^-,
QC 17,18	↓	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-MS	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^-,
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 #: 29503A4

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: MG
2nd Reviewer: L

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

$\%R = \frac{Found}{True} \times 100$ Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution
True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated %R	Reported %R	Acceptable (Y/N)
	ICP (Initial calibration)						
1340 ICV	ICP/MS (Initial calibration)	Cr	103.80	100	103.80	103.80	Y
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
1601 CKS	ICP/MS (Continuing calibration)	Pb	201.200	200	100.60	100.60	↓
	CVAA (Continuing calibration)						
	GFAA (Initial calibration)						
	GFAA (Continuing calibation)						

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

LDC #: 29503A4

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: MG
2nd Reviewer:

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{\text{Found}}{\text{True}} \times 100$ Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$ Where, S = Original sample concentration
D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$\%D = \frac{|I-SDR|}{I} \times 100$ Where, I = Initial Sample Result (mg/L)
SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I (units)	True / D / SDR (units)	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
—	ICP interference check	—	—	—	—	—	—
1533 LCS 4459	Laboratory control sample	Pb	51.750 (μg/L)	50 (μg/L)	103.5	103.5	Y
1627 18	Matrix spike	Cr	(SSR-SR) 50.820 (μg/L)	50 (μg/L)	101.6	100.6	↓
1621 / 1624 17	Duplicate	Cr	< 1.0 (μg/L)	< 1.0 (μg/L)	0	NC	↓
—	ICP serial dilution	—	—	—	—	—	—

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

LDC #: 29503A4

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: MG
2nd reviewer: V

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

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

[✓ Y] N N/A Have results been reported and calculated correctly?
[✓ Y] N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
[✓ Y] N N/A Are all detection limits below the CRDL?

Detected analyte results for #1, Pb were recalculated and verified using the following equation:

Concentration = $\frac{(RD)(FV)(Dil)}{(In.\ Vol.)}$

Recalculation:

$$\frac{(3.601\ \mu g/L)(0.050\ L)}{0.050\ L} = 3.601\ \mu g/L$$

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor

#	Sample ID	Analyte	Reported Concentration (µg/L)	Calculated Concentration (µg/L)	Acceptable (Y/N)
1	1	Pb	3.6	3.6	Y
2	11	Pb	4.6	4.6	↓

Note:

RECALC.4SW

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Green Valley Citgo Project

Collection Date: October 16 through October 19, 2012

LDC Report Date: May 1, 2013

Matrix: Water

Parameters: Dissolved Chromate as Chromium

Validation Level: EPA Region III, Level IM2

Laboratory: Enviro-Chem Laboratories, Inc.

Sample Delivery Group (SDG): ECL026876/ECL026908/ECL026926/ECL026927

Sample Identification

11711 Serene-First Draw
11711 Serene-Flushed
3923 Rosewood-First Draw
3923 Rosewood-Flushed
4016 Middleton-First Draw
4016 Middleton-Flush
3989 Farm-First Draw
3989 Farm-Flushed
3989 Farm-FB
11711 Serene-First DrawMS
11711 Serene-First DrawMSD

Introduction

This data review covers 11 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 218.7 for Dissolved Chromate as Chromium.

This review follows the EPA Region III Innovative Approaches for Data Validation (EPA June 1995).

A qualification summary table is provided at the end of this report if data has been qualified. 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.

The following are definitions of the data qualifiers:

U	Indicates the compound or element was analyzed for but not detected at or above the stated limit.
J	Indicates an estimated value.
K	Indicates the reported value may be biased high.
L	Indicates the reported value may be biased low.
R	Quality control indicates the data is not usable.
NJ	Presumptive evidence of presence of the compound at an estimated quantity.
UJ	Indicates the compound or element was analyzed for but not detected. The sample detection limit is an estimated value.
UL	Indicates the compound or element was analyzed for but not detected. The sample detection limit is probably higher.
B	Indicates the compound or element was analyzed for but not detected substantially above the level reported in laboratory or field blanks.
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. Initial Calibration

All criteria for the initial calibration were met.

III. Calibration verification

Calibration verification frequency and analysis criteria were met.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No dissolved chromate as chromium was found in the initial, continuing and preparation blanks.

Sample 3989 Farm-FB was identified as a field blank. No dissolved chromate as chromium was found.

V. Matrix Spike/Matrix Spike Duplicates

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

VI. Duplicates

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

VII. Laboratory Control Samples

Laboratory control sample (LCS) analysis was not required by the method.

VIII. Sample Result Verification

All sample result verifications were acceptable.

IX. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

X. Field Duplicates

No field duplicates were identified in this SDG.

Green Valley Citgo Project
Dissolved Chromate as Chromium - Data Qualification Summary - SDG ECL026876/ECL026908/ECL026926/ECL026927

No Sample Data Qualified in this SDG

Green Valley Citgo Project
Dissolved Chromate as Chromium - Laboratory Blank Data Qualification Summary - SDG ECL026876/ECL026908/ECL026926/ECL026927

No Sample Data Qualified in this SDG

Green Valley Citgo Project
Dissolved Chromate as Chromium - Field Blank Data Qualification Summary - SDG ECL026876/ECL026908/ECL026926/ECL026927

No Sample Data Qualified in this SDG

LDC #: 29503A6

VALIDATION COMPLETENESS WORKSHEET

Date: 4-18-13
SDG #: ECL026876/ECL026908/ECL026926/ECL02692 Level IV
Page: 1 of 1
Laboratory: Enviro-Chem Laboratories, Inc. ECL026927
Reviewer: MG
2nd Reviewer: ✓

Dissolved Chromate as Cr mg

METHOD: ~~Chromate~~ (EPA Method 218.7)

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: 10-16-12 through 10-19-12
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	A	MS / MSD
VI.	Duplicates	N	
VII.	Laboratory control samples	N	not required
VIII.	Sample result verification	A	
IX.	Overall assessment of data	A	
X.	Field duplicates	N	
XI.	Field blanks	ND	FB = 7

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

Validated Samples:
all water

1	11711 Serene-First Draw	11	11711 Serene-Flushed	21		31	
2	3923 Rosewood-First Draw	12	4016 Middleton-Flush	22		32	
3	3923 Rosewood-Flushed	13		23		33	
4	4016 Middleton-First Draw	14		24		34	
5	3989 Farm-First Draw	15		25		35	
6	3989 Farm-Flushed	16		26		36	
7	3989 Farm-FB	17		27		37	
8	11711 Serene-First DrawMS	18		28		38	
9	11711 Serene-First DrawMSD	19		29		39	
10	~~3989 Farm-FBMS~~	20		30		40	

mg

Notes:

LDC #: 29503A6

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: MG
2nd Reviewer:

Method: Inorganics (EPA Method 218.7)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial calibration correlation coefficients ≥ 0.995?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?	✓			
Were titrant checks performed as required? (Level IV only)			✓	
Were balance checks performed as required? (Level IV only)			✓	
III. Blanks				
Was a method blank associated with every sample in this SDG?	✓			(LRBs)
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
IV. Matrix spike/Matrix spike duplicates and Duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	✓			
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of ≤ CRDL(≤ 2X CRDL for soil) was used for samples that were ≤ 5X the CRDL, including when only one of the duplicate sample values were ≤ 5X the CRDL.	✓			
V. Laboratory control samples				
Was an LCS anaylzed for this SDG?		✓		
Was an LCS analyzed per extraction batch?		✓		
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?			✓	
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	

LDC #: 29503A6

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: MG
2nd Reviewer:

Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
Were detection limits < RL?	✓			
VIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
IX. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
X. Field blanks				
Field blanks were identified in this SDG.	✓			
Target analytes were detected in the field blanks.		✓		

LDC #: 29503A6

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: MG
2nd Reviewer: ✓

METHOD: Inorganics, Method 218.7

The correlation coefficient (r) for the calibration of CrO4-Cr was recalculated. Calibration date: 10-9-12

An initial or continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = Found x 100 / True

Where, Found = concentration of each analyte measured in the analysis of the ICV or CCV solution
True = concentration of each analyte in the ICV or CCV source

Type of Analysis	Analyte	Standard ID	Conc Found (units)	Area True (units)	Recalculated r or %R	Reported r or %R	Acceptable (Y/N)
Initial calibration	Cr O4 as Cr	Blank	—	—	$r^2=0.9999$	$r^2=0.9998$	Y
		Standard 1	0.02 (μg/L)	0.0541			
		Standard 2	0.05 ( )	0.1069			
		Standard 3	0.10 ( )	0.2209			
		Standard 4	0.25 ( )	0.5474			
		Standard 5	0.50 ( )	1.1031			
		Standard 6	1.0 ( )	2.1934			
		Standard 7	5.0 ( )	11.1459			
Calibration verification	CrO4-Cr	CCC-Low	0.0166 (μg/L)	0.02 (μg/L)	83	83	
Calibration verification	—	—	—	—	—	—	—
Calibration verification	—	—	—	—	—	—	—

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

LDC #: 29503A6

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: MG
2nd Reviewer: L

METHOD: Inorganics, Method 218.7

Percent recoveries (%R) for a laboratory control sample and a matrix spike sample were recalculated using the following formula:

%R = Found x 100 / True   Where,   Found = concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

RPD = |S-D| x 100 / (S+D)/2   Where,
S = Original sample concentration
D = Duplicate sample concentration

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated %R / RPD	Reported %R / RPD	Acceptable (Y/N)
—	Laboratory control sample	—	—	—	—	—	—
8	Matrix spike sample	CrO_4-Cr	(SSR-SR) 0.9844 (μg/L)	1 (μg/L)	98.4	98.4	Y
8/9	Duplicate sample	CrO_4-Cr	1.0158 (μg/L)	1.0538 (μg/L)	3.7	3.7	↓

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

LDC #: 29503A6

VALIDATION FINDINGS WORKSHEET

Sample Calculation Verification

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

METHOD: Inorganics, Method 218.7

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

[✓ Y] N N/A Have results been reported and calculated correctly?
[✓ Y] N N/A Are results within the calibrated range of the instruments?
[✓ Y] N N/A Are all detection limits below the CRQL?

Compound (analyte) results for # 1 Chromate - Cr reported with a positive detect were recalculated and verified using the following equation:

Concentration =

$y = mx + b$
where $m = 2.2173$
$b = 0.0040$
dil = 1x

Recalculation:

$0.158 = 2.2173(x) + 0.0040$
$0.069 = x$ µg/L

#	Sample ID	Analyte	Reported Concentration (µg/L)	Calculated Concentration (µg/L)	Acceptable (Y/N)
1	1	Chromate - Cr	0.069	0.069	Y

Note:

RECALC.6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Green Valley Citgo Project

Collection Date: October 23 through October 25, 2012

LDC Report Date: April 25, 2013

Matrix: Water

Parameters: Chromium & Lead

Validation Level: EPA Region III, Level IM2

Laboratory: Enviro-Chem Laboratories, Inc.

Sample Delivery Group (SDG): ECL026945/ECL026962/ECL026972/ECL026973/ECL026987

Sample Identification

3997 Farm-First Draw
3997 Farm-Flushed
3740 Blueberry-First Draw
3740 Blueberry-Flushed
3995 Farm-First Draw
3995 Farm-Flushed
3993 Farm-First Draw
3993 Farm-Flushed
11712 Serene - First Draw
11712 Serene – Flushed
3996 Farm - First Draw
3996 Farm - Flushed
11712 Serene - Flushed DB
3998 Rye - First Draw
3998 Rye - Flushed
3998 Rye - Flushed DB
3997 Farm-First DrawF
3997 Farm-FlushedF
3740 Blueberry-First DrawF
3740 Blueberry-FlushedF
3995 Farm-First DrawF
3995 Farm-FlushedF
3993 Farm-First DrawF
3993 Farm-FlushedF
11712 Serene - First DrawF
11712 Serene - FlushedF
3996 Farm - First DrawF
3996 Farm - FlushedF
11712 Serene - Flushed DBF
3998 Rye - First DrawF
3998 Rye - FlushedF
3998 Rye - Flushed DBF
3997 Farm-First DrawMS
3997 Farm-First DrawDUP
3996 Farm - First DrawDUP
11712 Serene - FlushedFDUP
11712 Serene - FlushedFMS
3998 Rye - Flushed DBFMS
3998 Rye - Flushed DBFDUP
3997 Farm-First DrawMS

Samples appended with “F” were analyzed as dissolved

Introduction

This data review covers 40 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 200.8 for Chromium and Lead.

This review follows the EPA Region III Innovative Approaches for Data Validation (EPA June 1995).

A qualification summary table is provided at the end of this report if data has been qualified. 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.

The following are definitions of the data qualifiers:

U	Indicates the compound or element was analyzed for but not detected at or above the stated limit.
J	Indicates an estimated value.
K	Indicates the reported value may be biased high.
L	Indicates the reported value may be biased low.
R	Quality control indicates the data is not usable.
NJ	Presumptive evidence of presence of the compound at an estimated quantity.
UJ	Indicates the compound or element was analyzed for but not detected. The sample detection limit is an estimated value.
UL	Indicates the compound or element was analyzed for but not detected. The sample detection limit is probably higher.
B	Indicates the compound or element was analyzed for but not detected substantially above the level reported in laboratory or field blanks.
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. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5%.

III. Calibration

The initial and continuing calibrations were performed at the required frequency.

The calibration standards criteria were met.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No chromium or lead contaminants were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

V. ICP Interference Check Sample (ICS) Analysis

ICP interference check sample (ICS) analysis was not required by the method.

VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VII. Duplicate Sample Analysis

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

VIII. Laboratory Control Samples (LCS)

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

IX. Internal Standards (ICP-MS)

All internal standard percent recoveries (%R) were within QC limits.

X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

XI. ICP Serial Dilution

ICP serial dilution was not performed for this SDG.

XII. Sample Result Verification

All sample result verifications were acceptable.

XIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

XIV. Field Duplicates

Samples 11712 Serene – Flushed and 11712 Serene - Flushed DB, samples 3998 Rye – Flushed and 3998 Rye - Flushed DB, samples 11712 Serene – FlushedF and 11712 Serene - Flushed DBF, and samples 3998 Rye – FlushedF and 3998 Rye - Flushed DBF were identified as field duplicates. No chromium or lead was detected in any of the samples with the following exceptions:

	Concentration (ug/L)		
Analyte	11712 Serene - Flushed	11712 Serene - Flushed DB	RPD
Lead	323	129	86

	Concentration (ug/L)		
Analyte	11712 Serene - FlushedF	11712 Serene - Flushed DBF	RPD
Lead	76.1	80.4	5

Green Valley Citgo Project
Chromium & Lead - Data Qualification Summary - SDG ECL026945/ECL026962/ECL026972/ECL026973/ECL026987

No Sample Data Qualified in this SDG

Green Valley Citgo Project
Chromium & Lead - Laboratory Blank Data Qualification Summary - SDG ECL026945/ECL026962/ECL026972/ECL026973/ECL026987

No Sample Data Qualified in this SDG

Green Valley Citgo Project
Chromium & Lead - Field Blank Data Qualification Summary - SDG ECL026945/ECL026962/ECL026972/ECL026973/ECL026987

No Sample Data Qualified in this SDG

LDC #: 29503B4

VALIDATION COMPLETENESS WORKSHEET

Date: 4-19-13
Page: 1 of 1
Reviewer: MG
2nd Reviewer:

SDG #: ECL026945/ECL026962/ECL026972/ECL026973/ECL026987
Laboratory: Enviro-Chem Laboratories, Inc. Level IV

METHOD: Chromium & Lead (EPA Method 200.8)

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: 10-23-12 through 10-25-12
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	N	not required
VI.	Matrix Spike Analysis	A	MS
VII.	Duplicate Sample Analysis	A	DUP
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
X.	Furnace Atomic Absorption QC	N	not utilized
XI.	ICP Serial Dilution	N	not performed
XII.	Sample Result Verification	A	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	SW	D = 10 + 13, D = 15* + 16*, D = 26 + 29, D = 31* + 32*
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: all water

1	1	3997 Farm-First Draw	11	2	3996 Farm - First Draw	21	1	3995 Farm-First DrawF	31	2	3998 Rye - FlushedF
2	1	3997 Farm-Flushed	12	2	3996 Farm - Flushed	22	1	3995 Farm-FlushedF	32	2	3998 Rye - Flushed DBF
3	1	3740 Blueberry-First Draw	13	2	11712 Serene - Flushed DB	23	1	3993 Farm-First DrawF	33	1	3997 Farm-First DrawMS
4	1	3740 Blueberry-Flushed	14	2	3998 Rye - First Draw	24	1	3993 Farm-FlushedF	34	1	3997 Farm-First DrawDUP
5	1	3995 Farm-First Draw	15	2	3998 Rye - Flushed	25	1	11712 Serene - First DrawF	35	2	3996 Farm - First DrawDUP
6	1	3995 Farm-Flushed	16	2	3998 Rye - Flushed DB	26	1	11712 Serene - FlushedF	36	1	11712 Serene - Flushed F DUP
7	1	3993 Farm-First Draw	17	1	3997 Farm-First DrawF	27	2	3996 Farm - First DrawF	37	1	11712 Serene - Flushed F MS
8	1	3993 Farm-Flushed	18	1	3997 Farm-FlushedF	28	2	3996 Farm - FlushedF	38	2	3998 Rye - Flushed DB F MS
9	1	11712 Serene - First Draw	19	1	3740 Blueberry-First DrawF	29	2	11712 Serene - Flushed DBF	39	2	3998 Rye - Flushed DB F DUP
10	1	11712 Serene - Flushed	20	1	3740 Blueberry-FlushedF	30	2	3998 Rye - First DrawF	40	2	#11 MS

mg ↓

Notes: Samples appended with "F" were analyzed as dissolved

1 PBW1
2 PBW2

LDC #: 29503B4

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: MG
2nd Reviewer:

Method: Metals (EPA SW 846 Method 6010B/7000/6020)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. ICP/MS Tune				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?	✓			
Were %RSD of isotopes in the tuning solution ≤5%?	✓			
III. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits?	✓			
Were all initial calibration correlation coefficients ≥ 0.995?	✓			
IV. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
V. ICP Interference Check Sample				
Were ICP interference check samples performed daily?		✓		
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?			✓	
VI. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	✓			
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were ≤ 5X the RL, including when only one of the duplicate sample values were < 5X the RL.	✓			
VII. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	✓			

LDC #: 29503B4

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: MG
2nd Reviewer:

Validation Area	Yes	No	NA	Findings/Comments
VIII. Furnace Atomic Absorption QC				
If MSA was performed, was the correlation coefficients > 0.995?			✓	
Do all applicable analysies have duplicate injections? (Level IV only)			✓	
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)			✓	
Were analytical spike recoveries within the 85-115% QC limits?			✓	
IX. ICP Serial Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?		✓		
Were all percent differences (%Ds) < 10%?			✓	
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.			✓	
X. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)				
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?	✓			
If the %Rs were outside the criteria, was a reanalysis performed?			✓	
XI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
XII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Field duplicate pairs were identified in this SDG.	✓			
Target analytes were detected in the field duplicates.	✓			
XV. Field blanks				
Field blanks were identified in this SDG.		✓		
Target analytes were detected in the field blanks.			✓	

LDC #: 29503B4

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

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

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1→32	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^-, ___
QC 33→40	↓	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-MS	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^-, ___
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#: 29503B4

VALIDATION FINDINGS WORKSHEET

Field Duplicates

Page: 1 of 1
Reviewer: MG
2nd Reviewer:

METHOD: Metals (EPA Method 6010B/7000)

[✓ Y] N NA Were field duplicate pairs identified in this SDG?
[✓ Y] N NA Were target analytes detected in the field duplicate pairs?

Analyte	Concentration (ug/L)		RPD	
	10	13		
Lead	323	129	86	

V:\FIELD DUPLICATES\FD_inorganic\29503B4.WPD

Analyte	Concentration (ug/L)		RPD	
	26	29		
Lead	76.1	80.4	5	

V:\FIELD DUPLICATES\FD_inorganic\29503B4.WPD

LDC #: 29503B4

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: MG
2nd Reviewer:

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

$\%R = \frac{\text{Found}}{\text{True}} \times 100$

Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution
True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated %R	Reported %R	Acceptable (Y/N)
	ICP (Initial calibration)						
1139 ICV	ICP/MS (Initial calibration)	Pb	107.600	100	107.60	107.60	Y
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
1212 CKS	ICP/MS (Continuing calibration)	Cr	199.100	200	99.55	99.55	↓
	CVAA (Continuing calibration)						
	GFAA (Initial calibration)						
	GFAA (Continuing calibation)						

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

LDC #: 29503B4

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: MG
2nd Reviewer:

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{Found}{True} \times 100$ Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation,
Found = SSR (spiked sample result) - SR (sample result).
True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$ Where, S = Original sample concentration
D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$\%D = \frac{|I-SDR|}{I} \times 100$ Where, I = Initial Sample Result (mg/L)
SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I (units)	True / D / SDR (units)	Recalculated	Reported	Acceptable (Y/N)
					%R / RPD / %D	%R / RPD / %D	
—	ICP interference check	—	—	—	—	—	—
1324 LCS 4474	Laboratory control sample	Cr	50.140 (mg/L)	50 (mg/L)	100.3	100.3	Y
1310 37	Matrix spike	Cr	(SSR-SR) 49.020 (mg/L)	50 (mg/L)	98.0	97.3	↓
1305 / 1308 36	Duplicate	Pb	76.070 (mg/L)	74.630 (mg/L)	1.9	1.9	
—	ICP serial dilution	—	—	—	—	—	—

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

LDC #: 29503B4

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

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

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

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

[✓ Y] N N/A Have results been reported and calculated correctly?
[✓ Y] N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
[✓ Y] N N/A Are all detection limits below the CRDL?

Detected analyte results for #10, Pb were recalculated and verified using the following equation:

Concentration = $\frac{(RD)(FV)(Dil)}{(In. Vol.)}$

Recalculation:

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor

$$\frac{(323.000\ \mu g/L)(0.050\ L)}{0.050\ L} = 323.000\ \mu g/L$$

#	Sample ID	Analyte	Reported Concentration (µg/L)	Calculated Concentration (µg/L)	Acceptable (Y/N)
1	1	Pb	14.9	14.9	Y
2	2	Cr	5.0	5.0	
		Pb	2.7	2.7	
3	10	Pb	323	323	
4	29	Pb	80.4	80.4	↓

Note:

LDC Report# 29503B6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Green Valley Citgo Project
Collection Date:	October 23 through October 25, 2012
LDC Report Date:	April 24, 2013
Matrix:	Water
Parameters:	Dissolved Chromate as Chromium
Validation Level:	EPA Region III, Level IM2
Laboratory:	Enviro-Chem Laboratories, Inc.
Sample Delivery Group (SDG):	ECL026945/ECL026962/ECL026972/ECL026987

Sample Identification

3997 Farm-First Draw
3997 Farm-Flushed
3740 Blueberry-First Draw
3740 Blueberry-Flushed
3995 Farm-First Draw
3995 Farm-Flushed
3993 Farm-First Draw
3993 Farm-Flushed
11712 Serene - First Draw
11712 Serene - Flushed
3996 Farm - First Draw
3996 Farm - Flushed
11712 Serene - Flushed DB
3998 Rye - First Draw
3998 Rye - Flushed
3998 Rye - Flushed DB
3997 Farm-First DrawMS
3997 Farm-First DrawMSD

Introduction

This data review covers 18 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 218.7 for Dissolved Chromate as Chromium.

This review follows the EPA Region III Innovative Approaches for Data Validation (EPA June 1995).

A qualification summary table is provided at the end of this report if data has been qualified. 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.

The following are definitions of the data qualifiers:

U	Indicates the compound or element was analyzed for but not detected at or above the stated limit.
J	Indicates an estimated value.
K	Indicates the reported value may be biased high.
L	Indicates the reported value may be biased low.
R	Quality control indicates the data is not usable.
NJ	Presumptive evidence of presence of the compound at an estimated quantity.
UJ	Indicates the compound or element was analyzed for but not detected. The sample detection limit is an estimated value.
UL	Indicates the compound or element was analyzed for but not detected. The sample detection limit is probably higher.
B	Indicates the compound or element was analyzed for but not detected substantially above the level reported in laboratory or field blanks.
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. Initial Calibration

All criteria for the initial calibration were met.

III. Calibration verification

Calibration verification frequency and analysis criteria were met.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No dissolved chromate as chromium was found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

V. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
3997 Farm-First DrawMS/MSD (All samples in SDG ECL026945/ ECL026962/ ECL026972/ ECL026987)	Dissolved chromate as chromium	68.8 (85-115)	70.5 (85-115)	-	L (all detects) UL (all non-detects)	A

VI. Duplicates

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

VII. Laboratory Control Samples

Laboratory control sample (LCS) analysis was not required by the method.

VIII. Sample Result Verification

All sample result verifications were acceptable.

IX. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

X. Field Duplicates

Samples 11712 Serene – Flushed and 11712 Serene - Flushed DB and samples 3998 Rye – Flushed and 3998 Rye - Flushed DB were identified as field duplicates. No dissolved chromate as chromium was detected in any of the samples.

Green Valley Citgo Project
Dissolved Chromate as Chromium - Data Qualification Summary - SDG ECL026945/ECL026962/ECL026972/ECL026987

SDG	Sample	Analyte	Flag	A or P	Reason
ECL026945/ ECL026962/ ECL026972/ ECL026987	3997 Farm-First Draw 3997 Farm-Flushed 3740 Blueberry-First Draw 3740 Blueberry-Flushed 3995 Farm-First Draw 3995 Farm-Flushed 3993 Farm-First Draw 3993 Farm-Flushed 11712 Serene - First Draw 11712 Serene - Flushed 3996 Farm - First Draw 3996 Farm - Flushed 11712 Serene - Flushed DB 3998 Rye - First Draw 3998 Rye - Flushed 3998 Rye - Flushed DB	Dissolved chromate as chromium	L (all detects) UL (all non-detects)	A	Matrix spike/Matrix spike duplicate (%R)

Green Valley Citgo Project
Dissolved Chromate as Chromium - Laboratory Blank Data Qualification Summary - SDG ECL026945/ECL026962/ECL026972/ECL026987

No Sample Data Qualified in this SDG

Green Valley Citgo Project
Dissolved Chromate as Chromium - Field Blank Data Qualification Summary - SDG ECL026945/ECL026962/ECL026972/ECL026987

No Sample Data Qualified in this SDG

LDC #: 29503B6

VALIDATION COMPLETENESS WORKSHEET

Date: 4-19-13
Page: 1 of 1
Reviewer: MG
2nd Reviewer:

SDG #: ECL026945/ECL026962/ECL026972/ECL026973/ECL026987
Laboratory: Enviro-Chem Laboratories, Inc. Level IV

Dissolved Chromate as Cr gmH

METHOD: ~~Chromate~~ (EPA Method 218.7)

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: 10-23-12 through 10-25-12
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	SW	MS / MSD
VI.	Duplicates	N	
VII.	Laboratory control samples	N	not required
VIII.	Sample result verification	A	
IX.	Overall assessment of data	A	
X.	Field duplicates	ND	D = 10+13 , D = 15+16
XI.	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:
all water

1	3997 Farm-First Draw	11	3996 Farm - First Draw	21		31	
2	3997 Farm-Flushed	12	3996 Farm - Flushed	22		32	
3	3740 Blueberry-First Draw	13	11712 Serene - Flushed DB	23		33	
4	3740 Blueberry-Flushed	14	3998 Rye - First Draw	24		34	
5	3995 Farm-First Draw	15	3998 Rye - Flushed	25		35	
6	3995 Farm-Flushed	16	3998 Rye - Flushed DB	26		36	
7	3993 Farm-First Draw	17	3997 Farm-First DrawMS	27		37	
8	3993 Farm-Flushed	18	3997 Farm-First DrawMSD	28		38	
9	11712 Serene - First Draw	19		29		39	
10	11712 Serene - Flushed	20		30		40	

Notes:

LDC #: 29503B6

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: MG
2nd Reviewer: Q

Method: Inorganics (EPA Method 218.7)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial calibration correlation coefficients $\geq$ 0.995?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?	✓			
Were titrant checks performed as required? (Level IV only)			✓	
Were balance checks performed as required? (Level IV only)			✓	
III. Blanks				
Was a method blank associated with every sample in this SDG?	✓			LRBs
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
IV. Matrix spike/Matrix spike duplicates and Duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.		✓		
Were the MS/MSD or duplicate relative percent differences (RPD) $\leq$ 20% for waters and $\leq$ 35% for soil samples? A control limit of $\leq$ CRDL($\leq$ 2X CRDL for soil) was used for samples that were $\leq$ 5X the CRDL, including when only one of the duplicate sample values were $\leq$ 5X the CRDL.	✓			
V. Laboratory control samples				
Was an LCS anaylzed for this SDG?		✓		
Was an LCS analyzed per extraction batch?		✓		
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?			✓	
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	

LDC #: 29503B6

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: MG
2nd Reviewer: V

Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
Were detection limits < RL?	✓			
VIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
IX. Field duplicates				
Field duplicate pairs were identified in this SDG.	✓			
Target analytes were detected in the field duplicates.		✓		
X. Field blanks				
Field blanks were identified in this SDG.		✓		
Target analytes were detected in the field blanks.			✓	

LDC #: 29503B6

VALIDATION FINDINGS WORKSHEET

Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: MG
2nd Reviewer: L

METHOD: Inorganics, EPA Method 218.7

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

[✓ Y] N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y [✓ N] N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

[✓ Y] N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

[✓ Y] N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
1	17/18	water	CrO_4 -Cr	68.8 (85-115)	70.5 (85-115)		all	L / UL / A

Comments:

LDC #: 29503B6

VALIDATION FINDINGS WORKSHEET

Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: MG
2nd Reviewer:

METHOD: Inorganics, Method 218.7

The correlation coefficient (r) for the calibration of CrO4-Cr was recalculated. Calibration date: 10-9-12

An initial or continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

$\%R = \frac{Found}{True} \times 100$ Where, Found = concentration of each analyte measured in the analysis of the ICV or CCV solution
True = concentration of each analyte in the ICV or CCV source

Type of Analysis	Analyte	Standard ID	Conc Found (units)	Area True (units)	Recalculated r or %R	Reported r or %R	Acceptable (Y/N)
Initial calibration	CrO4 as Cr	Blank	—	—	r^2=0.9999	r^2=0.9998	Y
		Standard 1	0.02 (µg/L)	0.0541			
		Standard 2	0.05 (↓)	0.1069			
		Standard 3	0.10 (↓)	0.2209			
		Standard 4	0.25 (↓)	0.5474			
		Standard 5	0.50 (↓)	1.1031			
		Standard 6	1.0 (↓)	2.1934			
		Standard 7	5.0 (↓)	11.1459			
Calibration verification	CrO4-Cr	CCC-MID	1.0328 (µg/L)	1 (µg/L)	103.3	103.3	↓
Calibration verification	—	—	—	—	—	—	—
Calibration verification	—	—	—	—	—	—	—

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

LDC #: 29503B6

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: MG
2nd Reviewer:

METHOD: Inorganics, Method 218.7

Percent recoveries (%R) for a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{\text{Found}}{\text{True}} \times 100$ Where,

Found = concentration of each analyte <u>measured</u> in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).

True = concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$ Where,

S = Original sample concentration
D = Duplicate sample concentration

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated %R / RPD	Reported %R / RPD	Acceptable (Y/N)
–	Laboratory control sample	–	–	–	–	–	–
17	Matrix spike sample	CrO_4-Cr	(SSR-SR) 0.6883 (μg/L)	1 (μg/L)	68.8	68.8	Y
17/18	Duplicate sample	CrO_4-Cr	0.6883 (μg/L)	0.7050 (μg/L)	2.4	2.4	↓

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

LDC #: 29503B6

VALIDATION FINDINGS WORKSHEET

Sample Calculation Verification

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

METHOD: Inorganics, Method 218.7

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

[✓ Y] N N/A Have results been reported and calculated correctly?
[✓ Y] N N/A Are results within the calibrated range of the instruments?
[✓ Y] N N/A Are all detection limits below the CRQL?

Compound (analyte) results for #2 CrO_4-Cr reported with a positive detect were recalculated and verified using the following equation:

Concentration =

$Y = mx + b$
where $m = 2.2173$
$b = 0.0040$
dil = 1x

Recalculation:

$0.340 = 2.2173(x) + 0.0040$

$0.1515\ \mu g/L = X$

#	Sample ID	Analyte	Reported Concentration (µg/L)	Calculated Concentration (µg/L)	Acceptable (Y/N)
1	2	Chromate - Cr	0.152	0.152	Y

Note: all other level IV samples are N.D.

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Green Valley Citgo Project
Collection Date:	November 6 through November 9, 2012
LDC Report Date:	April 25, 2013
Matrix:	Water
Parameters:	Chromium & Lead
Validation Level:	EPA Region III, Level IM2
Laboratory:	Enviro-Chem Laboratories, Inc.
Sample Delivery Group (SDG):	ECL027052/ECL027072/ECL027120/ECL027121

Sample Identification

3806 Greenridge-First Draw
3806 Greenridge-Flushed
11789 Thomas Spring-First Draw
11789 Thomas Spring-Flushed
3984A Farm First Draw
3984A Farm Flushed
3990 Farm First Draw
3990 Farm Flushed
3994 Farm-First Draw
3994 Farm-Flushed
3994 Farm-Flushed DB
3992 Farm-First Draw
3992 Farm-Flushed
3987 Farm-First Draw
3987 Farm-Flushed
3806 Greenridge-First DrawF
3806 Greenridge-FlushedF
11789 Thomas Spring-First DrawF
11789 Thomas Spring-FlushedF
3984A Farm First DrawF
3984A Farm FlushedF
3990 Farm First DrawF
3990 Farm FlushedF
3994 Farm-First DrawF
3994 Farm-FlushedF
3994 Farm-Flushed DBF
3992 Farm-First DrawF
3992 Farm-FlushedF
3987 Farm-First DrawF
3987 Farm-FlushedF
3806 Greenridge-First DrawMS
3806 Greenridge-First DrawDUP
3994 Farm-Flushed DBMS
3994 Farm-Flushed DBDUP
3994 Farm-FlushedMSF
3994 Farm-FlushedDUPF

Samples appended with “F” were analyzed as dissolved

Introduction

This data review covers 36 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 200.8 for Chromium and Lead.

This review follows the EPA Region III Innovative Approaches for Data Validation (EPA June 1995).

A qualification summary table is provided at the end of this report if data has been qualified. 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.

The following are definitions of the data qualifiers:

U	Indicates the compound or element was analyzed for but not detected at or above the stated limit.
J	Indicates an estimated value.
K	Indicates the reported value may be biased high.
L	Indicates the reported value may be biased low.
R	Quality control indicates the data is not usable.
NJ	Presumptive evidence of presence of the compound at an estimated quantity.
UJ	Indicates the compound or element was analyzed for but not detected. The sample detection limit is an estimated value.
UL	Indicates the compound or element was analyzed for but not detected. The sample detection limit is probably higher.
B	Indicates the compound or element was analyzed for but not detected substantially above the level reported in laboratory or field blanks.
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. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5%.

III. Calibration

The initial and continuing calibrations were performed at the required frequency.

The calibration standards criteria were met.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No chromium or lead contaminants were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

V. ICP Interference Check Sample (ICS) Analysis

ICP interference check sample (ICS) analysis was not required by the method.

VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VII. Duplicate Sample Analysis

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

VIII. Laboratory Control Samples (LCS)

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

IX. Internal Standards (ICP-MS)

All internal standard percent recoveries (%R) were within QC limits.

X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

XI. ICP Serial Dilution

ICP serial dilution was not performed for this SDG.

XII. Sample Result Verification

All sample result verifications were acceptable.

XIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

XIV. Field Duplicates

Samples 3994 Farm-Flushed and 3994 Farm-Flushed DB and samples 3994 Farm-FlushedF and 3994 Farm-Flushed DBF were identified as field duplicates. No chromium or lead was detected in any of the samples.

Green Valley Citgo Project
Chromium & Lead - Data Qualification Summary - SDG ECL027052/ECL027072/ECL027120/ECL027121

No Sample Data Qualified in this SDG

Green Valley Citgo Project
Chromium & Lead - Laboratory Blank Data Qualification Summary - SDG ECL027052/ECL027072/ECL027120/ECL027121

No Sample Data Qualified in this SDG

Green Valley Citgo Project
Chromium & Lead - Field Blank Data Qualification Summary - SDG ECL027052/ECL027072/ECL027120/ECL027121

No Sample Data Qualified in this SDG

LDC #: 29503C4 **VALIDATION COMPLETENESS WORKSHEET** Date: 4-19-13
SDG #: ECL027052/ECL027072/ECL027120/ECL027121 Page: 1 of 1
Laboratory: Enviro-Chem Laboratories, Inc. Level IV Reviewer: MG
2nd Reviewer:

METHOD: Chromium & Lead (EPA Method 200.8)

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 11-6-12 through 11-9-12
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	N	not required
VI.	Matrix Spike Analysis	A	MS
VII.	Duplicate Sample Analysis	A	DUP
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
X.	Furnace Atomic Absorption QC	N	not utilized
XI.	ICP Serial Dilution	N	not performed
XII.	Sample Result Verification	A	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	ND	D = 10 + 11, D = 25 + 26
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:
all water

1[1]	3806 Greenridge-First Draw	11[2]	3994 Farm-Flushed DB	21[1]	3984A Farm FlushedF	31[1]	3806 Greenridge-First DrawMS
2[1]	3806 Greenridge-Flushed	12[2]	3992 Farm-First Draw	22[1]	3990 Farm First DrawF	32[1]	3806 Greenridge-First DrawDUP
3[1]	11789 Thomas Spring-First Draw	13[2]	3992 Farm-Flushed	23[1]	3990 Farm FlushedF	33[2]	3994 Farm-Flushed DBMS
4[1]	11789 Thomas Spring-Flushed	14[2]	3987 Farm-First Draw	24[1]	3994 Farm-First DrawF	34[2]	3994 Farm-Flushed DBDUP
5[1]	3984A Farm First Draw	15[2]	3987 Farm-Flushed	25[1]	3994 Farm-FlushedF	35[1]	3994 Farm-FlushedMSF
6[1]	3984A Farm Flushed	16[1]	3806 Greenridge-First DrawF	26[2]	3994 Farm-Flushed DBF	36[1]	3994 Farm-FlushedDUPF
7[1]	3990 Farm First Draw	17[1]	3806 Greenridge-FlushedF	27[2]	3992 Farm-First DrawF	37	
8[1]	3990 Farm Flushed	18[1]	11789 Thomas Spring-First DrawF	28[2]	3992 Farm-FlushedF	38	
9[1]	3994 Farm-First Draw	19[1]	11789 Thomas Spring-FlushedF	29[2]	3987 Farm-First DrawF	39	
10[1]	3994 Farm-Flushed	20[1]	3984A Farm First DrawF	30[2]	3987 Farm-FlushedF	40	

Notes: Samples appended with "F" were analyzed as dissolved

[1] PBW1
[2] PBW2

LDC #: 29503C4

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: MG
2nd Reviewer: V

Method: Metals (EPA SW 846 Method 6010B/7000/6020)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. ICP/MS Tune				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?	✓			
Were %RSD of isotopes in the tuning solution ≤5%?	✓			
III. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits?	✓			
Were all initial calibration correlation coefficients ≥ 0.995?	✓			
IV. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
V. ICP Interference Check Sample				
Were ICP interference check samples performed daily?		✓		
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?			✓	
VI. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	✓			
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were ≤ 5X the RL, including when only one of the duplicate sample values were ≤ 5X the RL.	✓			
VII. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	✓			

LDC #: 29503C4

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: MG
2nd Reviewer: W

Validation Area	Yes	No	NA	Findings/Comments
VIII. Furnace Atomic Absorption QC				
If MSA was performed, was the correlation coefficients > 0.995?			✓	
Do all applicable analysies have duplicate injections? (Level IV only)			✓	
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)			✓	
Were analytical spike recoveries within the 85-115% QC limits?			✓	
IX. ICP Serial Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?		✓		
Were all percent differences (%Ds) < 10%?			✓	
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.			✓	
X. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)				
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?	✓			
If the %Rs were outside the criteria, was a reanalysis performed?			✓	
XI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
XII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Field duplicate pairs were identified in this SDG.	✓			
Target analytes were detected in the field duplicates.		✓		
XV. Field blanks				
Field blanks were identified in this SDG.		✓		
Target analytes were detected in the field blanks.			✓	

LDC #: 29503C4

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

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

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1 → 30	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^-, ___ ___
QC 31 → 36	↓	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-MS	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^-, ___ ___
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 #: 29503C4

VALIDATION FINDINGS WORKSHEET

Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: MG
2nd Reviewer:

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

$\%R = \frac{\text{Found}}{\text{True}} \times 100$

Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution
True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated %R	Reported %R	Acceptable (Y/N)
	ICP (Initial calibration)						
1049 ICV	ICP/MS (Initial calibration)	Cr	103.200	100	103.20	103.20	Y
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
1122 CKS	ICP/MS (Continuing calibration)	Pb	200.000	200	100.00	100.00	
	CVAA (Continuing calibration)						
	GFAA (Initial calibration)						
	GFAA (Continuing calibation)						

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

LDC #: 29503C4

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: MG
2nd Reviewer:

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{\text{Found}}{\text{True}} \times 100$ Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$ Where, S = Original sample concentration
D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$\%D = \frac{|I-SDR|}{I} \times 100$ Where, I = Initial Sample Result (mg/L)
SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I (units)	True / D / SDR (units)	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
—	ICP interference check	—	—	—	—	—	—
1100 LCS 4501	Laboratory control sample	Pb	50.490 (µg/L)	50 (µg/L)	101	101	Y
1108 31	Matrix spike	Cr	(SSR-SR) 49.680 (µg/L)	50 (µg/L)	99.4	99.2	↓
1102/1105 32	Duplicate	Pb	2.317 (µg/L)	2.318 (µg/L)	0	0	
—	ICP serial dilution	—	—	—	—	—	—

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

LDC #: 29503C4

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: MG
2nd reviewer: V

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

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

[✓ Y] N N/A Have results been reported and calculated correctly?
[✓ Y] N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
[✓ Y] N N/A Are all detection limits below the CRDL?

Detected analyte results for # 1, Pb were recalculated and verified using the following equation:

Concentration = $\frac{(RD)(FV)(Dil)}{(In.\ Vol.)}$

Recalculation:

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor

$$\frac{(2.317\ \mu g/L)(0.050\ L)}{0.050\ L} = 2.317\ \mu g/L$$

#	Sample ID	Analyte	Reported Concentration (µg/L)	Calculated Concentration (µg/L)	Acceptable (Y/N)
1	1	Pb	2.3	2.3	Y
					↓
2	3	Pb	2.5	2.5	
3	16	Pb	1.7	1.7	

Note:

LDC Report# 29503C6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Green Valley Citgo Project
Collection Date:	November 6 through November 9, 2012
LDC Report Date:	April 24, 2013
Matrix:	Water
Parameters:	Dissolved Chromate as Chromium
Validation Level:	EPA Region III, Level IM2
Laboratory:	Enviro-Chem Laboratories, Inc.
Sample Delivery Group (SDG):	ECL027052/ECL027072/ECL027120/EXL027121

Sample Identification

3806 Greenridge-First Draw
3806 Greenridge-Flushed
11789 Thomas Spring-First Draw
11789 Thomas Spring-Flushed
3984A Farm First Draw
3984A Farm Flushed
3990 Farm First Draw
3990 Farm Flushed
3994 Farm-First Draw
3994 Farm-Flushed
3994 Farm-Flushed DB
3992 Farm-First Draw
3992 Farm-Flushed
3987 Farm-First Draw
3987 Farm-Flushed

Introduction

This data review covers 15 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 218.7 for Dissolved Chromate as Chromium.

This review follows the EPA Region III Innovative Approaches for Data Validation (EPA June 1995).

A qualification summary table is provided at the end of this report if data has been qualified. 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.

The following are definitions of the data qualifiers:

U	Indicates the compound or element was analyzed for but not detected at or above the stated limit.
J	Indicates an estimated value.
K	Indicates the reported value may be biased high.
L	Indicates the reported value may be biased low.
R	Quality control indicates the data is not usable.
NJ	Presumptive evidence of presence of the compound at an estimated quantity.
UJ	Indicates the compound or element was analyzed for but not detected. The sample detection limit is an estimated value.
UL	Indicates the compound or element was analyzed for but not detected. The sample detection limit is probably higher.
B	Indicates the compound or element was analyzed for but not detected substantially above the level reported in laboratory or field blanks.
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. Initial Calibration

All criteria for the initial calibration were met.

III. Calibration verification

Calibration verification frequency and analysis criteria were met.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No dissolved chromate as chromium was found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

V. 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.

VI. Duplicates

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

VII. Laboratory Control Samples

Laboratory control sample (LCS) analysis was not required by the method.

VIII. Sample Result Verification

All sample result verifications were acceptable.

IX. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

X. Field Duplicates

Samples 3994 Farm-Flushed and 3994 Farm-Flushed DB were identified as field duplicates. No dissolved chromate as chromium was detected in any of the samples.

Green Valley Citgo Project
Dissolved Chromate as Chromium - Data Qualification Summary - SDG ECL027052/ECL027072/ECL027120/EXL027121

No Sample Data Qualified in this SDG

Green Valley Citgo Project
Dissolved Chromate as Chromium - Laboratory Blank Data Qualification Summary - SDG ECL027052/ECL027072/ECL027120/EXL027121

No Sample Data Qualified in this SDG

Green Valley Citgo Project
Dissolved Chromate as Chromium - Field Blank Data Qualification Summary - SDG ECL027052/ECL027072/ECL027120/EXL027121

No Sample Data Qualified in this SDG

LDC #: 29503C6

VALIDATION COMPLETENESS WORKSHEET

Date: 4-19-13
Page: 1 of 1
Reviewer: MG
2nd Reviewer:

SDG #: ECL027052/ECL027072/ECL027120/ECL027121
Laboratory: Enviro-Chem Laboratories, Inc. Level IV

Dissolved Chromate as Cr
METHOD: ~~Chromate~~ (EPA Method 218.7) mB.

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 11-6-12 through 11-9-12
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	N	client specified
VI.	Duplicates	N	" "
VII.	Laboratory control samples	N	not required
VIII.	Sample result verification	A	
IX.	Overall assessment of data	A	
X.	Field duplicates	ND	D = 10+11
XI	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:
all water

1	3806 Greenridge-First Draw	11	3994 Farm-Flushed DB	21		31	
2	3806 Greenridge-Flushed	12	3992 Farm-First Draw	22		32	
3	11789 Thomas Spring-First Draw	13	3992 Farm-Flushed	23		33	
4	11789 Thomas Spring-Flushed	14	3987 Farm-First Draw	24		34	
5	3984A Farm First Draw	15	3987 Farm-Flushed	25		35	
6	3984A Farm Flushed	16		26		36	
7	3990 Farm First Draw	17		27		37	
8	3990 Farm Flushed	18		28		38	
9	3994 Farm-First Draw	19		29		39	
10	3994 Farm-Flushed	20		30		40	

Notes:

LDC #: 29503C6

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: MG
2nd Reviewer:

Method: Inorganics (EPA Method 218.7)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial calibration correlation coefficients ≥ 0.995?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?	✓			
Were titrant checks performed as required? (Level IV only)			✓	
Were balance checks performed as required? (Level IV only)			✓	
III. Blanks				
Was a method blank associated with every sample in this SDG?	✓			LRBs
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
IV. Matrix spike/Matrix spike duplicates and Duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / [✓ Water]		✓		
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.			✓	
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of ≤ CRDL(≤ 2X CRDL for soil) was used for samples that were ≤ 5X the CRDL, including when only one of the duplicate sample values were ≤ 5X the CRDL.			✓	
V. Laboratory control samples				
Was an LCS anaylzed for this SDG?		✓		
Was an LCS analyzed per extraction batch?		✓		
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?			✓	
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	

LDC #: 29503C6

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: MG
2nd Reviewer:

Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
Were detection limits < RL?	✓			
VIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
IX. Field duplicates				
Field duplicate pairs were identified in this SDG.	✓			
Target analytes were detected in the field duplicates.		✓		
X. Field blanks				
Field blanks were identified in this SDG.		✓		
Target analytes were detected in the field blanks.			✓	

LDC #: 29503C6

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: MG
2nd Reviewer:

METHOD: Inorganics, Method 218.7

The correlation coefficient (r) for the calibration of CrO_4-Cr was recalculated. Calibration date: ~~11-12-13~~ 11-13-12 mA.

An initial or continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

$\%R = \frac{\text{Found}}{\text{True}} \times 100$

Where, Found = concentration of each analyte measured in the analysis of the ICV or CCV solution
True = concentration of each analyte in the ICV or CCV source

Type of Analysis	Analyte	Standard ID	Conc Found (units)	Area True (units)	Recalculated r or %R	Reported r or %R	Acceptable (Y/N)
Initial calibration	CrO_4 as Cr	Blank	–	–	r^2 = 1.0000	r^2 = 1.0000	Y
		Standard 1	0.02 (µg/L)	0.0485			
		Standard 2	0.05 ( )	0.1199			
		Standard 3	0.10 ( )	0.2297			
		Standard 4	0.25 ( )	0.5841			
		Standard 5	0.50 ( )	1.1978			
		Standard 6	1.00 ( )	2.3853			
		Standard 7	5.00 ( )	11.9665			
Calibration verification	CrO_4-Cr	0215 CCC-MID	0.9960 (µg/L)	1 (µg/L)	99.6	99.6	
Calibration verification	–	–	–	–	–	–	–
Calibration verification	–	–	–	–	–	–	–

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

LDC #: 29503C6

VALIDATION FINDINGS WORKSHEET

Sample Calculation Verification

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

METHOD: Inorganics, Method 218.7

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

[✓ Y] N N/A Have results been reported and calculated correctly?
[✓ Y] N N/A Are results within the calibrated range of the instruments?
[✓ Y] N N/A Are all detection limits below the CRQL?

Compound (analyte) results for #2, Chromate as Cr reported with a positive detect were recalculated and verified using the following equation:

Concentration =

$y = mx + b$
where
$m = 2.3902$
$b = -0.0012$
dil = 1x

Recalculation:

$0.173 = 2.3902(x) - 0.0012$

0.0729 μg/L $= x$

#	Sample ID	Analyte	Reported Concentration (μg/L)	Calculated Concentration (μg/L)	Acceptable (Y/N)
1	2	CrO_4 - Cr	0.073	0.073	Y
2	4	CrO_4 - Cr	0.150	0.150	↓

Note:

LDC Report# 29503D4

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Green Valley Citgo Project
Collection Date:	November 13 through November 14, 2012
LDC Report Date:	April 24, 2013
Matrix:	Water
Parameters:	Chromium & Lead
Validation Level:	EPA Region III, Level IM2
Laboratory:	Enviro-Chem Laboratories, Inc.
Sample Delivery Group (SDG):	ECL027154/ECL027163

Sample Identification

3985 Farm First Draw
3985 Farm Flushed
3933 Rosewood First Draw
3933 Rosewood Flushed
11894 Barley First Draw
11894 Barley Flushed
3991 Farm First Draw
3991 Farm Flushed
3985 Farm First DrawF
3985 Farm FlushedF
3933 Rosewood First DrawF
3933 Rosewood FlushedF
11894 Barley First DrawF
11894 Barley FlushedF
3991 Farm First DrawF
3991 Farm FlushedF
3985 Farm First DrawMS
3985 Farm First DrawDUP
3991 Farm FlushedFMS
3991 Farm FlushedFDUP

Samples appended with “F” were analyzed as dissolved

Introduction

This data review covers 20 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 200.8 for Chromium and Lead.

This review follows the EPA Region III Innovative Approaches for Data Validation (EPA June 1995).

A qualification summary table is provided at the end of this report if data has been qualified. 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.

The following are definitions of the data qualifiers:

U	Indicates the compound or element was analyzed for but not detected at or above the stated limit.
J	Indicates an estimated value.
K	Indicates the reported value may be biased high.
L	Indicates the reported value may be biased low.
R	Quality control indicates the data is not usable.
NJ	Presumptive evidence of presence of the compound at an estimated quantity.
UJ	Indicates the compound or element was analyzed for but not detected. The sample detection limit is an estimated value.
UL	Indicates the compound or element was analyzed for but not detected. The sample detection limit is probably higher.
B	Indicates the compound or element was analyzed for but not detected substantially above the level reported in laboratory or field blanks.
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. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5%.

III. Calibration

The initial and continuing calibrations were performed at the required frequency.

The calibration standards criteria were met.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No chromium or lead contaminants were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

V. ICP Interference Check Sample (ICS) Analysis

ICP interference check sample (ICS) analysis was not required by the method.

VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits with the following exceptions:

DUP ID (Associated Samples)	Analyte	RPD (Limits)	Difference (Limits)	Flag	A or P
3991 Farm FlushedFDUP (3991 Farm FlushedF)	Chromium	-	2.0 mg/L (≤1.0)	J (all detects) UJ (all non-detects)	A

VIII. Laboratory Control Samples (LCS)

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

IX. Internal Standards (ICP-MS)

All internal standard percent recoveries (%R) were within QC limits.

X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

XI. ICP Serial Dilution

ICP serial dilution was not performed for this SDG.

XII. Sample Result Verification

All sample result verifications were acceptable.

XIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

XIV. Field Duplicates

No field duplicates were identified in this SDG.

Green Valley Citgo Project
Chromium & Lead - Data Qualification Summary - SDG ECL027154/ECL027163

SDG	Sample	Analyte	Flag	A or P	Reason
ECL027154/ ECL027163	3991 Farm FlushedF	Chromium	J (all detects) UJ (all non-detects)	A	Duplicate sample analysis (difference)

Green Valley Citgo Project
Chromium & Lead - Laboratory Blank Data Qualification Summary - SDG ECL027154/ECL027163

No Sample Data Qualified in this SDG

Green Valley Citgo Project
Chromium & Lead - Field Blank Data Qualification Summary - SDG ECL027154/ECL027163

No Sample Data Qualified in this SDG

LDC #: 29503D4

VALIDATION COMPLETENESS WORKSHEET

Level IV

SDG #: ECL027154/ECL027163

Laboratory: Enviro-Chem Laboratories, Inc.

Date: 4-19-13

Page: 1 of 1

Reviewer: MG

2nd Reviewer:

METHOD: Chromium & Lead (EPA Method 200.8)

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 11-13-12 through 11-14-12
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	N	not required
VI.	Matrix Spike Analysis	A	MS
VII.	Duplicate Sample Analysis	SW	DUP
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
X.	Furnace Atomic Absorption QC	N	not utilized
XI.	ICP Serial Dilution	N	not performed
XII.	Sample Result Verification	A	
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: all water

1	3985 Farm First Draw	11	3933 Rosewood First DrawF	21		31	
2	3985 Farm Flushed	12	3933 Rosewood FlushedF	22		32	
3	3933 Rosewood First Draw	13	11894 Barley First DrawF	23		33	
4	3933 Rosewood Flushed	14	11894 Barley FlushedF	24		34	
5	11894 Barley First Draw	15	3991 Farm First DrawF	25		35	
6	11894 Barley Flushed	16	3991 Farm FlushedF	26		36	
7	3991 Farm First Draw	17	3985 Farm First DrawMS	27		37	
8	3991 Farm Flushed	18	3985 Farm First DrawDUP	28		38	
9	3985 Farm First DrawF	19	3991 Farm FlushedF MS	29		39	
10	3985 Farm FlushedF	20	3991 Farm FlushedFDUP	30	PBW	40	

Notes: Samples appended with "F" were analyzed as dissolved

LDC #: 29503D4

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: MG
2nd Reviewer: W

Method: Metals (EPA SW 846 Method 6010B/7000/6020)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. ICP/MS Tune				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?	✓			
Were %RSD of isotopes in the tuning solution ≤5%?	✓			
III. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits?	✓			
Were all initial calibration correlation coefficients ≥ 0.995?	✓			
IV. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
V. ICP Interference Check Sample				
Were ICP interference check samples performed daily?		✓		
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?			✓	
VI. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	✓			
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were ≤ 5X the RL, including when only one of the duplicate sample values were ≤ 5X the RL.		✓		
VII. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	✓			

LDC #: 29503D4

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: MG
2nd Reviewer: ✓

Validation Area	Yes	No	NA	Findings/Comments
VIII. Furnace Atomic Absorption QC				
If MSA was performed, was the correlation coefficients > 0.995?			✓	
Do all applicable analysies have duplicate injections? (Level IV only)			✓	
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)			✓	
Were analytical spike recoveries within the 85-115% QC limits?			✓	
IX. ICP Serial Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?		✓		
Were all percent differences (%Ds) < 10%?			✓	
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.			✓	
X. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)				
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?	✓			
If the %Rs were outside the criteria, was a reanalysis performed?			✓	
XI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
XII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
XV. Field blanks				
Field blanks were identified in this SDG.		✓		
Target analytes were detected in the field blanks.			✓	

LDC #: 29503D4

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

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

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1→16	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^-, ____
QC 17→20	↓	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-MS	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^-, ____
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 #: 29503D4

VALIDATION FINDINGS WORKSHEET

Duplicate Analysis

Page: 1 of 1
Reviewer: MG
2nd Reviewer: L

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

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

[✓ Y] N N/A Was a duplicate sample analyzed for each matrix in this SDG?

Y [✓ N] N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤ 35% for soil samples? If no, see qualifications below. A control limit of ±R.L. (±2X R.L. for soil) was used for sample values that were <5X the R.L., including the case when only one of the duplicate sample values was <5X R.L.. If field blanks were used for laboratory duplicates, note in the Overall Assessment.

LEVEL IV ONLY:

[✓ Y] N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Date	Duplicate ID	Matrix	Analyte	RPD (Limits)	Difference (Limits)	Associated Samples	Qualifications
1		20	water	Cr		2.0 ug/L (≤ 1.0)	16 *	J/UJ/A

Comments: * 2nd QC for this batch is in limit, so qual. parent only.

LDC #: 29503D4

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: MG
2nd Reviewer:

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

$\%R = \frac{Found}{True} \times 100$ Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution
True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated %R	Reported %R	Acceptable (Y/N)
	ICP (Initial calibration)						
1003 ICV	ICP/MS (Initial calibration)	Pb	103.900	100	103.90	103.90	Y
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
1036 CKS	ICP/MS (Continuing calibration)	Cr	194.400	200	97.20	97.20	↓
	CVAA (Continuing calibration)						
	GFAA (Initial calibration)						
	GFAA (Continuing calibation)						

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

LDC #: 29503D4

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: MG
2nd Reviewer:

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{\text{Found}}{\text{True}} \times 100$ Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$ Where, S = Original sample concentration
D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$\%D = \frac{|I-SDR|}{I} \times 100$ Where, I = Initial Sample Result (mg/L)
SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I (units)	True / D / SDR (units)	Recalculated	Reported	Acceptable (Y/N)
					%R / RPD / %D	%R / RPD / %D	
—	ICP interference check	—	—	—	—	—	—
1014 LCS 4518	Laboratory control sample	Cr	49.140 (µg/L)	50 (µg/L)	98.3	98.3	Y
1123 19	Matrix spike	Pb	(SSR-SR) 51.280 (µg/L)	50 (µg/L)	102.6	102.6	↓
1118 / 1121 20	Duplicate	Cr	5.827 (µg/L)	3.829 (µg/L)	41.4	41.4	↓
—	ICP serial dilution	—	—	—	—	—	—

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

LDC #: 29503D4

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

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

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

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

[✓ Y] N N/A Have results been reported and calculated correctly?
[✓ Y] N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
[✓ Y] N N/A Are all detection limits below the CRDL?

Detected analyte results for # 4, Cr were recalculated and verified using the following equation:

Concentration = $\frac{(RD)(FV)(Dil)}{(In.\ Vol.)}$

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor

Recalculation:

$$\frac{(7.165\ \mu g/L)(0.050\ L)}{0.050\ L} = 7.165\ \mu g/L$$

#	Sample ID	Analyte	Reported Concentration (μg/L)	Calculated Concentration (μg/L)	Acceptable (Y/N)
1	1	Pb	3.3	3.3	Y
2	4	Cr	7.2	7.2	↓

Note:

LDC Report# 29503D6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Green Valley Citgo Project
Collection Date:	November 13 through November 14, 2012
LDC Report Date:	April 24, 2013
Matrix:	Water
Parameters:	Dissolved Chromate as Chromium
Validation Level:	EPA Region III, Level IM2
Laboratory:	Enviro-Chem Laboratories, Inc.
Sample Delivery Group (SDG):	ECL027154/ECL027163

Sample Identification

3985 Farm First Draw
3985 Farm Flushed
3933 Rosewood First Draw
3933 Rosewood Flushed
11894 Barley First Draw
11894 Barley Flushed
3991 Farm First Draw
3991 Farm Flushed
3985 Farm First DrawMS
3985 Farm First DrawMSD

Introduction

This data review covers 10 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 218.7 for Dissolved Chromate as Chromium.

This review follows the EPA Region III Innovative Approaches for Data Validation (EPA June 1995).

A qualification summary table is provided at the end of this report if data has been qualified. 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.

The following are definitions of the data qualifiers:

U	Indicates the compound or element was analyzed for but not detected at or above the stated limit.
J	Indicates an estimated value.
K	Indicates the reported value may be biased high.
L	Indicates the reported value may be biased low.
R	Quality control indicates the data is not usable.
NJ	Presumptive evidence of presence of the compound at an estimated quantity.
UJ	Indicates the compound or element was analyzed for but not detected. The sample detection limit is an estimated value.
UL	Indicates the compound or element was analyzed for but not detected. The sample detection limit is probably higher.
B	Indicates the compound or element was analyzed for but not detected substantially above the level reported in laboratory or field blanks.
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. Initial Calibration

All criteria for the initial calibration were met.

III. Calibration verification

Calibration verification frequency and analysis criteria were met.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No dissolved chromate as chromium was found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

V. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
3985 Farm First DrawMS/MSD (All samples in SDG ECL027154/ ECL027163)	Dissolved chromate as chromium	71 (85-115)	69.3 (85-115)	-	L (all detects) UL (all non-detects)	A

VI. Duplicates

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

VII. Laboratory Control Samples

Laboratory control sample (LCS) analysis was not required by the method.

VIII. Sample Result Verification

All sample result verifications were acceptable.

IX. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

X. Field Duplicates

No field duplicates were identified in this SDG.

Green Valley Citgo Project
Dissolved Chromate as Chromium - Data Qualification Summary - SDG ECL027154/ECL027163

SDG	Sample	Analyte	Flag	A or P	Reason
ECL027154/ ECL027163	3985 Farm First Draw 3985 Farm Flushed 3933 Rosewood First Draw 3933 Rosewood Flushed 11894 Barley First Draw 11894 Barley Flushed 3991 Farm First Draw 3991 Farm Flushed	Dissolved chromate as chromium	L (all detects) UL (all non-detects)	A	Matrix spike/Matrix spike duplicate (%R)

Green Valley Citgo Project
Dissolved Chromate as Chromium - Laboratory Blank Data Qualification Summary - SDG ECL027154/ECL027163

No Sample Data Qualified in this SDG

Green Valley Citgo Project
Dissolved Chromate as Chromium - Field Blank Data Qualification Summary - SDG ECL027154/ECL027163

No Sample Data Qualified in this SDG

LDC #: 29503D6

VALIDATION COMPLETENESS WORKSHEET

Level IV

Date: 4-22-13
Page: 1 of 1
Reviewer: MG
2nd Reviewer: ✓

SDG #: ECL027154/ECL027163
Laboratory: Enviro-Chem Laboratories, Inc.

METHOD: Dissolved ~~Chromate~~ Chromate as Cr (EPA Method 218.7)

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 11-13-12 through 11-14-12
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	SW	MS/MSD
VI.	Duplicates	N	
VII.	Laboratory control samples	N	not required
VIII.	Sample result verification	A	
IX.	Overall assessment of data	A	
X.	Field duplicates	N	
XI	Field blanks	N	

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: all water

1	3985 Farm First Draw	11	~~3985 Farm First DrawDUP~~	21		31	
2	3985 Farm Flushed	12		22		32	
3	3933 Rosewood First Draw	13		23		33	
4	3933 Rosewood Flushed	14		24		34	
5	11894 Barley First Draw	15		25		35	
6	11894 Barley Flushed	16		26		36	
7	3991 Farm First Draw	17		27		37	
8	3991 Farm Flushed	18		28		38	
9	3985 Farm First DrawMS	19		29		39	
10	3985 Farm First DrawMSD	20		30	PBW	40	

Notes:

LDC #: 29503D6

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: MG
2nd Reviewer:

Method: Inorganics (EPA Method 218.7)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial calibration correlation coefficients ≥ 0.995?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?	✓			
Were titrant checks performed as required? (Level IV only)			✓	
Were balance checks performed as required? (Level IV only)			✓	
III. Blanks				
Was a method blank associated with every sample in this SDG?	✓			LRBs
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
IV. Matrix spike/Matrix spike duplicates and Duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.		✓		
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of ≤ CRDL(≤ 2X CRDL for soil) was used for samples that were ≤ 5X the CRDL, including when only one of the duplicate sample values were ≤ 5X the CRDL.	✓			
V. Laboratory control samples				
Was an LCS anaylzed for this SDG?		✓		
Was an LCS analyzed per extraction batch?		✓		
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?			✓	
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	

LDC #: 29503D6

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: MG
2nd Reviewer: ✓

Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
Were detection limits < RL?	✓			
VIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
IX. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
X. Field blanks				
Field blanks were identified in this SDG.		✓		
Target analytes were detected in the field blanks.			✓	

LDC #: 29503D6

VALIDATION FINDINGS WORKSHEET

Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: MG
2nd Reviewer: L

METHOD: Inorganics, EPA Method 218.7

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

[✓ Y] N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y [✓ N] N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

[✓ Y] N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

[✓ Y] N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
1	9/10	water	CrO4-Cr	71 (85-115)	69.3 (85-115)		all	L/UL/A

Comments:

LDC #: 29503D6

VALIDATION FINDINGS WORKSHEET

Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: MG
2nd Reviewer:

METHOD: Inorganics, Method 218.7

The correlation coefficient (r) for the calibration of CrO_4-Cr was recalculated. Calibration date: ~~11-12-13~~ 11-13-12 gmA

An initial or continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = Found / True x 100

Where, Found = concentration of each analyte measured in the analysis of the ICV or CCV solution
True = concentration of each analyte in the ICV or CCV source

Type of Analysis	Analyte	Standard ID	Conc Found (units)	Area True (units)	Recalculated r or %R	Reported r or %R	Acceptable (Y/N)
Initial calibration	CrO_4 as Cr	Blank	—	—	$r^2 = 1.0000$	$r^2 = 1.0000$	Y
		Standard 1	0.02 (μg/L)	0.0485			
		Standard 2	0.05 ( )	0.1199			
		Standard 3	0.10 ( )	0.2297			
		Standard 4	0.25 ( )	0.5841			
		Standard 5	0.50 ( )	1.1978			
		Standard 6	1.00 ( )	2.3853			
		Standard 7	5.00 (↓)	11.9665			
Calibration verification	CrO_4-Cr	CCC-LOW	0.0219 (μg/L)	0.02 (μg/L)	109.5	109.7	↓
Calibration verification	—	—	—	—	—	—	—
Calibration verification	—	—	—	—	—	—	—

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

LDC #: 29503D6

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: MG
2nd Reviewer:

METHOD: Inorganics, Method 218.7

Percent recoveries (%R) for a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{Found}{True} \times 100$ Where,

Found = concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).

True = concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$ Where,

S = Original sample concentration

D = Duplicate sample concentration

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated	Reported	Acceptable (Y/N)
					%R / RPD	%R / RPD	
—	Laboratory control sample	—	—	—	—	—	—
9	Matrix spike sample	CrO4-Cr	(SSR-SR) 0.7100 (µg/L)	1 (µg/L)	71	71	Y
9/10	Duplicate sample	CrO4-Cr	0.7100 (µg/L)	0.6925 (µg/L)	2.5	2.5	↓

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

LDC #: 29503D6

VALIDATION FINDINGS WORKSHEET

Sample Calculation Verification

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

METHOD: Inorganics, Method 218.7

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

[✓ Y] N N/A Have results been reported and calculated correctly?
[✓ Y] N N/A Are results within the calibrated range of the instruments?
[✓ Y] N N/A Are all detection limits below the CRQL?

Compound (analyte) results for #6 Dissolved Chromate as Cr reported with a positive detect were recalculated and verified using the following equation:

Concentration =

$y = mx + b$
where $m = 2.3902$
$b = -0.0012$
dil = 1x

Recalculation:

$0.062 = 2.3902(x) - 0.0012$

0.0264 µg/L $= x$

#	Sample ID	Analyte	Reported Concentration (µg/L)	Calculated Concentration (µg/L)	Acceptable (Y/N)
1	6	CrO_4 - Cr	0.026	0.026	Y

Note:

LDC Report# 29503E4

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Green Valley Citgo Project
Collection Date:	December 1, 2012
LDC Report Date:	April 24, 2013
Matrix:	Water
Parameters:	Chromium & Lead
Validation Level:	EPA Region III, Level IM2
Laboratory:	Enviro-Chem Laboratories, Inc.
Sample Delivery Group (SDG):	ECL027334

Sample Identification

3833 Greenridge First Draw
3833 Greenridge Flushed
3833 Greenridge First DrawF
3833 Greenridge FlushedF
3833 Greenridge First DrawMS
3833 Greenridge First DrawDUP

Samples appended with "F" were analyzed as dissolved

Introduction

This data review covers 6 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 200.8 for Chromium and Lead.

This review follows the EPA Region III Innovative Approaches for Data Validation (EPA June 1995).

A qualification summary table is provided at the end of this report if data has been qualified. 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.

The following are definitions of the data qualifiers:

U	Indicates the compound or element was analyzed for but not detected at or above the stated limit.
J	Indicates an estimated value.
K	Indicates the reported value may be biased high.
L	Indicates the reported value may be biased low.
R	Quality control indicates the data is not usable.
NJ	Presumptive evidence of presence of the compound at an estimated quantity.
UJ	Indicates the compound or element was analyzed for but not detected. The sample detection limit is an estimated value.
UL	Indicates the compound or element was analyzed for but not detected. The sample detection limit is probably higher.
B	Indicates the compound or element was analyzed for but not detected substantially above the level reported in laboratory or field blanks.
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. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5%.

III. Calibration

The initial and continuing calibrations were performed at the required frequency.

The calibration standards criteria were met.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No chromium or lead contaminants were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

V. ICP Interference Check Sample (ICS) Analysis

ICP interference check sample (ICS) analysis was not required by the method.

VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VII. Duplicate Sample Analysis

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

VIII. Laboratory Control Samples (LCS)

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

IX. Internal Standards (ICP-MS)

All internal standard percent recoveries (%R) were within QC limits.

X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

XI. ICP Serial Dilution

ICP serial dilution was not performed for this SDG.

XII. Sample Result Verification

All sample result verifications were acceptable.

XIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

XIV. Field Duplicates

No field duplicates were identified in this SDG.

Green Valley Citgo Project
Chromium & Lead - Data Qualification Summary - SDG ECL027334

No Sample Data Qualified in this SDG

Green Valley Citgo Project
Chromium & Lead - Laboratory Blank Data Qualification Summary - SDG ECL027334

No Sample Data Qualified in this SDG

Green Valley Citgo Project
Chromium & Lead - Field Blank Data Qualification Summary - SDG ECL027334

No Sample Data Qualified in this SDG

LDC #: 29503E4

SDG #: ECL027334

Laboratory: Enviro-Chem Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level IV

Date: 4-22-13

Page: 1 of 1

Reviewer: MG

2nd Reviewer:

METHOD: Chromium & Lead (EPA Method 200.8)

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: 12-1-12
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	N	not required
VI.	Matrix Spike Analysis	A	MS
VII.	Duplicate Sample Analysis	A	DUP
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
X.	Furnace Atomic Absorption QC	N	not utilized
XI.	ICP Serial Dilution	N	not performed
XII.	Sample Result Verification	A	
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: all water

1	3833 Greenbridge First Draw	11		21		31	
2	3833 Greenbridge Flushed	12		22		32	
3	3833 Greenbridge First DrawF	13		23		33	
4	3833 Greenbridge FlushedF	14		24		34	
5	3833 Greenbridge First DrawMS	15		25		35	
6	3833 Greenbridge First DrawDUP	16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20	PBW	30		40	

Notes: mg Samples appended with "F" were analyzed as dissolved

LDC #: 29503E4

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: MG
2nd Reviewer: L

Method: Metals (EPA SW 846 Method 6010B/7000/6020)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. ICP/MS Tune				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?	✓			
Were %RSD of isotopes in the tuning solution ≤5%?	✓			
III. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits?	✓			
Were all initial calibration correlation coefficients > 0.995?	✓			
IV. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
V. ICP Interference Check Sample				
Were ICP interference check samples performed daily?		✓		
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?			✓	
VI. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	✓			
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were ≤ 5X the RL, including when only one of the duplicate sample values were ≤ 5X the RL.	✓			
VII. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	✓			

LDC #: 29503E4

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: MG
2nd Reviewer:

Validation Area	Yes	No	NA	Findings/Comments
VIII. Furnace Atomic Absorption QC				
If MSA was performed, was the correlation coefficients > 0.995?			✓	
Do all applicable analysies have duplicate injections? (Level IV only)			✓	
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)			✓	
Were analytical spike recoveries within the 85-115% QC limits?			✓	
IX. ICP Serial Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?		✓		
Were all percent differences (%Ds) < 10%?			✓	
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.			✓	
X. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)				
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?	✓			
If the %Rs were outside the criteria, was a reanalysis performed?			✓	
XI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
XII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
XV. Field blanks				
Field blanks were identified in this SDG.		✓		
Target analytes were detected in the field blanks.			✓	

LDC #: 29503E4

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

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

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1→4	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^-, ___ ___
QC 5,6	↓	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-MS	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^-, ___ ___
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 #: 29503E4

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

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

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

$\%R = \frac{\text{Found}}{\text{True}} \times 100$

Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution
True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated %R	Reported %R	Acceptable (Y/N)
	ICP (Initial calibration)						
1106 ICV	ICP/MS (Initial calibration)	Cr	98.670	100	98.67	98.67	Y
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
1139 CKS	ICP/MS (Continuing calibration)	Pb	196. 800	200	98.40	98.40	↓
	CVAA (Continuing calibration)						
	GFAA (Initial calibration)						
	GFAA (Continuing calibation)						

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

LDC #: 29503E4

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: MG
2nd Reviewer: LA

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{\text{Found}}{\text{True}} \times 100$ Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$ Where, S = Original sample concentration
D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$\%D = \frac{|I-SDR|}{I} \times 100$ Where, I = Initial Sample Result (mg/L)
SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I (units)	True / D / SDR (units)	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
—	ICP interference check	—	—	—	—	—	—
LCS 4568	Laboratory control sample	Pb	48.890 (µg/L)	50 (µg/L)	97.8	97.8	Y
1125 5	Matrix spike	Cr	(SSR-SR) 48.050 (µg/L)	50 (µg/L)	96.1	96.1	↓
1120 / 1122 6	Duplicate	Pb	5.144 (µg/L)	5.305 (µg/L)	3.1	3.1	
	ICP serial dilution						

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

LDC #: 29503E4

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

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

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

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

[✓ Y] N N/A Have results been reported and calculated correctly?
[✓ Y] N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
[✓ Y] N N/A Are all detection limits below the CRDL?

Detected analyte results for #2, Pb were recalculated and verified using the following equation:

Concentration = $\frac{(RD)(FV)(Dil)}{(In. Vol.)}$

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor

Recalculation:

$$\frac{(39.300\ \mu g/L)(0.050\ L)}{0.050\ L} = 39.300\ \mu g/L$$

#	Sample ID	Analyte	Reported Concentration (µg/L)	Calculated Concentration (µg/L)	Acceptable (Y/N)
1	2	Pb	39.3	39.3	Y

Note:

LDC Report# 29503E6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Green Valley Citgo Project
Collection Date:	December 1, 2012
LDC Report Date:	April 24, 2013
Matrix:	Water
Parameters:	Dissolved Chromate as Chromium
Validation Level:	EPA Region III, Level IM2
Laboratory:	Enviro-Chem Laboratories, Inc.
Sample Delivery Group (SDG):	ECL027334

Sample Identification

3833 Greenridge First Draw
3833 Greenridge Flushed
3833 Greenridge First DrawMS
3833 Greenridge First DrawMSD

Introduction

This data review covers 4 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 218.7 for Dissolved Chromate as Chromium.

This review follows the EPA Region III Innovative Approaches for Data Validation (EPA June 1995).

A qualification summary table is provided at the end of this report if data has been qualified. 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.

The following are definitions of the data qualifiers:

U	Indicates the compound or element was analyzed for but not detected at or above the stated limit.
J	Indicates an estimated value.
K	Indicates the reported value may be biased high.
L	Indicates the reported value may be biased low.
R	Quality control indicates the data is not usable.
NJ	Presumptive evidence of presence of the compound at an estimated quantity.
UJ	Indicates the compound or element was analyzed for but not detected. The sample detection limit is an estimated value.
UL	Indicates the compound or element was analyzed for but not detected. The sample detection limit is probably higher.
B	Indicates the compound or element was analyzed for but not detected substantially above the level reported in laboratory or field blanks.
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. Initial Calibration

All criteria for the initial calibration were met.

III. Calibration verification

Calibration verification frequency and analysis criteria were met.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No dissolved chromate as chromium was found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

V. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
3833 Greenridge First DrawMS/MSD (All samples in SDG ECL027334)	Dissolved chromate as chromium	54.4 (85-115)	57.6 (86-115)	-	L (all detects) UL (all non-detects)	A

VI. Duplicates

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

VII. Laboratory Control Samples

Laboratory control sample (LCS) analysis was not required by the method.

VIII. Sample Result Verification

All sample result verifications were acceptable.

IX. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

X. Field Duplicates

No field duplicates were identified in this SDG.

Green Valley Citgo Project
Dissolved Chromate as Chromium - Data Qualification Summary - SDG ECL027334

SDG	Sample	Analyte	Flag	A or P	Reason
ECL027334	3833 Greenridge First Draw 3833 Greenridge Flushed	Dissolved chromate as chromium	L (all detects) UL (all non-detects)	A	Matrix spike/Matrix spike duplicate (%R)

Green Valley Citgo Project
Dissolved Chromate as Chromium - Laboratory Blank Data Qualification Summary - SDG ECL027334

No Sample Data Qualified in this SDG

Green Valley Citgo Project
Dissolved Chromate as Chromium - Field Blank Data Qualification Summary - SDG ECL027334

No Sample Data Qualified in this SDG

LDC #: 29503E6
SDG #: ECL027334
Laboratory: Enviro-Chem Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level IV

Date: 4-22-13
Page: 1 of 1
Reviewer: MG
2nd Reviewer:

Dissolved Chromate as Cr
METHOD: ~~Chromate~~ (EPA Method 218.7) MG.

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: 12-1-12
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	SW	MS/MSD
VI.	Duplicates	N	
VII.	Laboratory control samples	N	not required
VIII.	Sample result verification	A	
IX.	Overall assessment of data	A	
X.	Field duplicates	N	
XI	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:
all water

1	3833 Greenbridge First Draw	11		21		31	
2	3833 Greenbridge Flushed	12		22		32	
3	3833 Greenbridge First DrawMS	13		23		33	
4	3833 Greenbridge First DrawMSD	14		24		34	
5	~~3833 Greenbridge First DrawDUP~~	15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20	PBW	30		40	

Notes: MG.

LDC #: 29503E6

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: MG
2nd Reviewer:

Method: Inorganics (EPA Method 218.7)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial calibration correlation coefficients $\geq$ 0.995?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?	✓			
Were titrant checks performed as required? (Level IV only)			✓	
Were balance checks performed as required? (Level IV only)			✓	
III. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
IV. Matrix spike/Matrix spike duplicates and Duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.		✓		
Were the MS/MSD or duplicate relative percent differences (RPD) $\leq$ 20% for waters and $\leq$ 35% for soil samples? A control limit of $\leq$ CRDL($\leq$ 2X CRDL for soil) was used for samples that were $\leq$ 5X the CRDL, including when only one of the duplicate sample values were $\leq$ 5X the CRDL.	✓			
V. Laboratory control samples				
Was an LCS anaylzed for this SDG?		✓		
Was an LCS analyzed per extraction batch?		✓		
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?			✓	
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	

LDC #: 29503E6

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: MG
2nd Reviewer: ✓

Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
Were detection limits < RL?	✓			
VIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
IX. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
X. Field blanks				
Field blanks were identified in this SDG.		✓		
Target analytes were detected in the field blanks.			✓	

LDC #: 29503E6

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: MG
2nd Reviewer:

METHOD: Inorganics, EPA Method 218.7

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

[✓ Y] N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y [✓ N] N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

[✓ Y] N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

[✓ Y] N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
1	3/4	water	CrO_4-Cr	54.4 (85-115)	57.6 (85-115)		all	L/UL/A

Comments:

LDC #: 29503E6

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: MG
2nd Reviewer:

METHOD: Inorganics, Method 218.7

The correlation coefficient (r) for the calibration of CrO4 - Cr was recalculated. Calibration date: ~~11-12-13~~ 11-13-12 gmA

An initial or continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = Found/True x 100 Where, Found = concentration of each analyte measured in the analysis of the ICV or CCV solution
True = concentration of each analyte in the ICV or CCV source

Type of Analysis	Analyte	Standard ID	Conc Found (units)	Area True (units)	Recalculated r or %R	Reported r or %R	Acceptable (Y/N)
Initial calibration	CrO4 as Cr	Blank	–	–	r^2= 1.0000	r^2= 1.0000	Y
		Standard 1	0.02 (µg/L)	0.0485			
		Standard 2	0.05 ( )	0.1199			
		Standard 3	0.10 ( )	0.2297			
		Standard 4	0.25 ( )	0.5841			
		Standard 5	0.50 ( )	1.1978			
		Standard 6	1.00 ( )	2.3853			
		Standard 7	5.00 ( )	11.9665			
Calibration verification	CrO4-Cr	1147 CCC-LOW	0.0188 (µg/L)	0.02 (µg/L)	94	94	↓
Calibration verification	–	–	–	–	–	–	–
Calibration verification	–	–	–	–	–	–	–

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

LDC #: 29503E6

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: MG
2nd Reviewer:

METHOD: Inorganics, Method 218.7

Percent recoveries (%R) for a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{\text{Found}}{\text{True}} \times 100$ Where, Found = concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$ Where, S = Original sample concentration
D = Duplicate sample concentration

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated %R / RPD	Reported %R / RPD	Acceptable (Y/N)
—	Laboratory control sample	—	—	—	—	—	—
1243 3	Matrix spike sample	CrO4 - Cr	(SSR-SR) 0.5442 (μg/L)	1 (μg/L)	54.4	54.4	Y
1243/1302 3/4	Duplicate sample	CrO4 - Cr	0.5442 (μg/L)	0.5755 (μg/L)	5.6	5.6	↓

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

LDC #: 29503E6

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

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

METHOD: Inorganics, Method 218.7

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

[✓ Y] N N/A Have results been reported and calculated correctly?
[✓ Y] N N/A Are results within the calibrated range of the instruments?
[✓ Y] N N/A Are all detection limits below the CRQL?

Compound (analyte) results for all samples = N.D. ~~reported with a positive detect were recalculated and verified using the following equatio~~n:

Concentration =

Recalculation:

#	Sample ID	Analyte	Reported Concentration (µg/L)	Calculated Concentration (µg/L)	Acceptable (Y/N)

Note:

RECALC.6

LDC Report# 29503F4

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Green Valley Citgo Project
Collection Date:	March 12, 2013
LDC Report Date:	April 24, 2013
Matrix:	Water
Parameters:	Chromium & Lead
Validation Level:	EPA Region III, Level IM2
Laboratory:	Enviro-Chem Laboratories, Inc.
Sample Delivery Group (SDG):	ECL028223

Sample Identification

11712 Serene-PT1 Total
11712 Serene-PT1DB Total
11712 Serene-PT2 Total
11712 Serene-PT3 Total
11712 Serene-PT4 Total
11712 Serene-FB Total
11712 Serene-PT1 Dissolved
11712 Serene-PT1 DB Dissolved
11712 Serene-PT2 Dissolved
11712 Serene-PT3 Dissolved
11712 Serene-PT4 Dissolved
11712 Serene-FB Dissolved
11712 Serene-PT1 TotalMS
11712 Serene-PT1 TotalDUP
11712 Serene-FB TotalMS
11712 Serene-FB TotalDUP

Samples appended with "F" were analyzed as dissolved

Introduction

This data review covers 16 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 200.8 for Chromium and Lead.

This review follows the EPA Region III Innovative Approaches for Data Validation (EPA June 1995).

A qualification summary table is provided at the end of this report if data has been qualified. 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.

The following are definitions of the data qualifiers:

U	Indicates the compound or element was analyzed for but not detected at or above the stated limit.
J	Indicates an estimated value.
K	Indicates the reported value may be biased high.
L	Indicates the reported value may be biased low.
R	Quality control indicates the data is not usable.
NJ	Presumptive evidence of presence of the compound at an estimated quantity.
UJ	Indicates the compound or element was analyzed for but not detected. The sample detection limit is an estimated value.
UL	Indicates the compound or element was analyzed for but not detected. The sample detection limit is probably higher.
B	Indicates the compound or element was analyzed for but not detected substantially above the level reported in laboratory or field blanks.
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. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5%.

III. Calibration

The initial and continuing calibrations were performed at the required frequency.

The calibration standards criteria were met.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No chromium or lead contaminants were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

V. ICP Interference Check Sample (ICS) Analysis

ICP interference check sample (ICS) analysis was not required by the method.

VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VII. Duplicate Sample Analysis

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

VIII. Laboratory Control Samples (LCS)

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

IX. Internal Standards (ICP-MS)

All internal standard percent recoveries (%R) were within QC limits.

X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

XI. ICP Serial Dilution

ICP serial dilution was not performed for this SDG.

XII. Sample Result Verification

All sample result verifications were acceptable.

XIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

XIV. Field Duplicates

Samples 11712 Serene-PT1 Total and 11712 Serene-PT1DB Total and samples 11712 Serene-PT1 Dissolved and 11712 Serene-PT1 DB Dissolved were identified as field duplicates. No metals were detected in any of the samples with the following exceptions:

Analyte	Concentration (ug/L)		RPD
	11712 Serene-PT1 Total	11712 Serene-PT1DB Total	
Lead	567	180	104

Analyte	Concentration (ug/L)		RPD
	11712 Serene-PT1 Dissolved	11712 Serene-PT1 DB Dissolved	
Lead	82.1	85.5	4

Green Valley Citgo Project
Chromium & Lead - Data Qualification Summary - SDGECL028223

No Sample Data Qualified in this SDG

Green Valley Citgo Project
Chromium & Lead - Laboratory Blank Data Qualification Summary - SDGECL028223

No Sample Data Qualified in this SDG

Green Valley Citgo Project
Chromium & Lead - Field Blank Data Qualification Summary - SDGECL028223

No Sample Data Qualified in this SDG

LDC #: 29503F4
SDG #: ECL028223
Laboratory: Enviro-Chem Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level IV

Date: 4-22-13
Page: 1 of 1
Reviewer: MG
2nd Reviewer:

METHOD: Chromium & Lead (EPA Method 200.8)

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: 3-12-13
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	A	
V.	ICP Interference Check Sample (ICS) Analysis	N	not required
VI.	Matrix Spike Analysis	A	MS
VII.	Duplicate Sample Analysis	A	DUP
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	A	
X.	Furnace Atomic Absorption QC	N	not utilized
XI.	ICP Serial Dilution	N	not performed
XII.	Sample Result Verification	A	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	SW	D = 1+2, D = 7+8
XV	Field Blanks	ND	FB = 6, 12

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

Validated Samples:
all water

1	11712 Serene-PT1 Total	11	11712 Serene-PT4 Dissolved	21		31	
2	11712 Serene-PT1DB Total	12	11712 Serene-FB Dissolved	22		32	
3	11712 Serene-PT2 Total	13	11712 Serene-PT1 TotalMS	23		33	
4	11712 Serene-PT3 Total	14	11712 Serene-PT1 TotalDUP	24		34	
5	11712 Serene-PT4 Total	15	11712 Serene-FB TotalMS	25		35	
6	11712 Serene-FB Total	16	11712 Serene-FB TotalDUP	26		36	
7	11712 Serene-PT1 Dissolved	17		27		37	
8	11712 Serene-P~~K~~T1 DB Dissolved	18		28		38	
9	11712 Serene-PT2 Dissolved	19		29		39	
10	11712 Serene-PT3 Dissolved	20		30	PBW	40	

Notes: Samples appended with "F" were analyzed as dissolved

LDC #: 29503F4

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: MG
2nd Reviewer:

Method: Metals (EPA SW 846 Method 6010B/7000/6020)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. ICP/MS Tune				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?	✓			
Were %RSD of isotopes in the tuning solution ≤5%?	✓			
III. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits?	✓			
Were all initial calibration correlation coefficients > 0.995?	✓			
IV. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
V. ICP Interference Check Sample				
Were ICP interference check samples performed daily?		✓		
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?			✓	
VI. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	✓			
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were ≤ 5X the RL, including when only one of the duplicate sample values were ≤ 5X the RL.	✓			
VII. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	✓			

LDC #: 29503 F4

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: MG
2nd Reviewer: ✓

Validation Area	Yes	No	NA	Findings/Comments
VIII. Furnace Atomic Absorption QC				
If MSA was performed, was the correlation coefficients > 0.995?			✓	
Do all applicable analysies have duplicate injections? (Level IV only)			✓	
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)			✓	
Were analytical spike recoveries within the 85-115% QC limits?			✓	
IX. ICP Serial Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?		✓		
Were all percent differences (%Ds) < 10%?			✓	
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.			✓	
X. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)				
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?	✓			
If the %Rs were outside the criteria, was a reanalysis performed?			✓	
XI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
XII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Field duplicate pairs were identified in this SDG.	✓			
Target analytes were detected in the field duplicates.	✓			
XV. Field blanks				
Field blanks were identified in this SDG.	✓			
Target analytes were detected in the field blanks.		✓		

LDC #: 29503F4

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

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

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1→12	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^-, ___
QC 13→16	↓	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-MS	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^-, ___
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#: 29503F4

VALIDATION FINDINGS WORKSHEET

Field Duplicates

Page: 1 of 1
Reviewer: MG
2nd Reviewer:

METHOD: Metals (EPA Method 6010B/7000)

[✓ Y] N NA Were field duplicate pairs identified in this SDG?
[✓ Y] N NA Were target analytes detected in the field duplicate pairs?

Analyte	Concentration (ug/L)		RPD	
	1	2		
Lead	567	180	104	

V:\FIELD DUPLICATES\FD_inorganic\29503F4.WPD

Analyte	Concentration (ug/L)		RPD	
	7	8		
Lead	82.1	85.5	4	

V:\FIELD DUPLICATES\FD_inorganic\29503F4.WPD

LDC #: 29503F4

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: MG
2nd Reviewer:

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

$\%R = \frac{\text{Found}}{\text{True}} \times 100$

Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution
True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated %R	Reported %R	Acceptable (Y/N)
	ICP (Initial calibration)						
1258 ICV	ICP/MS (Initial calibration)	Pb	96.600	100	96.60	96.60	Y
	CVAA (Initial calibration)						
	ICP (Continuing calibration)						
1334 CKS	ICP/MS (Continuing calibration)	Cr	198.500	200	99.25	99.25	↓
	CVAA (Continuing calibration)						
	GFAA (Initial calibration)						
	GFAA (Continuing calibation)						

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

CALCLC.4SW

LDC #: 29503F4

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: MG
2nd Reviewer:

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{\text{Found}}{\text{True}} \times 100$

Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation,
Found = SSR (spiked sample result) - SR (sample result).
True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$

Where, S = Original sample concentration
D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$\%D = \frac{|I-SDR|}{I} \times 100$

Where, I = Initial Sample Result (mg/L)
SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I (units)	True / D / SDR (units)	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
—	ICP interference check	—	—	—	—	—	—
1309 LCS 4793	Laboratory control sample	Pb	47.950 (μg/L)	50 (μg/L)	95.9	95.9	Y
1317 13	Matrix spike	Cr	(SSR-SR) 49.470 (μg/L)	50 (μg/L)	98.9	98.5	↓
1312/1315 14	Duplicate	Pb	567.50 (μg/L)	549.80 (μg/L)	3.2	3.2	↓
—	ICP serial dilution	—	—	—	—	—	—

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

LDC #: 29503F4

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

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

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
[✓ Y] N N/A Have results been reported and calculated correctly?
[✓ Y] N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
[✓ Y] N N/A Are all detection limits below the CRDL?

Detected analyte results for #1, Pb were recalculated and verified using the following equation:

Concentration = (RD)(FV)(Dil) / (In. Vol.)

Recalculation:

$$\frac{(567.500\ \mu g/L)(0.050\ L)}{0.050\ L} = 567.500\ \mu g/L$$

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (~~G~~)
Dil = Dilution factor

#	Sample ID	Analyte	Reported Concentration (μg/L)	Calculated Concentration (μg/L)	Acceptable (Y/N)
1	1	Pb	567	568	Y
2	2	Pb	180	180	↓

Note:

RECALC.4SW

LDC Report# 29503F6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Green Valley Citgo Project

Collection Date: March 12, 2013

LDC Report Date: April 25, 2013

Matrix: Water

Parameters: Dissolved Chromate as Chromium

Validation Level: EPA Region III, Level IM2

Laboratory: Enviro-Chem Laboratories, Inc.

Sample Delivery Group (SDG): ECL028223

Sample Identification

11712 Serene-PT1 Dissolved
11712 Serene-PT1 DB Dissolved
11712 Serene-PT2 Dissolved
11712 Serene-PT3 Dissolved
11712 Serene-PT4 Dissolved
11712 Serene-FB Dissolved
11712 Serene-PT1 DissolvedMS
11712 Serene-PT1 DissolvedMSD

Introduction

This data review covers 8 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 218.7 for Dissolved Chromate as Chromium.

This review follows the EPA Region III Innovative Approaches for Data Validation (EPA June 1995).

A qualification summary table is provided at the end of this report if data has been qualified. 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.

The following are definitions of the data qualifiers:

U	Indicates the compound or element was analyzed for but not detected at or above the stated limit.
J	Indicates an estimated value.
K	Indicates the reported value may be biased high.
L	Indicates the reported value may be biased low.
R	Quality control indicates the data is not usable.
NJ	Presumptive evidence of presence of the compound at an estimated quantity.
UJ	Indicates the compound or element was analyzed for but not detected. The sample detection limit is an estimated value.
UL	Indicates the compound or element was analyzed for but not detected. The sample detection limit is probably higher.
B	Indicates the compound or element was analyzed for but not detected substantially above the level reported in laboratory or field blanks.
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. Initial Calibration

All criteria for the initial calibration were met.

III. Calibration verification

Calibration verification frequency and analysis criteria were met.

IV. Blanks

Method blanks were reviewed for each matrix as applicable. No dissolved chromate as chromium was found in the initial, continuing and preparation blanks.

Sample 11712 Serene-FB Dissolved was identified as a field blank. No dissolved chromate as chromium was found.

V. Matrix Spike/Matrix Spike Duplicates

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. Duplicates

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

VII. Laboratory Control Samples

Laboratory control sample (LCS) analysis was not required by the method.

VIII. Sample Result Verification

All sample result verifications were acceptable.

IX. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

X. Field Duplicates

Samples 11712 Serene-PT1 Dissolved and11712 Serene-PT1 DB Dissolved were identified as field duplicates. No dissolved chromate as chromium was detected in any of the samples.

Green Valley Citgo Project
Dissolved Chromate as Chromium - Data Qualification Summary - SDG ECL028223

No Sample Data Qualified in this SDG

Green Valley Citgo Project
Dissolved Chromate as Chromium - Laboratory Blank Data Qualification Summary - SDG ECL028223

No Sample Data Qualified in this SDG

Green Valley Citgo Project
Dissolved Chromate as Chromium - Field Blank Data Qualification Summary - SDG ECL028223

No Sample Data Qualified in this SDG

LDC #: 29503F6

SDG #: ECL028223

Laboratory: Enviro-Chem Laboratories, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level IV

Date: 4-22-13

Page: 1 of 1

Reviewer: MG

2nd Reviewer:

Dissolved Chromate as Cr

METHOD: ~~Chromate~~ (EPA Method 218.7)

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: 3-12-13
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Blanks	A	
V	Matrix Spike/Matrix Spike Duplicates	A	MS/MSD
VI.	Duplicates	N	
VII.	Laboratory control samples	N	not required
VIII.	Sample result verification	A	
IX.	Overall assessment of data	A	
X.	Field duplicates	ND	D= 1+2
XI	Field blanks	ND	FB = 6

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

Validated Samples:
all water

1	11712 Serene-PT1 Dissolved	11		21		31	
2	11712 Serene-PT1 DB Dissolved	12		22		32	
3	11712 Serene-PT2 Dissolved	13		23		33	
4	11712 Serene-PT3 Dissolved	14		24		34	
5	11712 Serene-PT4 Dissolved	15		25		35	
6	11712 Serene-FB Dissolved	16		26		36	
7	11712 Serene-PT1 DissolvedMS	17		27		37	
8	11712 Serene-PT1 DissolvedMSD	18		28		38	
9	~~11712 Serene-PT1 DissolvedDUP~~	19		29		39	
10		20	PBW	30		40	

Notes:

LDC #: 29503F6

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: MG
2nd Reviewer:

Method: Inorganics (EPA Method 218.7)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial calibration correlation coefficients > 0.995?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?	✓			
Were titrant checks performed as required? (Level IV only)			✓	
Were balance checks performed as required? (Level IV only)			✓	
III. Blanks				
Was a method blank associated with every sample in this SDG?	✓			LRBs
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
IV. Matrix spike/Matrix spike duplicates and Duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	✓			
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of ≤ CRDL(≤ 2X CRDL for soil) was used for samples that were ≤ 5X the CRDL, including when only one of the duplicate sample values were ≤ 5X the CRDL.	✓			
V. Laboratory control samples				
Was an LCS analyzed for this SDG?		✓		
Was an LCS analyzed per extraction batch?		✓		
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?			✓	
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	

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VALIDATION FINDINGS CHECKLIST

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Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
Were detection limits < RL?	✓			
VIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
IX. Field duplicates				
Field duplicate pairs were identified in this SDG.	✓			
Target analytes were detected in the field duplicates.		✓		
X. Field blanks				
Field blanks were identified in this SDG.	✓			
Target analytes were detected in the field blanks.		✓		

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VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

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Reviewer: MG
2nd Reviewer: L

METHOD: Inorganics, Method 218.7

The correlation coefficient (r) for the calibration of CrO_4 - Cr was recalculated. Calibration date: 1-14-13

An initial or continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

$\%R = \frac{Found}{True} \times 100$

Where, Found = concentration of each analyte measured in the analysis of the ICV or CCV solution
True = concentration of each analyte in the ICV or CCV source

Type of Analysis	Analyte	Standard ID	Conc Found (units)	Area True (units)	Recalculated r or %R	Reported r or %R	Acceptable (Y/N)
Initial calibration	CrO_4 as Cr	Blank	—	—	r^2=1.0000	r^2= 1.0000	Y
		Standard 1	0.02 (mg/L)	0.0425			
		Standard 2	0.05 ( )	0.1146			
		Standard 3	0.10 ( )	0.2167			
		Standard 4	0.25 ( )	0.5487			
		Standard 5	0.50 ( )	1.1172			
		Standard 6	1.0 ( )	2.2337			
		Standard 7	5.0 (↓)	11.2497			
Calibration verification	CrO_4-Cr	CCC-LOW	0.0269 (mg/L)	0.02 (mg/L)	134.5	134.4	↓
Calibration verification	—	—	—	—	—	—	—
Calibration verification	—	—	—	—	—	—	—

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

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VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: MG
2nd Reviewer: LA

METHOD: Inorganics, Method 218.7

Percent recoveries (%R) for a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{Found}{True} \times 100$ Where,

Found = concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).

True = concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$ Where,

S = Original sample concentration
D = Duplicate sample concentration

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated %R / RPD	Reported %R / RPD	Acceptable (Y/N)
—	Laboratory control sample	—	—	—	—	—	—
1913 7	Matrix spike sample	CrO4 - Cr	(SSR-SR) 1.0455 (μg/L)	1 (μg/L)	104.6	104.6	Y
1913/1932 7/8	Duplicate sample	CrO4 - Cr	1.0455 (μg/L)	1.0217 (μg/L)	2.3	2.3	↓

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

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VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

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

METHOD: Inorganics, Method 218.7

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

[✓ Y] N N/A Have results been reported and calculated correctly?
[✓ Y] N N/A Are results within the calibrated range of the instruments?
[✓ Y] N N/A Are all detection limits below the CRQL?

Compound (analyte) results for all samples = N.D. ~~reported with a positive detect were recalculated and verified using the following equation:~~

Concentration =

Recalculation:

#	Sample ID	Analyte	Reported Concentration (µg/L)	Calculated Concentration (µg/L)	Acceptable (Y/N)

Note: