DATA VALIDATION REPORT - Level III Review

SDG No.:	**218081812+13+14**	**Analysis:**	**Explosives and Metals**
Laboratory:	**GCAL**	**Project:**	**Williston LTA**
Reviewer:	**Naoum Tavantzis**	**Date:**	**October 24th, 2018**

This report presents the findings of a review of the referenced data. The report consists of this summary, a listing of the samples included in the review, copies of data reports with data qualifying flags applied, data review worksheets, supporting documentation, and an explanation of the data qualifying flags employed. The review performed is based on the specifics of the analytical method referenced and provisions of the approved project-specific QAPP; and, qualified according to the USEPA CLP National Functional Guidelines for Organic and Inorganic (January 2017) Superfund Data Review. Modifications reflect the level of review requested, the specifications of the project-specific QAPP, and the specifics of the analytical methods employed.

Major Anomalies: During the explosives analysis, the following laboratory control spike pairs (LCS/LCSD) displayed percent recoveries outside the laboratory quality control (QC) limits:

Preparation Batch	QC Limits (%)	Analyte	LCS Recovery (%)	LCSD Recovery (%)
642698	80-116	1,3,5-Trinitrobenzene	**47**	**41**
	73-119	1,3-Dinitrobenzene	**50**	**43**
	71-120	2,4,6-Trinitrobenzene	**42**	**39**
	75-121	2,4-Dinitrotoluene	**26**	**32**
	79-117	2,6-Dinitrotoluene	105	**56**
	71-123	2-Amino-4,6-dinitrotoluene	**37**	**34**
	84-120	2-Nitrotoluene	**44**	**35**
	86-118	3,5-Dinitroaniline	**39**	**34**
	67-129	3-Nitrotoluene	**42**	**35**
	64-127	4-Amino-2,6-dinitrotoluene	**38**	**34**
	71-124	4-Nitrotoluene	**47**	**60**
	74-124	HMX	**39**	**34**
	80-128	Nitrobenzene	**39**	**34**
	73-124	Nitroglycerin	**37**	**32**
	72-128	PETN	**31**	**30**
	67-129	RDX	**42**	**42**
	68-135	Tetryl	**0**	**0**
643342	80-116	1,3,5-Trinitrobenzene	**121**	119
	73-119	1,3-Dinitrobenzene	**126**	111
	67-129	3-Nitrotoluene	113	**145**
	71-124	4-Nitrotoluene	108	**354**
	72-128	PETN	116	**166**
	68-135	Tetryl	0	**0**

The field sample results associated with the 0% recovery for tetryl were non-detect and were qualified R,l. The field sample results associated with the remaining percent recoveries less than the lower QC limits were non-detect and were qualified UJ,l. The field sample results associated with the positive biases were non-detect; no data qualifying action was taken. In addition, the LCS/LCSD displayed several relative percent difference (RPD) anomalies greater than the laboratory QC limit of 20%. The associated field sample results were non-detect; no data qualifying action was required.

Minor Anomalies: During the explosives analysis, the LCSD prepared in QC batch 642698 displayed a percent recovery less than the lower QC limit of 50% for surrogate 1,2-dinitrobenzene at 45%. All field samples displayed surrogate percent recoveries within control limits; no data qualifying action is taken based on QC sample surrogate percent recovery anomalies. The matrix spike (MS) performed on field sample WIL02DA02A, prepared in QC batch 643342, displayed a percent recovery less than the lower QC limit of 74% for HMX at 61%. The associated parent sample result was non-detect and was qualified UJ,m. In addition, the matrix spike pairs (MS/MSD) performed on field sample WIL02DA02A in QC batches 642698 and 643342 displayed several RPDs greater than the QC laboratory QC limit of 20%. The associated parent sample results were non-detect; no data qualifying action was required. The field sample results associated with the percent recoveries less than the lower QC limits were re-extracted after the technical holding time of 14 days had expired. The associated field sample results were non-detect and were qualified UJ,h, unless previously qualified due to a LCS or MS percent recovery anomaly.

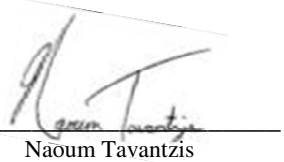
During the metals analysis, the method blank prepared in QC batch 642222 displayed a detection greater than the limit of detection for zinc at 518 µg/Kg. The associated field sample results were positive and were greater than five times the concentration found in the blank; no data qualifying action was required. The equipment blank WIL03IS00 displayed concentrations greater than the DL for antimony at 0.74 µg/L and copper at 0.26 µg/L. The associated field sample results were positive and were greater than five times the concentration found in the blank; no data qualifying action was required. The following MS/MSD displayed percent recoveries outside the quality QC limits:

Parent Sample	Preparation Batch	Analyte	QC Limits (%)	MS Recovery (%)	MSD Recovery (%)
WIL02DA02A	642222	Antimony	72-124	**7**	**5**
WIL01IS02	642442	Antimony	72-124	**11**	**12**
		Copper	84-119	**132**	115
	642531	Antimony	72-124	**7**	**8**

The post-digestion spikes performed on these parent samples displayed percent recoveries within laboratory QC limits. The field sample results associated with the positive bias were positive and were qualified J+,m. The field sample results associated with the negative biases were non-detect and were qualified UJ,m. The serial dilution performed on field sample WIL02DA02A in analytical sequence 642309 displayed a percent difference greater than the QC limit of 10% for zinc at 10.9%. The associated field sample results were positive and were qualified J,s.

Correctable Anomalies: None.

Comments: On the basis of this evaluation, the laboratory appears to have followed the specified method, with the exception of anomalies discussed previously. If a given fraction was not discussed, all quality control criteria reviewed were within acceptable limits. Except for those data flagged "R", all data are usable, as qualified, for their intended purpose based on the data reviewed.

Signed: 

Naoum Tavantzis

Williston LTA

Job: 60520956

Laboratory: GCAL
SDG#: 217102040

Sample ID	Client ID	Sample Type	Sample Date	Matrix	8330B	Metals
21808181206	WIL02DA02A	Field Sample	8/16/2018	Discrete Soil	x	x
21808181213						
21808181209	WIL02DA01A	Field Sample	8/16/2018	Discrete Soil	x	x
21808181216						
21808181210	WIL02DA01B	Field Duplicate	8/16/2018	Discrete Soil	x	x
21808181217						
21808181301	WIL03IS01	Field Sample	8/14/2018	Incremental Soil		x
21808181302	WIL01IS02	Field Duplicate	8/14/2018	Incremental Soil		x
21808181303	WIL03IS00	Equipment Blank	8/16/2018	Incremental Soil		x
21808181304	WIL04IS03	Field Triplicate	8/15/2018	Incremental Soil		x
21808181305	WIL04IS01	Field Sample	8/15/2018	Incremental Soil		x
21808181306	WIL04IS02	Field Duplicate	8/15/2018	Incremental Soil		x
21808181307	WIL03IS03	Field Triplicate	8/14/2018	Incremental Soil		x
21808181308	WIL03IS02	Field Duplicate	8/14/2018	Incremental Soil		x
21808181401	WIL02IS01	Field Sample	8/15/2018	Incremental Soil	x	x
21808181404	WIL02IS02	Field Duplicate	8/15/2018	Incremental Soil	x	x
21808181405	WIL01IS03	Field Triplicate	8/14/2018	Incremental Soil		x
21808181406	WIL01IS01	Field Sample	8/14/2018	Incremental Soil		x
21808181407	WIL02IS03	Field Triplicate	8/15/2018	Incremental Soil	x	x

Williston
Triplicate Results

Client Sample ID:				WIL01IS01		WIL01IS02		WIL01IS03						
Date				8/14/18		8/14/18		8/14/18						
	Units	RL	5x LOQ	Sample	Conc	Duplicate Conc		Triplicate Conc		Average	% RSD	Average Deviation	2x LOQ	Pass/ Fail
Metals														
Antimony	mg/Kg	0.855	4.28	0.422	U	0.427	U	0.383	U	0.411	4.82%	**0.0185**	1.71	Pass
Copper	mg/Kg	0.427	2.14	23.8		21.0		24.3		23.0	**6.30%**	1.36	0.854	Pass
Lead	mg/Kg	0.427	2.14	46.5		63.5		69.1		59.7	**16.1%**	8.80	0.854	Pass
Zinc	mg/Kg	8.55	42.8	67.3		61.2		64.3		64.3	**3.88%**	2.09	17.1	Pass

Control limit [sample Average]>5xLOQ use 30%

[sample Average]<5xLOQ use Average Deviation <2xRL

Williston
Triplicate Results

Client Sample ID:				WIL01IS01		WIL01IS02		WIL01IS03						
Date				8/14/18		8/14/18		8/14/18						
	Units	RL	5x LOQ	Sample	Conc	Duplicate Conc		Triplicate Conc		Average	% RSD	Average Deviation	2x LOQ	Pass/ Fail
Explosives						All non-detect								
Metals														
Antimony	mg/Kg	0.937	4.69	0.469	U	0.453	U	0.468	U	0.463	1.58%	**0.00689**	1.874	Pass
Copper	mg/Kg	0.469	2.35	38.4		33.9		35.6		36.0	**5.16%**	1.62	0.938	Pass
Lead	mg/Kg	0.469	2.35	15.9		15.1		15.7		15.6	**2.18%**	0.311	0.938	Pass
Zinc	mg/Kg	9.37	46.9	88.5		77.4		81.4		82.4	**5.57%**	4.04	18.74	Pass

Control limit [sample Average]>5xLOQ use 30%

[sample Average]<5xLOQ use Average Deviation <2xRL

Williston
Triplicate Results

Client Sample ID:				WIL03IS01		WIL03IS02		WIL03IS03						
Date				8/14/18		8/14/18		8/14/18						
	Units	RL	5x LOQ	Sample Conc		Duplicate Conc		Triplicate Conc		Average	% RSD	Average Deviation	2x LOQ	Pass/ Fail
Metals														
Antimony	mg/Kg	1.13	5.65	0.417	U	0.423	U	0.564	U	0.468	14.5%	**0.0640**	2.26	Pass
Copper	mg/Kg	0.564	2.82	27.3		23.1		35.7		28.7	**18.3%**	4.67	1.13	Pass
Lead	mg/Kg	0.564	2.82	14.7		14.3		22.7		17.2	**22.5%**	3.64	1.13	Pass
Zinc	mg/Kg	11.3	56.5	72.9		66.9		81.7		73.8	**8.23%**	5.24	22.6	Pass

Control limit [sample Average]>5xLOQ use 30%

[sample Average]<5xLOQ use Average Deviation <2xRL

Williston
Triplicate Results

Client Sample ID:				WIL04IS01		WIL04IS02		WIL04IS03						
Date				8/15/18		8/15/18		8/15/18						
	Units	RL	5x LOQ	Sample	Conc	Duplicate Conc		Triplicate Conc		Average	% RSD	Average Deviation	2x LOQ	Pass/ Fail
Metals														
Antimony	mg/Kg	0.773	3.87	0.379	U	0.387	U	0.386	U	0.384	0.927%	**0.00333**	1.546	Pass
Copper	mg/Kg	0.387	1.94	14.9		14.4		15.4		14.9	**2.74%**	0.333	0.774	Pass
Lead	mg/Kg	0.387	1.94	7.11		6.66		7.26		7.01	**3.64%**	0.233	0.774	Pass
Zinc	mg/Kg	7.73	38.7	56.4		51.1		56.5		54.7	**4.61%**	2.38	15.46	Pass

Control limit [sample Average]>5xLOQ use 30%

[sample Average]<5xLOQ use Average Deviation <2xRL

Williston
218081812
Duplicate

Client Sample ID:				WI02SA02A		WI02SA02B					
Date Sampled:				8/16/18		8/16/18					
	Units	LOQ	5x LOQ	Sample Conc		Duplicate Conc		%RPD	Delta	2x LOQ	Pass/ Fail
Explosives	All Non-detect										
Metals											
Antimony	mg/Kg	1.15	5.8	0.574	U	0.535	U	7.0%	**0.039**	2.3	Pass
Copper	mg/Kg	0.574	2.9	35.4		38.4		**8.1%**	3.0	1.1	Pass
Lead	mg/Kg	0.574	2.9	18.9		17.3		**8.8%**	1.6	1.1	Pass
Zinc	mg/Kg	11.5	58	101		98.50		**2.5%**	2.5	23	Pass

Control limit [sample]>5xLOQ use 30%
[sample]<5xLOQ use Delta<2xLOQ

1D

ORGANICS ANALYSIS DATA SHEET

Report No:	218081812	Client Sample ID:	WIL02DA02A
Collect Date:	08/16/18 Time: 1020	GCAL Sample ID:	21808181206
Matrix:	Solid % Moisture: NA	Instrument ID:	HPLC3
Sample Amt:	10.3 g	Lab File ID:	2180912\A64
Injection Vol.:	1.0 (µL)	GC Column:	ARC18 ID 3 (mm)
Prep Final Vol.:	40000 (µL)	Dilution Factor:	1 Analyst: MEG
Prep Date:	08/25/18	Analysis Date:	09/13/18 Time: 0540
Prep Batch:	642698	Analytical Batch:	643776
Prep Method:	8330B	Analytical Method:	EPA 8330B

CONCENTRATION UNITS: ug/kg

CAS	ANALYTE	RESULT	Q	DL	LOD	LOQ
99-35-4	1,3,5-Trinitrobenzene	97.1	UQ	40.8	97.1	194
99-65-0	1,3-Dinitrobenzene	97.1	UQ	74.8	97.1	194
118-96-7	2,4,6-Trinitrotoluene	97.1	UQ	49.5	97.1	194
121-14-2	2,4-Dinitrotoluene	97.1	UQ	96.1	97.1	194
606-20-2	2,6-Dinitrotoluene	97.1	UQ	59.2	97.1	194
35572-78-2	2-Amino-4,6-dinitrotoluene	97.1	UQ	95.1	97.1	194
88-72-2	2-Nitrotoluene	97.1	UQJ	62.1	97.1	194
618-87-1	3,5-Dinitroaniline	97.1	UQ	80.6	97.1	194
99-08-1	3-Nitrotoluene	146	UQ	121	146	194
19406-51-0	4-Amino-2,6-dinitrotoluene	97.1	UQ	74.8	97.1	194
99-99-0	4-Nitrotoluene	97.1	UQJ	74.8	97.1	194
2691-41-0	HMX	97.1	UQ	25.2	97.1	194
98-95-3	Nitrobenzene	97.1	UQ	35.0	97.1	194
55-63-0	Nitroglycerin	97.1	UQ	71.8	97.1	194
78-11-5	Pentaerythritol Tetranitrate	146	UQ	118	146	194
121-82-4	RDX	97.1	UQ	17.5	97.1	194
479-45-8	Tetryl	97.1	UQJ	39.8	97.1	194

FORM I ORG-1

1D

ORGANICS ANALYSIS DATA SHEET

Report No:	218081812	Client Sample ID:	WIL02DA02A (RE)
Collect Date:	08/16/18 Time: 1020	GCAL Sample ID:	21808181213
Matrix:	Solid % Moisture: NA	Instrument ID:	HPLC3
Sample Amt:	10.1 g	Lab File ID:	2180912\A72
Injection Vol.:	1.0 (µL)	GC Column:	ARC18 ID 3 (mm)
Prep Final Vol.:	40000 (µL)	Dilution Factor:	1 Analyst: MEG
Prep Date:	09/05/18	Analysis Date:	09/13/18 Time: 0818
Prep Batch:	643342	Analytical Batch:	643776
Prep Method:	8330B	Analytical Method:	EPA 8330B

CONCENTRATION UNITS: ug/kg

CAS	ANALYTE	RESULT	Q	DL	LOD	LOQ
99-35-4	1,3,5-Trinitrobenzene	99.0	UQ	41.6	99.0	198
99-65-0	1,3-Dinitrobenzene	99.0	U	76.2	99.0	198
118-96-7	2,4,6-Trinitrotoluene	99.0	U	50.5	99.0	198
121-14-2	2,4-Dinitrotoluene	99.0	U	98.0	99.0	198
606-20-2	2,6-Dinitrotoluene	99.0	UJ	60.4	99.0	198
35572-78-2	2-Amino-4,6-dinitrotoluene	99.0	U	97.0	99.0	198
88-72-2	2-Nitrotoluene	99.0	U	63.4	99.0	198
618-87-1	3,5-Dinitroaniline	99.0	U	82.2	99.0	198
99-08-1	3-Nitrotoluene	149	UQ	124	149	198
19406-51-0	4-Amino-2,6-dinitrotoluene	99.0	U	76.2	99.0	198
99-99-0	4-Nitrotoluene	99.0	UQ	76.2	99.0	198
2691-41-0	HMX	99.0	UJ	25.7	99.0	198
98-95-3	Nitrobenzene	99.0	U	35.6	99.0	198
55-63-0	Nitroglycerin	99.0	U	73.3	99.0	198
78-11-5	Pentaerythritol Tetranitrate	149	UQ	121	149	198
121-82-4	RDX	99.0	U	17.8	99.0	198
479-45-8	Tetryl	99.0	UQ	40.6	99.0	198

US, h

US, m

US, h

R, I

NAT
10/24/18
Use initial results

FORM I ORG-1

1D

ORGANICS ANALYSIS DATA SHEET

Report No:	218081812	Client Sample ID:	WIL02DA01A
Collect Date:	08/16/18 Time: 0930	GCAL Sample ID:	21808181209
Matrix:	Solid % Moisture: NA	Instrument ID:	HPLC3
Sample Amt:	10.5 g	Lab File ID:	2180912\A67
Injection Vol.:	1.0 (µL)	GC Column:	ARC18 ID 3 (mm)
Prep Final Vol.:	40000 (µL)	Dilution Factor:	1 Analyst: MEG
Prep Date:	08/25/18	Analysis Date:	09/13/18 Time: 0639
Prep Batch:	642698	Analytical Batch:	643776
Prep Method:	8330B	Analytical Method:	EPA 8330B

CONCENTRATION UNITS: ug/kg

CAS	ANALYTE	RESULT	Q	DL	LOD	LOQ
99-35-4	1,3,5-Trinitrobenzene U5, 1	95.2	UQ	40.0	95.2	190
99-65-0	1,3-Dinitrobenzene	95.2	UQ	73.3	95.2	190
118-96-7	2,4,6-Trinitrotoluene	95.2	UQ	48.6	95.2	190
121-14-2	2,4-Dinitrotoluene	95.2	UQ	94.3	95.2	190
606-20-2	2,6-Dinitrotoluene	95.2	UQ	58.1	95.2	190
35572-78-2	2-Amino-4,6-dinitrotoluene	95.2	UQ	93.3	95.2	190
88-72-2	2-Nitrotoluene	95.2	UQ	61.0	95.2	190
618-87-1	3,5-Dinitroaniline	95.2	UQ	79.0	95.2	190
99-08-1	3-Nitrotoluene	143	UQ	119	143	190
19406-51-0	4-Amino-2,6-dinitrotoluene	95.2	UQ	73.3	95.2	190
99-99-0	4-Nitrotoluene	95.2	UQ	73.3	95.2	190
2691-41-0	HMX	95.2	UQ	24.8	95.2	190
98-95-3	Nitrobenzene	95.2	UQ	34.3	95.2	190
55-63-0	Nitroglycerin	95.2	UQ	70.5	95.2	190
78-11-5	Pentaerythritol Tetranitrate	143	UQ	116	143	190
121-82-4	RDX	95.2	UQ	17.1	95.2	190
479-45-8	Tetryl R, 1	95.2	UQ	39.0	95.2	190

FORM I ORG-1

1D

ORGANICS ANALYSIS DATA SHEET

Report No:	218081812	Client Sample ID:	WIL02DA01A (RE)
Collect Date:	08/16/18 Time: 0930	GCAL Sample ID:	21808181216
Matrix:	Solid % Moisture: NA	Instrument ID:	HPLC3
Sample Amt:	10.1 g	Lab File ID:	2180912\A75
Injection Vol.:	1.0 (µL)	GC Column:	ARC18 ID 3 (mm)
Prep Final Vol.:	40000 (µL)	Dilution Factor:	1 Analyst: MEG
Prep Date:	09/05/18	Analysis Date:	09/13/18 Time: 0917
Prep Batch:	643342	Analytical Batch:	643776
Prep Method:	8330B	Analytical Method:	EPA 8330B

CONCENTRATION UNITS: ug/kg

CAS	ANALYTE	RESULT	Q	DL	LOD	LOQ
99-35-4	1,3,5-Trinitrobenzene	99.0	UQ	41.6	99.0	198
99-65-0	1,3-Dinitrobenzene	99.0	U	76.2	99.0	198
118-96-7	2,4,6-Trinitrotoluene	99.0	U	50.5	99.0	198
121-14-2	2,4-Dinitrotoluene	99.0	U	98.0	99.0	198
606-20-2	2,6-Dinitrotoluene	99.0	U	60.4	99.0	198
35572-78-2	2-Amino-4,6-dinitrotoluene	99.0	U	97.0	99.0	198
88-72-2	2-Nitrotoluene	99.0	U	63.4	99.0	198
618-87-1	3,5-Dinitroaniline	99.0	U	82.2	99.0	198
99-08-1	3-Nitrotoluene	149	UQ	124	149	198
19406-51-0	4-Amino-2,6-dinitrotoluene	99.0	U	76.2	99.0	198
99-99-0	4-Nitrotoluene	99.0	UQ	76.2	99.0	198
2691-41-0	HMX	99.0	U	25.7	99.0	198
98-95-3	Nitrobenzene	99.0	U	35.6	99.0	198
55-63-0	Nitroglycerin	99.0	U	73.3	99.0	198
78-11-5	Pentaerythritol Tetranitrate	149	UQ	121	149	198
121-82-4	RDX	99.0	U	17.8	99.0	198
479-45-8	Tetryl	99.0	UQ	40.6	99.0	198

UJ, J

R, J

Use initial results MAT identity

FORM I ORG-1

1D

ORGANICS ANALYSIS DATA SHEET

Report No:	218081812	Client Sample ID:	WIL02DA01B
Collect Date:	08/16/18 Time: 0935	GCAL Sample ID:	21808181210
Matrix:	Solid % Moisture: NA	Instrument ID:	HPLC3
Sample Amt:	10 g	Lab File ID:	2180912\A68
Injection Vol.:	1.0 (µL)	GC Column:	ARC18 ID 3 (mm)
Prep Final Vol.:	40000 (µL)	Dilution Factor:	1 Analyst: MEG
Prep Date:	08/25/18	Analysis Date:	09/13/18 Time: 0659
Prep Batch:	642698	Analytical Batch:	643776
Prep Method:	8330B	Analytical Method:	EPA 8330B

CONCENTRATION UNITS: ug/kg

CAS	ANALYTE	RESULT	Q	DL	LOD	LOQ
99-35-4	1,3,5-Trinitrobenzene U5,1	100	UQ	42.0	100	200
99-65-0	1,3-Dinitrobenzene	100	UQ	77.0	100	200
118-96-7	2,4,6-Trinitrotoluene	100	UQ	51.0	100	200
121-14-2	2,4-Dinitrotoluene	100	UQ	99.0	100	200
606-20-2	2,6-Dinitrotoluene	100	UQ	61.0	100	200
35572-78-2	2-Amino-4,6-dinitrotoluene	100	UQ	98.0	100	200
88-72-2	2-Nitrotoluene	100	UQ	64.0	100	200
618-87-1	3,5-Dinitroaniline	100	UQ	83.0	100	200
99-08-1	3-Nitrotoluene	150	UQ	125	150	200
19406-51-0	4-Amino-2,6-dinitrotoluene	100	UQ	77.0	100	200
99-99-0	4-Nitrotoluene	100	UQ	77.0	100	200
2691-41-0	HMX	100	UQ	26.0	100	200
98-95-3	Nitrobenzene	100	UQ	36.0	100	200
55-63-0	Nitroglycerin	100	UQ	74.0	100	200
78-11-5	Pentaerythritol Tetranitrate	150	UQ	122	150	200
121-82-4	RDX	100	UQ	18.0	100	200
479-45-8	Tetryl R,1	100	UQ	41.0	100	200

FORM I ORG-1

1D

ORGANICS ANALYSIS DATA SHEET

Report No:	218081812	Client Sample ID:	WIL02DA01B (RE)
Collect Date:	08/16/18 Time: 0935	GCAL Sample ID:	21808181217
Matrix:	Solid % Moisture: NA	Instrument ID:	HPLC3
Sample Amt:	10.1 g	Lab File ID:	2180912\A76
Injection Vol.:	1.0 (µL)	GC Column:	ARC18 ID 3 (mm)
Prep Final Vol.:	40000 (µL)	Dilution Factor:	1 Analyst: MEG
Prep Date:	09/05/18	Analysis Date:	09/13/18 Time: 0937
Prep Batch:	643342	Analytical Batch:	643776
Prep Method:	8330B	Analytical Method:	EPA 8330B

CONCENTRATION UNITS: ug/kg

CAS	ANALYTE	RESULT	Q	DL	LOD	LOQ
99-35-4	1,3,5-Trinitrobenzene	99.0	UQ	41.6	99.0	198
99-65-0	1,3-Dinitrobenzene	99.0	U	76.2	99.0	198
118-96-7	2,4,6-Trinitrotoluene	99.0	U	50.5	99.0	198
121-14-2	2,4-Dinitrotoluene	99.0	U	98.0	99.0	198
606-20-2	2,6-Dinitrotoluene	99.0	U	60.4	99.0	198
35572-78-2	2-Amino-4,6-dinitrotoluene	99.0	U	97.0	99.0	198
88-72-2	2-Nitrotoluene	99.0	U	63.4	99.0	198
618-87-1	3,5-Dinitroaniline	99.0	U	82.2	99.0	198
99-08-1	3-Nitrotoluene	149	UQ	124	149	198
19406-51-0	4-Amino-2,6-dinitrotoluene	99.0	U	76.2	99.0	198
99-99-0	4-Nitrotoluene	99.0	UQ	76.2	99.0	198
2691-41-0	HMX	99.0	U	25.7	99.0	198
98-95-3	Nitrobenzene	99.0	U	35.6	99.0	198
55-63-0	Nitroglycerin	99.0	U	73.3	99.0	198
78-11-5	Pentaerythritol Tetranitrate	149	UQ	121	149	198
121-82-4	RDX	99.0	U	17.8	99.0	198
479-45-8	Tetryl	99.0	UQ	40.6	99.0	198

US.h

R.1

Use 2nd set results MAT 10/24/18

FORM I ORG-1

1D

ORGANICS ANALYSIS DATA SHEET

Report No:	218081814	Client Sample ID:	WIL02IS01
Collect Date:	08/15/18 Time: 1200	GCAL Sample ID:	21808181401
Matrix:	Solid % Moisture: NA	Instrument ID:	HPLC3
Sample Amt:	10.1 g	Lab File ID:	2180830\A22
Injection Vol.:	1.0 (µL)	GC Column:	ARC18 ID 3 (mm)
Prep Final Vol.:	40000 (µL)	Dilution Factor:	1 Analyst: MEG
Prep Date:	08/24/18	Analysis Date:	08/30/18 Time: 1741
Prep Batch:	642680	Analytical Batch:	643050
Prep Method:	8330B	Analytical Method:	EPA 8330B

CONCENTRATION UNITS: ug/kg

CAS	ANALYTE	RESULT	Q	DL	LOD	LOQ
99-35-4	1,3,5-Trinitrobenzene	99.0	U	41.6	99.0	198
99-65-0	1,3-Dinitrobenzene	99.0	U	76.2	99.0	198
118-96-7	2,4,6-Trinitrotoluene	99.0	U	50.5	99.0	198
121-14-2	2,4-Dinitrotoluene	99.0	U	98.0	99.0	198
606-20-2	2,6-Dinitrotoluene	99.0	U	60.4	99.0	198
35572-78-2	2-Amino-4,6-dinitrotoluene	99.0	U	97.0	99.0	198
88-72-2	2-Nitrotoluene	99.0	U	63.4	99.0	198
618-87-1	3,5-Dinitroaniline	99.0	U	82.2	99.0	198
99-08-1	3-Nitrotoluene	149	U	124	149	198
19406-51-0	4-Amino-2,6-dinitrotoluene	99.0	U	76.2	99.0	198
99-99-0	4-Nitrotoluene	99.0	UQ	76.2	99.0	198
2691-41-0	HMX	99.0	U	25.7	99.0	198
98-95-3	Nitrobenzene	99.0	U	35.6	99.0	198
55-63-0	Nitroglycerin	99.0	U	73.3	99.0	198
78-11-5	Pentaerythritol Tetranitrate	149	U	121	149	198
121-82-4	RDX	99.0	U	17.8	99.0	198
479-45-8	Tetryl	99.0	U	40.6	99.0	198

FORM I ORG-1

1D

ORGANICS ANALYSIS DATA SHEET

Report No:	218081814	Client Sample ID:	WIL02IS02
Collect Date:	08/15/18 Time: 1210	GCAL Sample ID:	21808181404
Matrix:	Solid % Moisture: NA	Instrument ID:	HPLC3
Sample Amt:	10.5 g	Lab File ID:	2180830\A25
Injection Vol.:	1.0 (µL)	GC Column:	ARC18 ID 3 (mm)
Prep Final Vol.:	40000 (µL)	Dilution Factor:	1 Analyst: MEG
Prep Date:	08/24/18	Analysis Date:	08/30/18 Time: 1840
Prep Batch:	642680	Analytical Batch:	643050
Prep Method:	8330B	Analytical Method:	EPA 8330B

CONCENTRATION UNITS: ug/kg

CAS	ANALYTE	RESULT	Q	DL	LOD	LOQ
99-35-4	1,3,5-Trinitrobenzene	95.2	U	40.0	95.2	190
99-65-0	1,3-Dinitrobenzene	95.2	U	73.3	95.2	190
118-96-7	2,4,6-Trinitrotoluene	95.2	U	48.6	95.2	190
121-14-2	2,4-Dinitrotoluene	95.2	U	94.3	95.2	190
606-20-2	2,6-Dinitrotoluene	95.2	U	58.1	95.2	190
35572-78-2	2-Amino-4,6-dinitrotoluene	95.2	U	93.3	95.2	190
88-72-2	2-Nitrotoluene	95.2	U	61.0	95.2	190
618-87-1	3,5-Dinitroaniline	95.2	U	79.0	95.2	190
99-08-1	3-Nitrotoluene	143	U	119	143	190
19406-51-0	4-Amino-2,6-dinitrotoluene	95.2	U	73.3	95.2	190
99-99-0	4-Nitrotoluene	95.2	UQ	73.3	95.2	190
2691-41-0	HMX	95.2	U	24.8	95.2	190
98-95-3	Nitrobenzene	95.2	U	34.3	95.2	190
55-63-0	Nitroglycerin	95.2	U	70.5	95.2	190
78-11-5	Pentaerythritol Tetranitrate	143	U	116	143	190
121-82-4	RDX	95.2	U	17.1	95.2	190
479-45-8	Tetryl	95.2	U	39.0	95.2	190

FORM I ORG-1

1D

ORGANICS ANALYSIS DATA SHEET

Report No:	218081814	Client Sample ID:	WIL02IS03
Collect Date:	08/15/18 Time: 1220	GCAL Sample ID:	21808181407
Matrix:	Solid % Moisture: NA	Instrument ID:	HPLC3
Sample Amt:	10 g	Lab File ID:	2180830\A26
Injection Vol.:	1.0 (µL)	GC Column:	ARC18 ID 3 (mm)
Prep Final Vol.:	40000 (µL)	Dilution Factor:	1 Analyst: MEG
Prep Date:	08/24/18	Analysis Date:	08/30/18 Time: 1900
Prep Batch:	642680	Analytical Batch:	643050
Prep Method:	8330B	Analytical Method:	EPA 8330B

CONCENTRATION UNITS: ug/kg

CAS	ANALYTE	RESULT	Q	DL	LOD	LOQ
99-35-4	1,3,5-Trinitrobenzene	100	U	42.0	100	200
99-65-0	1,3-Dinitrobenzene	100	U	77.0	100	200
118-96-7	2,4,6-Trinitrotoluene	100	U	51.0	100	200
121-14-2	2,4-Dinitrotoluene	100	U	99.0	100	200
606-20-2	2,6-Dinitrotoluene	100	U	61.0	100	200
35572-78-2	2-Amino-4,6-dinitrotoluene	100	U	98.0	100	200
88-72-2	2-Nitrotoluene	100	U	64.0	100	200
618-87-1	3,5-Dinitroaniline	100	U	83.0	100	200
99-08-1	3-Nitrotoluene	150	U	125	150	200
19406-51-0	4-Amino-2,6-dinitrotoluene	100	U	77.0	100	200
99-99-0	4-Nitrotoluene	100	UQ	77.0	100	200
2691-41-0	HMX	100	U	26.0	100	200
98-95-3	Nitrobenzene	100	U	36.0	100	200
55-63-0	Nitroglycerin	100	U	74.0	100	200
78-11-5	Pentaerythritol Tetranitrate	150	U	122	150	200
121-82-4	RDX	100	U	18.0	100	200
479-45-8	Tetryl	100	U	41.0	100	200

FORM I ORG-1

I

INORGANIC ANALYSIS DATA SHEET

Report No:	218081812	Client Sample ID:	WIL02DA02A
Collect Date:	08/16/18 Time: 1020	GCAL Sample ID:	21808181206
Matrix:	Solid % Solids: 69.73	Instrument ID:	ICPMS2
Sample Amt:	1.25 g	Lab File ID:	2180820B_MS2.b\121277SMPL.d
Prep Vol.:	50 (mL)	Dilution Factor:	10 Analyst: LWZ
Prep Date:	08/20/18	Analysis Date:	08/20/18 Time: 1802
Prep Batch:	642222	Analytical Batch:	642309
Prep Method:	3050B	Analytical Method:	EPA 6020B

ANALYTE	*RESULT*	*UNITS*	*Q*	*DL*	*LOD*	*LOQ*
Antimony	574 U5,m	ug/kg	U	287	574	1150
Copper	35400	ug/kg		143	287	574
Lead	18900	ug/kg		143	287	574
Zinc	101000 J,5	ug/kg		2870	5740	11500

FORM I - IN

I

INORGANIC ANALYSIS DATA SHEET

Report No:	218081812	Client Sample ID:	WIL02DA01A
Collect Date:	08/16/18 Time: 0930	GCAL Sample ID:	21808181209
Matrix:	Solid % Solids: 70.44	Instrument ID:	ICPMS2
Sample Amt:	1.45 g	Lab File ID:	2180820B_MS2.b\121282SMPL.d
Prep Vol.:	50 (mL)	Dilution Factor:	10 Analyst: LWZ
Prep Date:	08/20/18	Analysis Date:	08/20/18 Time: 1820
Prep Batch:	642222	Analytical Batch:	642309
Prep Method:	3050B	Analytical Method:	EPA 6020B

ANALYTE	*RESULT*	*UNITS*	*Q*	*DL*	*LOD*	*LOQ*
Antimony	490 UJ,M	ug/kg	U	245	490	979
Copper	39300	ug/kg		122	245	490
Lead	17600	ug/kg		122	245	490
Zinc	98900 J,3	ug/kg		2450	4900	9790

I

INORGANIC ANALYSIS DATA SHEET

Report No:	218081812	Client Sample ID:	WIL02DA01B
Collect Date:	08/16/18 Time: 0935	GCAL Sample ID:	21808181210
Matrix:	Solid % Solids: 70.26	Instrument ID:	ICPMS2
Sample Amt:	1.33 g	Lab File ID:	2180820B_MS2.b\121283SMPL.d
Prep Vol.:	50 (mL)	Dilution Factor:	10 Analyst: LWZ
Prep Date:	08/20/18	Analysis Date:	08/20/18 Time: 1824
Prep Batch:	642222	Analytical Batch:	642309
Prep Method:	3050B	Analytical Method:	EPA 6020B

ANALYTE	RESULT	UNITS	Q	DL	LOD	LOQ
Antimony	535 U5,m	ug/kg	U	268	535	1070
Copper	38400	ug/kg		134	268	535
Lead	17300	ug/kg		134	268	535
Zinc	98500 5,5	ug/kg		2680	5350	10700

FORM I - IN

I

INORGANIC ANALYSIS DATA SHEET

Report No:	218081813	Client Sample ID:	WIL03IS01
Collect Date:	08/14/18 Time: 1600	GCAL Sample ID:	21808181301
Matrix:	Solid % Solids: 88.78	Instrument ID:	ICPMS2
Sample Amt:	1.35 g	Lab File ID:	2180828B_MS2.b\1841SMPL_2180828A_MS2.D
Prep Vol.:	50 (mL)	Dilution Factor:	10 Analyst: LWZ
Prep Date:	08/25/18	Analysis Date:	08/28/18 Time: 1305
Prep Batch:	642531	Analytical Batch:	642829
Prep Method:	EPA 3050B \ ISM	Analytical Method:	EPA 6020B

ANALYTE	RESULT	UNITS	Q	DL	LOD	LOQ
Antimony	417 U,m	ug/kg	U	209	417	834
Copper	27300	ug/kg		104	209	417
Lead	14700	ug/kg		104	209	417
Zinc	72900	ug/kg		2090	4170	8340

FORM I - IN

I

INORGANIC ANALYSIS DATA SHEET

Report No:	218081813	Client Sample ID:	WIL01IS02
Collect Date:	08/14/18 Time: 1350	GCAL Sample ID:	21808181302
Matrix:	Solid % Solids: 93.58	Instrument ID:	ICPMS1
Sample Amt:	1.25 g	Lab File ID:	2180823A_MS1.b\038SMPL.d
Prep Vol.:	50 (mL)	Dilution Factor:	10 Analyst: LWZ
Prep Date:	08/22/18	Analysis Date:	08/23/18 Time: 1209
Prep Batch:	642442	Analytical Batch:	642536
Prep Method:	EPA 3050B \ ISM	Analytical Method:	EPA 6020B

ANALYTE	*RESULT*	*UNITS*	*Q*	*DL*	*LOD*	*LOQ*
Antimony	427 UJm	ug/kg	U	214	427	855
Copper	21000 J+m	ug/kg		107	214	427
Lead	63500	ug/kg		107	214	427
Zinc	61200	ug/kg		2140	4270	8550

FORM I - IN

I

INORGANIC ANALYSIS DATA SHEET

Report No:	218081813	Client Sample ID:	WIL03IS00
Collect Date:	08/16/18 Time: 0820	GCAL Sample ID:	21808181303
Matrix:	Water % Solids: NA	Instrument ID:	ICPMS1
Sample Amt:	50 mL	Lab File ID:	2180821A_MS1.b\023SMPL.d
Prep Vol.:	50 (mL)	Dilution Factor:	1 Analyst: LWZ
Prep Date:	08/20/18	Analysis Date:	08/21/18 Time: 1151
Prep Batch:	642277	Analytical Batch:	642381
Prep Method:	3010A	Analytical Method:	EPA 6020B

ANALYTE	*RESULT*	*UNITS*	*Q*	*DL*	*LOD*	*LOQ*
Antimony	0.74	ug/L	J	0.50	1.00	2.00
Copper	0.26	ug/L	J	0.25	0.50	1.00
Lead	0.50	ug/L	U	0.25	0.50	1.00
Zinc	10.0	ug/L	U	5.00	10.0	20.0

FORM I - IN

I

INORGANIC ANALYSIS DATA SHEET

Report No:	218081813	Client Sample ID:	WIL04IS03
Collect Date:	08/15/18 Time: 1610	GCAL Sample ID:	21808181304
Matrix:	Solid % Solids: 97.47	Instrument ID:	ICPMS1
Sample Amt:	1.33 g	Lab File ID:	2180823A_MS1.b\043SMPL.d
Prep Vol.:	50 (mL)	Dilution Factor:	10 Analyst: LWZ
Prep Date:	08/22/18	Analysis Date:	08/23/18 Time: 1231
Prep Batch:	642442	Analytical Batch:	642536
Prep Method:	EPA 3050B \ ISM	Analytical Method:	EPA 6020B

ANALYTE	RESULT	UNITS	Q	DL	LOD	LOQ
Antimony	386 UJ,M	ug/kg	U	193	386	771
Copper	15400 J+,M	ug/kg		96.4	193	386
Lead	7260	ug/kg		96.4	193	386
Zinc	56500	ug/kg		1930	3860	7710

FORM I - IN

I

INORGANIC ANALYSIS DATA SHEET

Report No:	218081813	Client Sample ID:	WIL04IS01
Collect Date:	08/15/18 Time: 1600	GCAL Sample ID:	21808181305
Matrix:	Solid % Solids: 97.68	Instrument ID:	ICPMS1
Sample Amt:	1.35 g	Lab File ID:	2180823A_MS1.b\044SMPL.d
Prep Vol.:	50 (mL)	Dilution Factor:	10 Analyst: LWZ
Prep Date:	08/22/18	Analysis Date:	08/23/18 Time: 1235
Prep Batch:	642442	Analytical Batch:	642536
Prep Method:	EPA 3050B \ ISM	Analytical Method:	EPA 6020B

ANALYTE	*RESULT*	*UNITS*	*Q*	*DL*	*LOD*	*LOQ*
Antimony	379 UJ,M	ug/kg	U	190	379	758
Copper	14900 J,M	ug/kg		94.8	190	379
Lead	7110	ug/kg		94.8	190	379
Zinc	56400	ug/kg		1900	3790	7580

FORM I - IN

I

INORGANIC ANALYSIS DATA SHEET

Report No:	218081813	Client Sample ID:	WIL04IS02
Collect Date:	08/15/18 Time: 1605	GCAL Sample ID:	21808181306
Matrix:	Solid % Solids: 97.99	Instrument ID:	ICPMS1
Sample Amt:	1.32 g	Lab File ID:	2180823A_MS1.b\045SMPL.d
Prep Vol.:	50 (mL)	Dilution Factor:	10 Analyst: LWZ
Prep Date:	08/22/18	Analysis Date:	08/23/18 Time: 1240
Prep Batch:	642442	Analytical Batch:	642536
Prep Method:	EPA 3050B \ ISM	Analytical Method:	EPA 6020B

ANALYTE	*RESULT*	*UNITS*	*Q*	*DL*	*LOD*	*LOQ*
Antimony	387 UJ,M	ug/kg	U	193	387	773
Copper	14400 J+,M	ug/kg		96.6	193	387
Lead	6660	ug/kg		96.6	193	387
Zinc	51100	ug/kg		1930	3870	7730

FORM I - IN

I

INORGANIC ANALYSIS DATA SHEET

Report No:	218081813	Client Sample ID:	WIL03IS03
Collect Date:	08/14/18 Time: 1610	GCAL Sample ID:	21808181307
Matrix:	Solid % Solids: 70.33	Instrument ID:	ICPMS2
Sample Amt:	1.26 g	Lab File ID:	2180828C_MS2.b\001SMPL.d
Prep Vol.:	50 (mL)	Dilution Factor:	10 Analyst: LWZ
Prep Date:	08/25/18	Analysis Date:	08/28/18 Time: 1355
Prep Batch:	642531	Analytical Batch:	642829
Prep Method:	EPA 3050B \ ISM	Analytical Method:	EPA 6020B

ANALYTE	RESULT	UNITS	Q	DL	LOD	LOQ
Antimony	564 UJ,M	ug/kg	U	282	564	1130
Copper	35700	ug/kg		141	282	564
Lead	22700	ug/kg		141	282	564
Zinc	81700	ug/kg		2820	5640	11300

FORM I - IN

I

INORGANIC ANALYSIS DATA SHEET

Report No:	218081813	Client Sample ID:	WIL03IS02
Collect Date:	08/14/18 Time: 1605	GCAL Sample ID:	21808181308
Matrix:	Solid % Solids: 92.27	Instrument ID:	ICPMS2
Sample Amt:	1.28 g	Lab File ID:	2180828B_MS2.b\1842SMPL_2180828A_MS2.D
Prep Vol.:	50 (mL)	Dilution Factor:	10 Analyst: LWZ
Prep Date:	08/25/18	Analysis Date:	08/28/18 Time: 1308
Prep Batch:	642531	Analytical Batch:	642829
Prep Method:	EPA 3050B \ ISM	Analytical Method:	EPA 6020B

ANALYTE	RESULT	UNITS	Q	DL	LOD	LOQ
Antimony	423 U5M	ug/kg	U	212	423	847
Copper	23100	ug/kg		106	212	423
Lead	14300	ug/kg		106	212	423
Zinc	66900	ug/kg		2120	4230	8470

FORM I - IN

I

INORGANIC ANALYSIS DATA SHEET

Report No:	218081814	Client Sample ID:	WIL02IS01
Collect Date:	08/15/18 Time: 1200	GCAL Sample ID:	21808181401
Matrix:	Solid % Solids: 85.34	Instrument ID:	ICPMS2
Sample Amt:	1.25 g	Lab File ID:	2180828B_MS2.b\1843SMPL_2180828A_MS2.D
Prep Vol.:	50 (mL)	Dilution Factor:	10 Analyst: LWZ
Prep Date:	08/25/18	Analysis Date:	08/28/18 Time: 1312
Prep Batch:	642531	Analytical Batch:	642829
Prep Method:	EPA 3050B \ ISM	Analytical Method:	EPA 6020B

ANALYTE	RESULT	UNITS	Q	DL	LOD	LOQ
Antimony	469 USm	ug/kg	U	234	469	937
Copper	38400	ug/kg		117	234	469
Lead	15900	ug/kg		117	234	469
Zinc	88500	ug/kg		2340	4690	9370

FORM I - IN

I

INORGANIC ANALYSIS DATA SHEET

Report No:	218081814	Client Sample ID:	WIL02IS02
Collect Date:	08/15/18 Time: 1210	GCAL Sample ID:	21808181404
Matrix:	Solid % Solids: 84.25	Instrument ID:	ICPMS2
Sample Amt:	1.31 g	Lab File ID:	2180828B_MS2.b\1848SMPL_2180828A_MS2.D
Prep Vol.:	50 (mL)	Dilution Factor:	10 Analyst: LWZ
Prep Date:	08/25/18	Analysis Date:	08/28/18 Time: 1329
Prep Batch:	642531	Analytical Batch:	642829
Prep Method:	EPA 3050B \ ISM	Analytical Method:	EPA 6020B

ANALYTE	RESULT	UNITS	Q	DL	LOD	LOQ
Antimony	453 US,M	ug/kg	U	227	453	906
Copper	33900	ug/kg		113	227	453
Lead	15100	ug/kg		113	227	453
Zinc	77400	ug/kg		2270	4530	9060

FORM I - IN

I

INORGANIC ANALYSIS DATA SHEET

Report No:	218081814	Client Sample ID:	WIL01IS03
Collect Date:	08/14/18 Time: 1400	GCAL Sample ID:	21808181405
Matrix:	Solid % Solids: 93.16	Instrument ID:	ICPMS2
Sample Amt:	1.4 g	Lab File ID:	2180828B_MS2.b\1849SMPL_2180828A_MS2.D
Prep Vol.:	50 (mL)	Dilution Factor:	10 Analyst: LWZ
Prep Date:	08/25/18	Analysis Date:	08/28/18 Time: 1333
Prep Batch:	642531	Analytical Batch:	642829
Prep Method:	EPA 3050B \ ISM	Analytical Method:	EPA 6020B

ANALYTE	RESULT	UNITS	Q	DL	LOD	LOQ
Antimony	383 U,m	ug/kg	U	192	383	767
Copper	24300	ug/kg		95.8	192	383
Lead	69100	ug/kg		95.8	192	383
Zinc	64500	ug/kg		1920	3830	7670

FORM I - IN

I

INORGANIC ANALYSIS DATA SHEET

Report No:	218081814	Client Sample ID:	WIL01IS01
Collect Date:	08/14/18 Time: 1340	GCAL Sample ID:	21808181406
Matrix:	Solid % Solids: 94.08	Instrument ID:	ICPMS2
Sample Amt:	1.26 g	Lab File ID:	2180828B_MS2.b\1852SMPL_2180828A_MS2.D
Prep Vol.:	50 (mL)	Dilution Factor:	10 Analyst: LWZ
Prep Date:	08/25/18	Analysis Date:	08/28/18 Time: 1344
Prep Batch:	642531	Analytical Batch:	642829
Prep Method:	EPA 3050B \ ISM	Analytical Method:	EPA 6020B

ANALYTE	RESULT	UNITS	Q	DL	LOD	LOQ
Antimony	422 US,M	ug/kg	U	211	422	844
Copper	23800	ug/kg		105	211	422
Lead	46500	ug/kg		105	211	422
Zinc	67300	ug/kg		2110	4220	8440

FORM I - IN

I

INORGANIC ANALYSIS DATA SHEET

Report No:	218081814	Client Sample ID:	WIL02IS03
Collect Date:	08/15/18 Time: 1220	GCAL Sample ID:	21808181407
Matrix:	Solid % Solids: 79.69	Instrument ID:	ICPMS2
Sample Amt:	1.34 g	Lab File ID:	2180828B_MS2.b\1853SMPL_2180828A_MS2.D
Prep Vol.:	50 (mL)	Dilution Factor:	10 Analyst: LWZ
Prep Date:	08/25/18	Analysis Date:	08/28/18 Time: 1347
Prep Batch:	642531	Analytical Batch:	642829
Prep Method:	EPA 3050B \ ISM	Analytical Method:	EPA 6020B

ANALYTE	*RESULT*	*UNITS*	*Q*	*DL*	*LOD*	*LOQ*
Antimony	468 UJ,m	ug/kg	U	234	468	936
Copper	35600	ug/kg		117	234	468
Lead	15700	ug/kg		117	234	468
Zinc	81400	ug/kg		2340	4680	9360

FORM I - IN

DATA VALIDATION WORKSHEET

Reviewer: Naoum Tavantzis
Explosives
Date: 10/24/2018
DV Level: **II** **III** **IV**
Review Document:
_X__ USEPA CLP National Functional Guidelines for Superfund Inorganic Methods Data Review
_X__ SW-846/DoD QSM v5.1
_X__ Project QAPP/SAP

Project Name: Williston LTA
Project Number: 60520956
Laboratory: GCAL
SDG No.: 218081812+13+14
Test Name: Explosives
Method No.: 8330B

1.0 Laboratory Deliverables		**Yes**	**No**	**NA**
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	**X**		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	**X**		
1.3	Do sample preservation, collection and storage condition meet method requirement?	**X**		
	If samples were received with the cooler temperature exceeding 10^{O}C, then flag J(+)/UJ(-).			
1.4	Were the sediment samples dryed and sieved appropiately?	**X**		
1.5	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		**X**	

Notes:

2.0 Holding Times		**Yes**	**No**	**NA**
2.1	Have any technical holding times, determined from date of sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-). Extraction: (aqueous) 7 days and (soil) 14 days; and Analysis: 40 days.	**X**		
2.2	Have any technical holding time grossly (twice the holding time) been exceeded? If yes, J(+)/UJ(-) OR R(-) .		**X**	

Notes: The field sample results associated with low LCS percent recoveries were re-extracted after the holding time of 14 days had expired.

3.0 Blanks (Laboratory and Field)						**Yes**	**No**	**NA**
3.1	Were method blanks (MB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix?)					**X**		
3.2	Do any method blanks have positive results? Action: If yes:						**X**	
	Blank Result:	≤LOD		>LOD				
	Sample Result:	≥[LOD]	<[LOD]	<LOD	≥LOD, <[Blank]	≥[LOD], ≥[Blank]		
	Qualification:	[LOD]"U"	Judgement	[LOD]"U"	[Blank]U OR R	Judgement		
3.3	Do any field equipment blanks/trip blanks have positive results? If yes, use same rules above.						**X**	

Notes:

4.0 Initial and Continuing Calibration		Yes	No	NA
4.1	Are the Quartlery LOD establishment forms provided? Is the signal/noise ratio of the LODV greater than 3:1?	X		
4.2	If not, is the determination repeated at a higher concentration?	X		
4.3	Are at least five standards included in the calibration curve? If no, flag "R".	X		
4.4	Was a second source calibration verification analyzed for each calibration curve? If no, flag "R".	X		
4.5	Were continuing calibration standards analyzed every 12 hours or ten samples and at the end of the sequence? If no, flag "R".	X		
4.6	Are all calibration standard %RSD (<15%ICAL, r>0.995), second source (±20%) or %D(≤20%) within the control limits?	X		
For initial calibration: %RSD > 15% J(+) If RRF<0.05 J(+)/R(-)				
For second source: %D>20%, J(+)/R(-).				
For continuing calibration: Positive Bias - %D >+ 20%, J(+), only. Negative Bias - %D>-20%, but<50% J(+)/UJ(-)				

Notes:

5.0 Laboratory Control Sample (LCS)		Yes	No	NA
5.1	Is the LCS/LCSD recovery form present?	X		
5.2	Were LCS/LCSDs analyzed at the required frequency (one per 20 samples per batch) for each matrix?		X	
5.3	Are there any %Rs for LCS/LCSD recoveries outside the QC limits of 80-120%?	X		
	Action: If Yes, for %R > UCL, J(+) only; for %R < LCL,J(+)/R(-);			
5.4	Are there any RPD >20%?	X		
	Action: If Yes, J(+) only.			

Notes: Several LCS recoveries less than the lower QC limits in batch 642698, and recoveries higher than the QC limits in batch 643342. Both batches displayed zero percent recoveries for tetryl. In addition, the LCS/LCSD displayed several relative percent difference (RPD) anomalies greater than the laboratory QC limit of 20%.

6.0 Surrogate Recovery		Yes	No	NA
6.1	Are surrogate recoveries within acceptance criteria for all samples and method blanks?	X		
6.2	If No in Section 6.1, are these sample(s) or method blank(s) reanalyzed?			X
	Action: If any surrogate in the fraction is out of specification, there should be a reanalysis to confirm that the non-compliance is because of sample matrix effects rather than laboratory deficiencies.			
6.3	If No in Section 6.2, is any sample dilution factor greater than 10? (recoveries may be diluted out.)			X
	Action: for a %R > UCL, J(+) only; for a %R < LCL, but > 10%, J(+)/UJ(-); for any %R < 10%, J(+)/R(-).			

Notes:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD)		Yes	No	NA
7.1	Is the matrix spike/matrix spike duplicate recovery form present?	X		
7.2	Were matrix spikes analyzed at required frequency (one per 20 samples per batch) for each matrix?	X		
7.3	Are there any %R for matrix spike and matrix spike duplicate recoveries outside the QC limits?	X		
7.4	Are there any RPDs for matrix spike and matrix spike duplicate recoveries outside the QC limits? Action: %R or % RPD> UCL J(+); %R< LCL: J(+)/UJ(-) [or possible R(-) for <20%] to parent sample results for the specific outlier analyte(s) or class of analytes using professional judgement.	X		

Notes: Matrix spike performed on WIL02DA02A in QC batch 643342 displayed a recovery less than the lower QC limit for HMX; the MS pair performed on WIL02DA02A displayed several RPD anomalies.

8.0 Field Duplicate /Triplicate		Yes	No	NA
8.1	Evaluate field duplicate results For sample results > 5 x RL, a control limit of ≤30% RPD/RSD will be used. For sample results < 5 x RL, a control limit of 2 x RL will be used.	X		

Notes:

9.0 Compound Identification and Detection Limit Verification		Yes	No	NA
9.1	Are any target compounds detected in the field samples? If Yes,are all positive identifications confirmed in second column? Apply J flag if RPD >40% between first and second columns.			X
9.2	Do detection limits meet those required by the project QAPP and were they properly adjusted for dilution factors and moisture (including adjustment of wet weight aliquot)?	X		

Notes:

10.0 Data Completeness		Yes	No	NA
10.1	Is % completeness within the control limits? (Control limit $95\%_{aq}$ and $90\%_{so}$)	X		
10.1.1	Number of samples:_____6_____			
10.1.2	Number of target compounds in each analysis:_____17_____			
10.1.3	Number of results rejected or not reported:_____3_____			
	% Completeness = (10.1.1 x 10.1.2 - 10.1.3) x 100/(10.1.1 x 10.1.2)			
	% Completeness = _____97.1%_____			

Vial	Sample	Dilution	File Number
P1-A-02	1207*2500	1	A000003.D
P1-A-02	1206*1250	1	A000004.D
P1-A-02	1205*1000	1	A000005.D
P1-A-03	1204*500	1	A000006.D
P1-A-03	1203*250	1	A000007.D
P1-A-03	1202*125	1	A000008.D
P1-A-03	1201*50	1	A000009.D
P1-A-04	1600*1000	1	A000010.D
P1-E-07	21807123417	1	A000011.D
P1-E-08	1831319	1	A000012.D
P1-E-09	1831318	1	A000013.D
P1-F-02	21807123418	1	A000014.D
P1-F-03	21807123419	1	A000015.D
P1-F-04	21807123420	1	A000016.D
P1-F-05	21807123421	1	A000017.D
P1-F-06	21807123422	1	A000018.D
P1-F-07	1831320	1	A000019.D
P1-F-08	1831314	1	A000020.D
P1-F-09	1831315	1	A000021.D
P1-A-01	1400*1000	1	A000022.D
P2-A-01	1831831	1	A000023.D
P2-A-02	1831832	1	A000024.D
P2-A-03	1831833	1	A000025.D
P2-A-04	21807132408	1	A000026.D
P2-A-05	21807132410	1	A000027.D
P2-A-06	21807132411	1	A000028.D
P2-A-07	21807132412	1	A000029.D
P2-A-08	21807132413	1	A000030.D
P2-A-09	1831834	1	A000031.D
P2-B-01	1831835	1	A000032.D
P2-B-02	21807132414	1	A000033.D
P2-B-03	21807132415	1	A000034.D
P2-B-04	21807132416	1	A000035.D
P1-A-01	1400*1000	1	A000036.D
P2-B-05	21807132417	1	A000037.D
P2-B-06	1831836	1	A000038.D
P2-B-07	1831837	1	A000039.D
P2-B-08	21807132418	5	A000040.D
P2-B-09	21807132419	1	A000041.D
P2-C-01	21807132421	5	A000042.D
P2-C-02	1831838	1	A000043.D
P2-C-03	1831832	1	A000044.D
P2-C-04	1831833	1	A000045.D
P1-A-01	1400*1000	1	A000046.D

Analyst	MEG
Method	ARCI
CCV	005-45-6
RunDate	7/24/2018

6E

ORGANICS INITIAL CALIBRATION DATA

					GCALID - FileID - Conc	1201 ~ 2180724\A09 ~ 50	
Report No:	218081812		Instrument ID:	HPLC3	1202 ~ 2180724\A08 ~ 125	1203 ~ 2180724\A07 ~ 250	
GC Column:	ID (mm)		Analyst:	MEG	1204 ~ 2180724\A06 ~ 500	1205 ~ 2180724\A05 ~ 1000	
Calib. Date 1:	07/24/18	Time 1: 1355	Analytical Batch:	640653	1206 ~ 2180724\A04 ~ 1250	1207 ~ 2180724\A03 ~ 2500	
Calib. Date 2:	07/24/18	Time 2: 1552	Analytical Method:	EPA 8330B			

ANALYTE	*1201*	*1202*	*1203*	*1204*	*1205*	*1206*	*1207*	*1208*	*1209*	*$\overline{RF}$ / b / A*	*m / B*	*C*	*FIT*	*TYPE*
1,2-Dinitrobenzene	16.7	16.6	16.5	17.4	18.6	18.5	17.5			17.8			11.78	A
1,3,5-Trinitrobenzene	10.9	11.5	11.4	11.1	12.4	12.4	11.9			11.9			11.66	A
1,3-Dinitrobenzene	11.5	12.0	11.4	10.7	12.8	12.7	12.5			12.2			12.12	A
2,4,6-Trinitrotoluene	17.2	16.3	16.4	16.5	18.2	18.1	17.9			17.6			10.85	A
2,4-Dinitrotoluene	12.1	12.0	12.2	13.6	14.1	14.0	13.6			13.5			12.38	A
2,6-Dinitrotoluene	22.7	25.0	25.1	21.1	26.4	26.8	27.1			25.3			13.72	A
2-Amino-4,6-dinitrotoluene	19.0	20.9	20.4	18.9	23.5	23.4	23.2			21.9			14.61	A
2-Nitrotoluene	13.3	13.1	13.5	14.0	15.1	15.1	15.3			14.6			11.90	A
3,5-Dinitroaniline	11.1	10.7	10.7	11.2	11.9	11.8	11.8			11.6			10.28	A
3-Nitrotoluene	11.7	11.5	11.4	12.0	13.0	12.7	13.1			12.5			10.60	A
4-Amino-2,6-dinitrotoluene	28.6	32.3	30.0	35.0	33.3	33.1	33.0			32.9			11.12	A
4-Nitrotoluene	21.1	23.5	24.3	22.2	23.0	23.7	23.8			23.6			10.02	A
HMX	36.9	37.6	39.7	40.7	44.2	43.6	43.9			42.1			12.44	A
Nitrobenzene	18.3	19.7	19.6	19.8	21.6	21.6	21.5			20.8			11.95	A
Nitroglycerin	29.6	29.3	30.7	31.0	34.1	34.1	34.4			32.7			12.34	A
Pentaerythritol Tetranitrate	26.2	27.6	27.5	28.4	30.3	30.6	32.0			29.7			11.85	A
RDX	29.5	30.1	31.0	32.0	34.6	34.6	35.0			33.3			12.36	A
Tetryl	21.6	23.2	23.6	23.3	25.6	25.8	25.5			24.4			12.87	A

FIT = %RSD For Average Curve And Calibration Coefficent For Linear And Quadratic

Curve Types: A - Averged, L - Linear Regression, W - Weighted Linear, Q - Quadratic

For curve types L and Q, the RRF and RSP (Response) are shown on separate lines to allow for evaluation against minimum RRF

$\overline{RF}$ = Mean Response Factor For Average Curve

m,b = Slope and Intercept For Linear Curve

A,B,C = Coefficents For Quadratic Curve

FORM V I SVOA

6I

ORGANICS INITIAL CALIBRATION VERIFICATION

Report No:	218081812	Instrument ID:	HPLC3
Analysis Date:	07/24/18 1612	Lab File ID:	2180724\A10
Analytical Method:	EPA 8330B	Analytical Batch:	640653

ANALYTE	*UNITS*	*TRUE*	*FOUND*	*% REC*	*LCL*	*UCL*	*Q*
1,3,5-Trinitrobenzene	ug/L	1000	1060	106	80	120	
1,3-Dinitrobenzene	ug/L	1000	1050	105	80	120	
2,4,6-Trinitrotoluene	ug/L	1000	1060	106	80	120	
2,4-Dinitrotoluene	ug/L	1000	1070	107	80	120	
2,6-Dinitrotoluene	ug/L	1000	1050	105	80	120	
2-Amino-4,6-dinitrotoluene	ug/L	1000	1030	103	80	120	
2-Nitrotoluene	ug/L	1000	1060	106	80	120	
3,5-Dinitroaniline	ug/L	1000	1060	106	80	120	
3-Nitrotoluene	ug/L	1000	1060	106	80	120	
4-Amino-2,6-dinitrotoluene	ug/L	1000	1100	110	80	120	
4-Nitrotoluene	ug/L	1000	1100	110	80	120	
HMX	ug/L	1000	1070	107	80	120	
Nitrobenzene	ug/L	1000	1080	108	80	120	
Nitroglycerin	ug/L	1000	1050	105	80	120	
Pentaerythritol Tetranitrate	ug/L	1000	1030	103	80	120	
RDX	ug/L	1000	1050	105	80	120	
Tetryl	ug/L	1000	1010	101	80	120	

Vial	Sample	Dilution	File Number
Vial 2	1400*1000	1	A000003.D
P2-A-01	1843189	1	A000004.D
P2-A-02	1843190	1	A000005.D
P2-A-03	1843191	1	A000006.D
P2-A-04	21808241101	1	A000007.D
P2-A-05	1843193	1	A000008.D
P2-A-06	1843192	1	A000009.D
P2-A-07	1843194	1	A000010.D
P2-A-08	1843195	1	A000011.D
P2-A-09	1843196	1	A000012.D
Vial 2	1400*1000	1	A000013.D
P2-B-01	21808172601	1	A000014.D
P2-B-02	21808172602	1	A000015.D
P2-B-03	21808172603	1	A000016.D
P2-B-04	21808172604	1	A000017.D
Vial 2	1400*1000	1	A000018.D
P2-B-06	1843101	1	A000019.D
P2-B-07	1843102	1	A000020.D
P2-B-08	1843103	1	A000021.D
P2-B-09	21808181401	1	A000022.D
P2-C-01	21808181402	1	A000023.D
P2-C-02	21808181403	1	A000024.D
P2-C-03	21808181404	1	A000025.D
P2-C-04	21808181407	1	A000026.D
P2-C-05	1843105	1	A000027.D
P2-C-06	1843104	1	A000028.D
P2-C-07	1843106	1	A000029.D
P2-C-08	1843214	1	A000030.D
P2-C-09	1843215	1	A000031.D
Vial 2	1400*1000	1	A000032.D

Analyst	MEG
Method	ARCI
CCV	005-49-4
RunDate	8/30/2018

7E

ORGANICS CONTINUING CALIBRATION CHECK

Report No:	218081812			CCAL ID:	1400
GC Column:	ARC18	ID	3 (mm)	Instrument ID:	HPLC3
Injection Vol.:	1.0		(µL)	Lab File ID:	2180830\A03
Init. Calib. Date 1:	07/24/18	Time 1:	1355	Analyst:	MEG
Init. Calib. Date 2:	07/24/18	Time 2:	1552	Analytical Batch:	643050
Analysis Date:	08/30/18	Time:	1116	Analytical Method:	EPA 8330B

ANALYTE	*TRUE*	*CONC*	*RRF*	*RRF CCV*	*Min RRF*	*%D/%Drift*	*Max %D/ %Drift*	*TYPE*	*Q*
1,2-Dinitrobenzene	1000	1156	17.8	15.2	NA	-14.6	20	A	
1,3,5-Trinitrobenzene	1000	1037	11.9	11.4	NA	-4.2	20	A	
1,3-Dinitrobenzene	1000	995.7	12.2	12.1	NA	-.8	20	A	
2,4,6-Trinitrotoluene	1000	1061	17.6	16.5	NA	-6.3	20	A	
2,4-Dinitrotoluene	1000	986.4	13.5	13.5	NA	0	20	A	
2,6-Dinitrotoluene	1000	976.3	25.3	25.6	NA	1.2	20	A	
2-Amino-4,6-dinitrotoluene	1000	960.0	21.9	22.4	NA	2.3	20	A	
2-Nitrotoluene	1000	866.8	14.6	16.6	NA	13.7	20	A	
3,5-Dinitroaniline	1000	970.9	11.6	11.9	NA	2.6	20	A	
3-Nitrotoluene	1000	890.7	12.5	13.9	NA	11.2	20	A	
4-Amino-2,6-dinitrotoluene	1000	1033	32.9	31.6	NA	-4	20	A	
4-Nitrotoluene	1000	921.0	23.6	25.4	NA	7.6	20	A	
HMX	1000	958.3	42.1	43.4	NA	3.1	20	A	
Nitrobenzene	1000	858.6	20.8	23.9	NA	14.9	20	A	
Nitroglycerin	1000	989.0	32.7	32.7	NA	0	20	A	
Pentaerythritol Tetranitrate	1000	1021	29.7	28.8	NA	-3	20	A	
RDX	1000	961.8	33.3	34.2	NA	2.7	20	A	
Tetryl	1000	972.3	24.4	24.8	NA	1.6	20	A	

FORM V II SV

7E

ORGANICS CONTINUING CALIBRATION CHECK

Report No:	218081812			CCAL ID:	1400
GC Column:	ARC18	ID	3 (mm)	Instrument ID:	HPLC3
Injection Vol.:	1.0		(µL)	Lab File ID:	2180830\A13
Init. Calib. Date 1:	07/24/18	Time 1:	1355	Analyst:	MEG
Init. Calib. Date 2:	07/24/18	Time 2:	1552	Analytical Batch:	643050
Analysis Date:	08/30/18	Time:	1443	Analytical Method:	EPA 8330B

ANALYTE	TRUE	CONC	$\overline{RRF}$	RRF CCV	Min RRF	%D/%Drift	Max %D/ %Drift	TYPE	Q
1,2-Dinitrobenzene	1000	1108	17.8	15.9	NA	-10.7	20	A	
1,3,5-Trinitrobenzene	1000	992.1	11.9	11.9	NA	0	20	A	
1,3-Dinitrobenzene	1000	952.0	12.2	12.7	NA	4.1	20	A	
2,4,6-Trinitrotoluene	1000	965.8	17.6	18.1	NA	2.8	20	A	
2,4-Dinitrotoluene	1000	937.7	13.5	14.2	NA	5.2	20	A	
2,6-Dinitrotoluene	1000	933.9	25.3	26.7	NA	5.5	20	A	
2-Amino-4,6-dinitrotoluene	1000	906.6	21.9	23.7	NA	8.2	20	A	
2-Nitrotoluene	1000	935.7	14.6	15.4	NA	5.5	20	A	
3,5-Dinitroaniline	1000	929.8	11.6	12.4	NA	6.9	20	A	
3-Nitrotoluene	1000	953.7	12.5	13.0	NA	4	20	A	
4-Amino-2,6-dinitrotoluene	1000	993.7	32.9	32.8	NA	-.3	20	A	
4-Nitrotoluene	1000	991.7	23.6	23.6	NA	0	20	A	
HMX	1000	916.9	42.1	45.3	NA	7.6	20	A	
Nitrobenzene	1000	928.8	20.8	22.1	NA	6.3	20	A	
Nitroglycerin	1000	945.8	32.7	34.2	NA	4.6	20	A	
Pentaerythritol Tetranitrate	1000	1008	29.7	29.2	NA	-1.7	20	A	
RDX	1000	924.8	33.3	35.6	NA	6.9	20	A	
Tetryl	1000	1021	24.4	23.6	NA	-3.3	20	A	

FORM V II SV

7E

ORGANICS CONTINUING CALIBRATION CHECK

Report No:	218081814			CCAL ID:	1400
GC Column:	ARC18	ID 3	(mm)	Instrument ID:	HPLC3
Injection Vol.:	1.0		(µL)	Lab File ID:	2180830\A18
Init. Calib. Date 1:	07/24/18	Time 1:	1355	Analyst:	MEG
Init. Calib. Date 2:	07/24/18	Time 2:	1552	Analytical Batch:	643050
Analysis Date:	08/30/18	Time:	1622	Analytical Method:	EPA 8330B

ANALYTE	TRUE	CONC	RRF	RRF CCV	Min RRF	%D/%Drift	Max %D/ %Drift	TYPE	Q
1,2-Dinitrobenzene	1000	1112	17.8	15.8	NA	-11.2	20	A	
1,3,5-Trinitrobenzene	1000	998.5	11.9	11.8	NA	-.8	20	A	
1,3-Dinitrobenzene	1000	957.2	12.2	12.6	NA	3.3	20	A	
2,4,6-Trinitrotoluene	1000	983.1	17.6	17.8	NA	1.1	20	A	
2,4-Dinitrotoluene	1000	938.4	13.5	14.2	NA	5.2	20	A	
2,6-Dinitrotoluene	1000	942.0	25.3	26.5	NA	4.7	20	A	
2-Amino-4,6-dinitrotoluene	1000	904.0	21.9	23.8	NA	8.7	20	A	
2-Nitrotoluene	1000	961.0	14.6	15.0	NA	2.7	20	A	
3,5-Dinitroaniline	1000	919.0	11.6	12.5	NA	7.8	20	A	
3-Nitrotoluene	1000	958.6	12.5	12.9	NA	3.2	20	A	
4-Amino-2,6-dinitrotoluene	1000	969.2	32.9	33.6	NA	2.1	20	A	
4-Nitrotoluene	1000	1014	23.6	23.1	NA	-2.1	20	A	
HMX	1000	916.4	42.1	45.3	NA	7.6	20	A	
Nitrobenzene	1000	937.6	20.8	21.9	NA	5.3	20	A	
Nitroglycerin	1000	941.9	32.7	34.3	NA	4.9	20	A	
Pentaerythritol Tetranitrate	1000	990.1	29.7	29.7	NA	0	20	A	
RDX	1000	901.8	33.3	36.5	NA	9.6	20	A	
Tetryl	1000	990.2	24.4	24.4	NA	0	20	A	

FORM V II SV

7E

ORGANICS CONTINUING CALIBRATION CHECK

Report No:	218081814			CCAL ID:	1400
GC Column:	ARC18	ID 3	(mm)	Instrument ID:	HPLC3
Injection Vol.:	1.0		(µL)	Lab File ID:	2180830\A32
Init. Calib. Date 1:	07/24/18	Time 1:	1355	Analyst:	MEG
Init. Calib. Date 2:	07/24/18	Time 2:	1552	Analytical Batch:	643050
Analysis Date:	08/30/18	Time:	2058	Analytical Method:	EPA 8330B

ANALYTE	*TRUE*	*CONC*	*$\overline{RRF}$*	*RRF CCV*	*Min RRF*	*%D/%Drift*	*Max %D/ %Drift*	*TYPE*	*Q*
1,2-Dinitrobenzene	1000	1141	17.8	15.4	NA	-13.5	20	A	
1,3,5-Trinitrobenzene	1000	1003	11.9	11.8	NA	-.8	20	A	
1,3-Dinitrobenzene	1000	979.0	12.2	12.3	NA	.8	20	A	
2,4,6-Trinitrotoluene	1000	976.1	17.6	17.9	NA	1.7	20	A	
2,4-Dinitrotoluene	1000	892.0	13.5	14.9	NA	10.4	20	A	
2,6-Dinitrotoluene	1000	1012	25.3	24.6	NA	-2.8	20	A	
2-Amino-4,6-dinitrotoluene	1000	919.1	21.9	23.4	NA	6.8	20	A	
2-Nitrotoluene	1000	937.8	14.6	15.4	NA	5.5	20	A	
3,5-Dinitroaniline	1000	925.7	11.6	12.4	NA	6.9	20	A	
3-Nitrotoluene	1000	925.8	12.5	13.4	NA	7.2	20	A	
4-Amino-2,6-dinitrotoluene	1000	969.1	32.9	33.6	NA	2.1	20	A	
4-Nitrotoluene	1000	963.8	23.6	24.3	NA	3	20	A	
HMX	1000	919.8	42.1	45.2	NA	7.4	20	A	
Nitrobenzene	1000	914.0	20.8	22.5	NA	8.2	20	A	
Nitroglycerin	1000	939.2	32.7	34.4	NA	5.2	20	A	
Pentaerythritol Tetranitrate	1000	958.4	29.7	30.7	NA	3.4	20	A	
RDX	1000	923.1	33.3	35.6	NA	6.9	20	A	
Tetryl	1000	981.3	24.4	24.6	NA	.8	20	A	

FORM V II SV

Vial	Sample	Dilution	File Number
Vial 2	1400*1000	1	A000004.D
P2-A-01	1845522	1	A000010.D
P2-A-02	1845523	1	A000011.D
P2-A-03	1845524	1	A000012.D
P2-A-04	21808311301	1	A000013.D
P2-A-05	1845525	1	A000014.D
P2-A-06	1845526	1	A000015.D
P2-A-07	1845527	1	A000016.D
P2-A-08	1845523	1	A000017.D
P2-A-09	1845524	1	A000021.D
P2-B-09	21808220401	1	A000022.D
Vial 2	1400*1000	1	A000023.D
P2-B-01	21808241301	1	A000024.D
P2-B-02	21808241302	1	A000025.D
P2-B-04	21808242301	1	A000026.D
P2-B-05	1843500	1	A000027.D
P2-B-06	1843499	1	A000028.D
P2-B-07	21808242302	1	A000029.D
P2-B-08	21808242303	1	A000030.D
Vial 2	1400*1000	1	A000031.D
P2-C-01	21808240301	1	A000032.D
P2-C-02	21808240302	1	A000033.D
P2-C-03	21808240303	1	A000034.D
P2-C-04	21808240304	1	A000035.D
P2-C-05	21808240305	1	A000036.D
P2-C-06	21808240306	1	A000037.D
P2-C-07	21808240307	1	A000038.D
P2-C-08	21808240308	1	A000039.D
P2-D-01	21808172301	1	A000040.D
Vial 2	1400*1000	1	A000041.D
P2-D-02	21808172302	1	A000042.D
P2-D-03	21808172303	1	A000043.D
P2-D-04	21808172304	1	A000044.D
P2-D-05	21808172305	1	A000045.D
P2-D-06	21808172306	1	A000046.D
P2-D-07	21808172307	1	A000047.D
P2-D-08	21808172308	1	A000048.D
P2-D-09	21808172309	1	A000049.D
P2-E-01	21808172310	1	A000050.D
P2-E-02	21808172311	1	A000051.D
Vial 2	1400*1000	1	A000052.D
P2-E-03	21808172312	1	A000053.D
P2-E-04	21808172313	1	A000054.D
P2-E-05	21808172314	1	A000055.D
P2-E-06	21808172315	1	A000056.D
P2-E-07	21808172316	1	A000057.D

P2-E-08	21808172317	1	A000058.D
P2-E-09	21808172318	1	A000059.D
P2-F-01	21808172319	1	A000060.D
P2-F-02	21808172320	1	A000061.D
P2-F-03	21808172321	1	A000062.D
Vial 2	1400*1000	1	A000063.D
P1-A-01	21808181206	1	A000064.D
P1-A-02	21808181207	1	A000065.D
P1-A-03	21808181208	1	A000066.D
P1-A-04	21808181209	1	A000067.D
P1-A-05	21808181210	1	A000068.D
P1-A-06	1846370	1	A000069.D
P1-A-07	1846371	1	A000070.D
P1-A-08	1846372	1	A000071.D
P1-A-09	21808181213	1	A000072.D
P1-B-01	21808181214	1	A000073.D
P1-B-02	21808181215	1	A000074.D
P1-B-03	21808181216	1	A000075.D
P1-B-04	21808181217	1	A000076.D
P1-B-05	1846373	1	A000077.D
P1-B-06	1846374	1	A000078.D
P1-B-07	1846375	1	A000079.D
P1-B-08	1846376	1	A000080.D
P1-B-09	1846377	1	A000081.D
Vial 2	1400*1000	1	A000082.D
P2-F-06	1845471	1	A000083.D
P2-F-07	1845472	1	A000084.D
P2-F-08	1845473	1	A000085.D
P2-F-09	21808302601	1	A000086.D
Vial 2	1400*1000	1	A000087.D

Analyst	MEG
Method	ARCI
CCV	005-49-9
RunDate	9/12/2018

7E

ORGANICS CONTINUING CALIBRATION CHECK

Report No:	218081812			CCAL ID:	1400
GC Column:	ARC18	ID 3	(mm)	Instrument ID:	HPLC3
Injection Vol.:	1.0		(µL)	Lab File ID:	2180912\A63
Init. Calib. Date 1:	07/24/18	Time 1:	1355	Analyst:	MEG
Init. Calib. Date 2:	07/24/18	Time 2:	1552	Analytical Batch:	643776
Analysis Date:	09/13/18	Time:	0520	Analytical Method:	EPA 8330B

ANALYTE	*TRUE*	*CONC*	*RRF*	*RRF CCV*	*Min RRF*	*%D/%Drift*	*Max %D/ %Drift*	*TYPE*	*Q*
1,2-Dinitrobenzene	1000	1168	17.8	15.1	NA	-15.2	20	A	
1,3,5-Trinitrobenzene	1000	1128	11.9	10.5	NA	-11.8	20	A	
1,3-Dinitrobenzene	1000	1083	12.2	11.2	NA	-8.2	20	A	
2,4,6-Trinitrotoluene	1000	1150	17.6	15.2	NA	-13.6	20	A	
2,4-Dinitrotoluene	1000	992.5	13.5	13.4	NA	-.7	20	A	
2,6-Dinitrotoluene	1000	1059	25.3	23.6	NA	-6.7	20	A	
2-Amino-4,6-dinitrotoluene	1000	980.6	21.9	21.9	NA	0	20	A	
2-Nitrotoluene	1000	954.5	14.6	15.1	NA	3.4	20	A	
3,5-Dinitroaniline	1000	1017	11.6	11.3	NA	-2.6	20	A	
3-Nitrotoluene	1000	899.2	12.5	13.8	NA	10.4	20	A	
4-Amino-2,6-dinitrotoluene	1000	1117	32.9	29.2	NA	-11.2	20	A	
4-Nitrotoluene	1000	882.8	23.6	26.5	NA	12.3	20	A	
HMX	1000	1035	42.1	40.1	NA	-4.8	20	A	
Nitrobenzene	1000	939.4	20.8	21.9	NA	5.3	20	A	
Nitroglycerin	1000	1071	32.7	30.2	NA	-7.6	20	A	
Pentaerythritol Tetranitrate	1000	1132	29.7	26.0	NA	-12.5	20	A	
RDX	1000	1024	33.3	32.1	NA	-3.6	20	A	
Tetryl	1000	935.7	24.4	25.8	NA	5.7	20	A	

FORM V II SV

7E

ORGANICS CONTINUING CALIBRATION CHECK

Report No:	218081812			CCAL ID:	1400
GC Column:	ARC18	ID	3 (mm)	Instrument ID:	HPLC3
Injection Vol.:	1.0		(µL)	Lab File ID:	2180912\A82
Init. Calib. Date 1:	07/24/18	Time 1:	1355	Analyst:	MEG
Init. Calib. Date 2:	07/24/18	Time 2:	1552	Analytical Batch:	643776
Analysis Date:	09/13/18	Time:	1135	Analytical Method:	EPA 8330B

ANALYTE	*TRUE*	*CONC*	*RRF*	*RRF CCV*	*Min RRF*	*%D/%Drift*	*Max %D/ %Drift*	*TYPE*	*Q*
1,2-Dinitrobenzene	1000	1130	17.8	15.6	NA	-12.4	20	A	
1,3,5-Trinitrobenzene	1000	1083	11.9	10.9	NA	-8.4	20	A	
1,3-Dinitrobenzene	1000	1081	12.2	11.2	NA	-8.2	20	A	
2,4,6-Trinitrotoluene	1000	1108	17.6	15.8	NA	-10.2	20	A	
2,4-Dinitrotoluene	1000	921.8	13.5	14.4	NA	6.7	20	A	
2,6-Dinitrotoluene	1000	1037	25.3	24.1	NA	-4.7	20	A	
2-Amino-4,6-dinitrotoluene	1000	987.5	21.9	21.8	NA	-.5	20	A	
2-Nitrotoluene	1000	969.2	14.6	14.9	NA	2.1	20	A	
3,5-Dinitroaniline	1000	1037	11.6	11.1	NA	-4.3	20	A	
3-Nitrotoluene	1000	827.4	12.5	15.0	NA	20	20	A	
4-Amino-2,6-dinitrotoluene	1000	1139	32.9	28.6	NA	-13.1	20	A	
4-Nitrotoluene	1000	1033	23.6	22.7	NA	-3.8	20	A	
HMX	1000	1031	42.1	40.3	NA	-4.3	20	A	
Nitrobenzene	1000	1078	20.8	19.1	NA	-8.2	20	A	
Nitroglycerin	1000	1083	32.7	29.9	NA	-8.6	20	A	
Pentaerythritol Tetranitrate	1000	1100	29.7	26.7	NA	-10.1	20	A	
RDX	1000	1012	33.3	32.5	NA	-2.4	20	A	
Tetryl	1000	1115	24.4	21.7	NA	-11.1	20	A	

FORM V II SV

EPA 8330B REPLICATE SUMMARY

Report No:	218081812	Parent Sample ID:	WIL02DA01B (RE)
Prep Method:	EPA 8330B	Parent GCAL ID:	21808181217
Prep Date:	9/5/2018 6:51:00 PM	Prep Batch:	643342
Analytical Method:	EPA 8330B		

ANALYTE	*CAS*	*UNITS*	*PARENT RESULT*	*REP #1 RESULT (1846373)*	*REP #2 RESULT (1846374)*	*%RSD*	*#*
1,3,5-Trinitrobenzene	99-35-4	ug/Kg	0	0	0	0	
1,3-Dinitrobenzene	99-65-0	ug/Kg	0	0	0	0	
2,4,6-Trinitrotoluene	118-96-7	ug/Kg	0	0	0	0	
2,4-Dinitrotoluene	121-14-2	ug/Kg	0	0	0	0	
2,6-Dinitrotoluene	606-20-2	ug/Kg	0	0	0	0	
2-Amino-4,6-dinitrotoluene	35572-78-2	ug/Kg	0	0	0	0	
2-Nitrotoluene	88-72-2	ug/Kg	0	0	0	0	
3,5-Dinitroaniline	618-87-1	ug/Kg	0	0	0	0	
3-Nitrotoluene	99-08-1	ug/Kg	0	0	0	0	
4-Amino-2,6-dinitrotoluene	19406-51-0	ug/Kg	0	0	0	0	
4-Nitrotoluene	99-99-0	ug/Kg	0	0	0	0	
HMX	2691-41-0	ug/Kg	0	0	0	0	
Nitrobenzene	98-95-3	ug/Kg	0	0	0	0	
Nitroglycerin	55-63-0	ug/Kg	0	0	0	0	
Pentaerythritol Tetranitrate	78-11-5	ug/Kg	0	0	0	0	
RDX	121-82-4	ug/Kg	0	0	0	0	
Tetryl	479-45-8	ug/Kg	0	0	0	0	

*** - RSD greater than 20%**

2F

ORGANIC SURROGATE RECOVERY

Report No: 218081812 Analytical Method: EPA 8330B

Client Sample ID	GCALSample ID	SMC1	#	SMC2	#	SMC3	#	SMC4	#	TOT OUT
WIL02DA02A	21808181206	106								0
WIL02DA02A MS	21808181207	111								0
WIL02DA02A MSD	21808181208	105								0
WIL02DA01A	21808181209	104								0
WIL02DA01B	21808181210	106								0
WIL02DA02A (RE)	21808181213	103								0
WIL02DA02A MS (RE)	21808181214	98								0
WIL02DA02A MSD (RE)	21808181215	112								0
WIL02DA01A (RE)	21808181216	97								0
WIL02DA01B (RE)	21808181217	96								0
MB1843189	1843189	71								0
LCS1843190	1843190	64								0
LCSD1843191	1843191	45	*							1
GRBLK for HBN 642698 [EXTO/549	1843194	83								0
MB1846370	1846370	114								0
LCS1846371	1846371	96								0
LCSD1846372	1846372	100								0
WIL02DA01B (RE)DUP	1846373	107								0
WIL02DA01B (RE)DUP	1846374	108								0
GRBLK for HBN 643342 [EXTO/550	1846375	107								0

QC LIMITS

SMC 1 :	1,2-Dinitrobenzene	50	150
SMC 2 :			
SMC 3 :			
SMC 4 :			

Column to be used to flag recovery limits

* Value outside of QC limits

D Surrogate diluted out

FORM II ORG-2

4C

ORGANIC METHOD BLANK SUMMARY

Report No:	218081812	Method Blank ID:	1843189
Matrix:	Solid	Instrument ID:	HPLC3
Sample Amt:	10 g	Lab File ID:	2180830\A04
Injection Vol.:	1.0 (µL)	GC Column:	ARC18 ID 3 (mm)
Prep Final Vol.:	40000 (µL)	Dilution Factor:	1 Analyst: MEG
Prep Date:	08/25/18	Analysis Date:	08/30/18 Time: 1145
Prep Batch:	642698	Analytical Batch:	643050
Prep Method:	8330B	Analytical Method:	EPA 8330B

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD

	CLIENT SAMPLE ID	GCAL SAMPLE ID	DATE ANALYZED	TIME ANALYZED	INSTRUMENT ID
1.	LCS1843190	1843190	08/30/18	1205	HPLC3
2.	LCSD1843191	1843191	08/30/18	1225	HPLC3
3.	GRBLK for HBN 642698 [EXTO/549	1843194	08/30/18	1344	HPLC3
4.	WIL02DA02A	21808181206	09/13/18	0540	HPLC3
5.	WIL02DA02A MS	21808181207	09/13/18	0559	HPLC3
6.	WIL02DA02A MSD	21808181208	09/13/18	0619	HPLC3
7.	WIL02DA01A	21808181209	09/13/18	0639	HPLC3
8.	WIL02DA01B	21808181210	09/13/18	0659	HPLC3

FORM IV ORGANIC

GCAL ANALYTICAL LABORATORIES, LLC

8330B Explosives Prep Solid

* 6 4 2 6 9 8 *

ANALYST/ TECH	DWB	START DATE/TIME	8/25/18 1649	END DATE/TIME	8/26/18 1502	BATCH	642698

#	CLIENT	TYPE	CLIENT ID	GCAL ID	INITIAL WGT (g)	FINAL VOL (mL)	COMMENT	STANDARDS\ REAGENTS
1	QC	MB	MB 1843189	1843189	10.0	40.0		8330 Surrogate 4/10ug/ml / Volume 1.0ml
2	QC	LCS	SRM 1843190 ** Use SRM **	1843190	10.0	40.0		703-27-9
3	QC	LCSD	SRMD 1843191 ** Use SRM **	1843191	10.0	40.0		8330 Spike 4/10ug/ml / Volume 1.0ml
4	4838	SAMP	WIL02DB02A	21808181204	10.1	40.0		703-23-1
5	4838	SAMP	WIL02DB01A	21808181205	10.0	40.0		Solid Reference Material
6	4838	SAMP	WIL02DA02A	21808181206	10.3	40.0		2/01150
7	4838	MS	WIL02DA02A MS	21808181207	10.0	40.0		HPLC Water
8	4838	MSD	WIL02DA02A MSD	21808181208	10.5	40.0		
9	4838	SAMP	WIL02DA01A	21808181209	10.5	40.0		Acetonitrile
10	4838	SAMP	WIL02DA01B	21808181210	10.0	40.0		2/270154
11	4612	SAMP	ADA-20X38-A03-SP07...	21808241101	10.1	40.0		Sand
12	QC	DUP	DUP 1843193	1843193	10.1	40.0		
13	QC	DUP	DUP 1843192	1843192	10.5	40.0		
14	QC	GRBLK	GRBLK 1843194	1843194	10.0	40.0		
15	QC	LCS	SRM 1843195 ** Use SRM **	1843195	10.0	40.0		
16	QC	LCSD	SRMD 1843196 ** Use SRM **	1843196	10.0	40.0		
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

EQUIPMENT\CONDITIONS

BALANCE ID	03	GRINDER ID - PUCK 01	

NOTES

Matrix-Solid. Batch Batch Rule 8330B_S_EX.

1D

ORGANICS ANALYSIS DATA SHEET

Report No:	218081812	Client Sample ID:	MB1843189
Collect Date:	NA Time: NA	GCAL Sample ID:	1843189
Matrix:	Solid % Moisture: NA	Instrument ID:	HPLC3
Sample Amt:	10 g	Lab File ID:	2180830\A04
Injection Vol.:	1.0 (µL)	GC Column:	ARC18 ID 3 (mm)
Prep Final Vol.:	40000 (µL)	Dilution Factor:	1 Analyst: MEG
Prep Date:	08/25/18	Analysis Date:	08/30/18 Time: 1145
Prep Batch:	642698	Analytical Batch:	643050
Prep Method:	8330B	Analytical Method:	EPA 8330B

CONCENTRATION UNITS: ug/kg

CAS	ANALYTE	RESULT	Q	DL	LOD	LOQ
99-35-4	1,3,5-Trinitrobenzene	100	U	42.0	100	200
99-65-0	1,3-Dinitrobenzene	100	U	77.0	100	200
118-96-7	2,4,6-Trinitrotoluene	100	U	51.0	100	200
121-14-2	2,4-Dinitrotoluene	100	U	99.0	100	200
606-20-2	2,6-Dinitrotoluene	100	U	61.0	100	200
35572-78-2	2-Amino-4,6-dinitrotoluene	100	U	98.0	100	200
88-72-2	2-Nitrotoluene	100	U	64.0	100	200
618-87-1	3,5-Dinitroaniline	100	U	83.0	100	200
99-08-1	3-Nitrotoluene	150	U	125	150	200
19406-51-0	4-Amino-2,6-dinitrotoluene	100	U	77.0	100	200
99-99-0	4-Nitrotoluene	100	U	77.0	100	200
2691-41-0	HMX	100	U	26.0	100	200
98-95-3	Nitrobenzene	100	U	36.0	100	200
55-63-0	Nitroglycerin	100	U	74.0	100	200
78-11-5	Pentaerythritol Tetranitrate	150	U	122	150	200
121-82-4	RDX	100	U	18.0	100	200
479-45-8	Tetryl	100	U	41.0	100	200

FORM I ORG-1

1D

ORGANICS ANALYSIS DATA SHEET

Report No:	218081812	Client Sample ID:	GRBLK for HBN 642698 [EXTO/549
Collect Date:	NA Time: NA	GCAL Sample ID:	1843194
Matrix:	Solid % Moisture: NA	Instrument ID:	HPLC3
Sample Amt:	10 g	Lab File ID:	2180830\A10
Injection Vol.:	1.0 (µL)	GC Column:	ARC18 ID 3 (mm)
Prep Final Vol.:	40000 (µL)	Dilution Factor:	1 Analyst: MEG
Prep Date:	08/25/18	Analysis Date:	08/30/18 Time: 1344
Prep Batch:	642698	Analytical Batch:	643050
Prep Method:	8330B	Analytical Method:	EPA 8330B

CONCENTRATION UNITS: ug/kg

CAS	ANALYTE	RESULT	Q	DL	LOD	LOQ
99-35-4	1,3,5-Trinitrobenzene	100	U	42.0	100	200
99-65-0	1,3-Dinitrobenzene	100	U	77.0	100	200
118-96-7	2,4,6-Trinitrotoluene	100	U	51.0	100	200
121-14-2	2,4-Dinitrotoluene	100	U	99.0	100	200
606-20-2	2,6-Dinitrotoluene	100	U	61.0	100	200
35572-78-2	2-Amino-4,6-dinitrotoluene	100	U	98.0	100	200
88-72-2	2-Nitrotoluene	100	U	64.0	100	200
618-87-1	3,5-Dinitroaniline	100	U	83.0	100	200
99-08-1	3-Nitrotoluene	150	U	125	150	200
19406-51-0	4-Amino-2,6-dinitrotoluene	100	U	77.0	100	200
99-99-0	4-Nitrotoluene	100	U	77.0	100	200
2691-41-0	HMX	100	U	26.0	100	200
98-95-3	Nitrobenzene	100	U	36.0	100	200
55-63-0	Nitroglycerin	100	U	74.0	100	200
78-11-5	Pentaerythritol Tetranitrate	150	U	122	150	200
121-82-4	RDX	100	U	18.0	100	200
479-45-8	Tetryl	100	U	41.0	100	200

FORM I ORG-1

3F

SOIL ORGANICS LCS/LCSD RECOVERY

Report No: 218081812

Prep Method: 8330B | Prep Batch: 642698

Analytical Method: EPA 8330B | Analytical Batch: 643050

GCAL QC ID: 1843190

ANALYTE	*UNITS*	*SPIKE ADDED*	*SAMPLE RESULT*	*LCS RESULT*	*LCS % REC*	#	*QC LIMITS*
1,3,5-Trinitrobenzene	ug/kg	2050	0	971	47	*	80 - 116
1,3-Dinitrobenzene	ug/kg	1520	0	755	50	*	73 - 119
2,4,6-Trinitrotoluene	ug/kg	1400	0	584	42	*	71 - 120
2,4-Dinitrotoluene	ug/kg	1610	0	424	26	*	75 - 121
2,6-Dinitrotoluene	ug/kg	1200	0	1250	105		79 - 117
2-Amino-4,6-dinitrotoluene	ug/kg	1260	0	469	37	*	71 - 123
2-Nitrotoluene	ug/kg	4080	0	1810	44	*	84 - 120
3,5-Dinitroaniline	ug/kg	3910	0	1530	39	*	86 - 118
3-Nitrotoluene	ug/kg	1750	0	739	42	*	67 - 129
4-Amino-2,6-dinitrotoluene	ug/kg	2600	0	987	38	*	64 - 127
4-Nitrotoluene	ug/kg	652	0	305	47	*	71 - 124
HMX	ug/kg	3500	0	1350	39	*	74 - 124
Nitrobenzene	ug/kg	3390	0	1320	39	*	80 - 128
Nitroglycerin	ug/kg	4600	0	1710	37	*	73 - 124
Pentaerythritol Tetranitrate	ug/kg	3100	0	957	31	*	72 - 128
RDX	ug/kg	1200	0	506	42	*	67 - 129
Tetryl	ug/kg	100	0	0	0	*	68 - 135

RPD : 3 out of 17 outside limits

Spike Recovery: 33 out of 34 outside limits

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

FORM III ORG-1

3F

SOIL ORGANICS LCS/LCSD RECOVERY

Report No: 218081812

Prep Method: 8330B | Prep Batch: 642698

Analytical Method: EPA 8330B | Analytical Batch: 643050

GCAL QC ID: 1843191

ANALYTE	*UNITS*	*SPIKE ADDED*	*LCSD RESULT*	*LCSD % REC*	#	*% RPD*	#	*QC LIMITS REC*	*QC LIMITS RPD*
1,3,5-Trinitrobenzene	ug/kg	2050	842	41	*	14		80 - 116	0 - 20
1,3-Dinitrobenzene	ug/kg	1520	657	43	*	14		73 - 119	0 - 20
2,4,6-Trinitrotoluene	ug/kg	1400	542	39	*	8		71 - 120	0 - 20
2,4-Dinitrotoluene	ug/kg	1610	519	32	*	20		75 - 121	0 - 20
2,6-Dinitrotoluene	ug/kg	1200	673	56	*	60	*	79 - 117	0 - 20
2-Amino-4,6-dinitrotoluene	ug/kg	1260	430	34	*	9		71 - 123	0 - 20
2-Nitrotoluene	ug/kg	4080	1450	35	*	22	*	84 - 120	0 - 20
3,5-Dinitroaniline	ug/kg	3910	1340	34	*	14		86 - 118	0 - 20
3-Nitrotoluene	ug/kg	1750	607	35	*	20		67 - 129	0 - 20
4-Amino-2,6-dinitrotoluene	ug/kg	2600	886	34	*	11		64 - 127	0 - 20
4-Nitrotoluene	ug/kg	652	392	60	*	25	*	71 - 124	0 - 20
HMX	ug/kg	3500	1190	34	*	13		74 - 124	0 - 20
Nitrobenzene	ug/kg	3390	1140	34	*	15		80 - 128	0 - 20
Nitroglycerin	ug/kg	4600	1460	32	*	16		73 - 124	0 - 20
Pentaerythritol Tetranitrate	ug/kg	3100	915	30	*	4		72 - 128	0 - 20
RDX	ug/kg	1200	499	42	*	1		67 - 129	0 - 20
Tetryl	ug/kg	100	0	0	*	0		68 - 135	0 - 20

RPD : 3 out of 17 outside limits

Spike Recovery: 33 out of 34 outside limits

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

FORM III ORG-1

3F

SOIL ORGANICS MS/MSD RECOVERY

Report No:	218081812	Parent Sample ID:	WIL02DA02A
Prep Method:	8330B	Prep Batch:	642698
Analytical Method:	EPA 8330B	Analytical Batch:	643776

GCAL QC ID: 21808181207

ANALYTE	*UNITS*	*SPIKE ADDED*	*SAMPLE RESULT*	*MS RESULT*	*MS % REC*	#	*QC LIMITS*
1,3,5-Trinitrobenzene	ug/kg	1000	0	1090	109		80 - 116
1,3-Dinitrobenzene	ug/kg	1000	0	1090	109		73 - 119
2,4,6-Trinitrotoluene	ug/kg	1000	0	1060	106		71 - 120
2,4-Dinitrotoluene	ug/kg	1000	0	1060	106		75 - 121
2,6-Dinitrotoluene	ug/kg	1000	0	1100	110		79 - 117
2-Amino-4,6-dinitrotoluene	ug/kg	1000	0	997	100		71 - 123
2-Nitrotoluene	ug/kg	1000	0	1130	113		84 - 120
3,5-Dinitroaniline	ug/kg	1000	0	1040	104		86 - 118
3-Nitrotoluene	ug/kg	1000	0	1040	104		67 - 129
4-Amino-2,6-dinitrotoluene	ug/kg	1000	0	1050	105		64 - 127
4-Nitrotoluene	ug/kg	1000	0	1120	112		71 - 124
HMX	ug/kg	1000	0	986	99		74 - 124
Nitrobenzene	ug/kg	1000	0	1010	101		80 - 128
Nitroglycerin	ug/kg	1000	0	977	98		73 - 124
Pentaerythritol Tetranitrate	ug/kg	1000	0	987	99		72 - 128
RDX	ug/kg	1000	0	917	92		67 - 129
Tetryl	ug/kg	1000	0	1030	103		68 - 135

RPD : 3 out of 17 outside limits

Spike Recovery: 0 out of 34 outside limits

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

FORM III ORG-1

3F

SOIL ORGANICS MS/MSD RECOVERY

Report No:	218081812	Parent Sample ID:	WIL02DA02A
Prep Method:	8330B	Prep Batch:	642698
Analytical Method:	EPA 8330B	Analytical Batch:	643776

GCAL QC ID: 21808181208

ANALYTE	UNITS	SPIKE ADDED	MSD RESULT	MSD % REC	#	% RPD	#	QC LIMITS REC	QC LIMITS RPD
1,3,5-Trinitrobenzene	ug/kg	952	1080	114		.6		80 - 116	0 - 20
1,3-Dinitrobenzene	ug/kg	952	1070	112		2		73 - 119	0 - 20
2,4,6-Trinitrotoluene	ug/kg	952	957	100		10		71 - 120	0 - 20
2,4-Dinitrotoluene	ug/kg	952	1040	109		2		75 - 121	0 - 20
2,6-Dinitrotoluene	ug/kg	952	989	104		10		79 - 117	0 - 20
2-Amino-4,6-dinitrotoluene	ug/kg	952	885	93		12		71 - 123	0 - 20
2-Nitrotoluene	ug/kg	952	812	85		32	*	84 - 120	0 - 20
3,5-Dinitroaniline	ug/kg	952	1100	116		5		86 - 118	0 - 20
3-Nitrotoluene	ug/kg	952	901	95		14		67 - 129	0 - 20
4-Amino-2,6-dinitrotoluene	ug/kg	952	1040	109		.8		64 - 127	0 - 20
4-Nitrotoluene	ug/kg	952	846	89		28	*	71 - 124	0 - 20
HMX	ug/kg	952	955	100		3		74 - 124	0 - 20
Nitrobenzene	ug/kg	952	1010	106		.5		80 - 128	0 - 20
Nitroglycerin	ug/kg	952	956	100		2		73 - 124	0 - 20
Pentaerythritol Tetranitrate	ug/kg	952	1040	109		5		72 - 128	0 - 20
RDX	ug/kg	952	1010	106		10		67 - 129	0 - 20
Tetryl	ug/kg	952	820	86		23	*	68 - 135	0 - 20

RPD : 3 out of 17 outside limits

Spike Recovery: 0 out of 34 outside limits

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

FORM III ORG-1

4C

ORGANIC METHOD BLANK SUMMARY

Report No:	218081812	Method Blank ID:	1846370
Matrix:	Solid	Instrument ID:	HPLC3
Sample Amt:	10 g	Lab File ID:	2180912\A69
Injection Vol.:	1.0 (µL)	GC Column:	ARC18 ID 3 (mm)
Prep Final Vol.:	40000 (µL)	Dilution Factor:	1 Analyst: MEG
Prep Date:	09/05/18	Analysis Date:	09/13/18 Time: 0719
Prep Batch:	643342	Analytical Batch:	643776
Prep Method:	8330B	Analytical Method:	EPA 8330B

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD

	CLIENT SAMPLE ID	GCAL SAMPLE ID	DATE ANALYZED	TIME ANALYZED	INSTRUMENT ID
1.	LCS1846371	1846371	09/13/18	0738	HPLC3
2.	LCSD1846372	1846372	09/13/18	0758	HPLC3
3.	WIL02DA02A (RE)	21808181213	09/13/18	0818	HPLC3
4.	WIL02DA02A MS (RE)	21808181214	09/13/18	0838	HPLC3
5.	WIL02DA02A MSD (RE)	21808181215	09/13/18	0857	HPLC3
6.	WIL02DA01A (RE)	21808181216	09/13/18	0917	HPLC3
7.	WIL02DA01B (RE)	21808181217	09/13/18	0937	HPLC3
8.	WIL02DA01B (RE)DUP	1846373	09/13/18	0957	HPLC3
9.	WIL02DA01B (RE)DUP	1846374	09/13/18	1016	HPLC3
10.	GRBLK for HBN 643342 [EXTO/550	1846375	09/13/18	1036	HPLC3

GCAL ANALYTICAL LABORATORIES, LLC

8330B Explosives Prep Solid

643342

ANALYST/ TECH		START DATE/TIME	9/5/18 1851	END DATE/TIME	9/6/18 1510	BATCH	643342

#	CLIENT	TYPE	CLIENT ID	GCAL ID	INITIAL WGT (g)	FINAL VOL (mL)	COMMENT	STANDARDS\ REAGENTS
1	QC	MB	MB 1846370	1846370	10.0	40		8330 Surrogate 4/10ug/ml / Volume 1.0ml
2	QC	LCS	SRM 1846371 ** Use SRM **	1846371	10.0	40		703-27-9
3	QC	LCSD	SRMD 1846372 ** Use SRM **	1846372	10.0	40		8330 Spike 4/10ug/ml / Volume 1.0ml
4	4838	SAMP	WIL02DB02A (RE)	21808181211	10.1	40		703-23-1
5	4838	SAMP	WIL02DB01A (RE)	21808181212	10.5	40		Solid Reference Material
6	4838	SAMP	WIL02DA02A (RE)	21808181213	10.1	40		212150
7	4838	MS	WIL02DA02A MS (RE)	21808181214	10.3	40		HPLC Water
8	4838	MSD	WIL02DA02A MSD (RE)	21808181215	10.5	40		216989
9	4838	SAMP	WIL02DA01A (RE)	21808181216	10.1	40		Acetonitrile
10	4838	SAMP	WIL02DA01B (RE)	21808181217	10.1	40		B124002
11	QC	DUP	DUP 1846374	1846374	10.0	40		Sand
12	QC	DUP	DUP 1846373	1846373	10.0	40		
13	QC	GRBLK	GRBLK 1846375	1846375	10.0	40		
14			LCS	1846376	10.0	40		
15			LCSD	1846377	10.0	40		
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

EQUIPMENT\CONDITIONS

BALANCE ID	GRINDER ID - PUCK 01	

NOTES

Matrix-Solid. Batch Batch Rule 8330B_S_EX.

1D

ORGANICS ANALYSIS DATA SHEET

Report No:	218081812	Client Sample ID:	MB1846370
Collect Date:	NA Time: NA	GCAL Sample ID:	1846370
Matrix:	Solid % Moisture: NA	Instrument ID:	HPLC3
Sample Amt:	10 g	Lab File ID:	2180912\A69
Injection Vol.:	1.0 (µL)	GC Column:	ARC18 ID 3 (mm)
Prep Final Vol.:	40000 (µL)	Dilution Factor:	1 Analyst: MEG
Prep Date:	09/05/18	Analysis Date:	09/13/18 Time: 0719
Prep Batch:	643342	Analytical Batch:	643776
Prep Method:	8330B	Analytical Method:	EPA 8330B

CONCENTRATION UNITS: ug/kg

CAS	ANALYTE	RESULT	Q	DL	LOD	LOQ
99-35-4	1,3,5-Trinitrobenzene	100	U	42.0	100	200
99-65-0	1,3-Dinitrobenzene	100	U	77.0	100	200
118-96-7	2,4,6-Trinitrotoluene	100	U	51.0	100	200
121-14-2	2,4-Dinitrotoluene	100	U	99.0	100	200
606-20-2	2,6-Dinitrotoluene	100	U	61.0	100	200
35572-78-2	2-Amino-4,6-dinitrotoluene	100	U	98.0	100	200
88-72-2	2-Nitrotoluene	100	U	64.0	100	200
618-87-1	3,5-Dinitroaniline	100	U	83.0	100	200
99-08-1	3-Nitrotoluene	150	U	125	150	200
19406-51-0	4-Amino-2,6-dinitrotoluene	100	U	77.0	100	200
99-99-0	4-Nitrotoluene	100	U	77.0	100	200
2691-41-0	HMX	100	U	26.0	100	200
98-95-3	Nitrobenzene	100	U	36.0	100	200
55-63-0	Nitroglycerin	100	U	74.0	100	200
78-11-5	Pentaerythritol Tetranitrate	150	U	122	150	200
121-82-4	RDX	100	U	18.0	100	200
479-45-8	Tetryl	100	U	41.0	100	200

FORM I ORG-1

1D

ORGANICS ANALYSIS DATA SHEET

Report No:	218081812	Client Sample ID:	GRBLK for HBN 643342 [EXTO/550
Collect Date:	NA Time: NA	GCAL Sample ID:	1846375
Matrix:	Solid % Moisture: NA	Instrument ID:	HPLC3
Sample Amt:	10 g	Lab File ID:	2180912\A79
Injection Vol.:	1.0 (µL)	GC Column:	ARC18 ID 3 (mm)
Prep Final Vol.:	40000 (µL)	Dilution Factor:	1 Analyst: MEG
Prep Date:	09/05/18	Analysis Date:	09/13/18 Time: 1036
Prep Batch:	643342	Analytical Batch:	643776
Prep Method:	8330B	Analytical Method:	EPA 8330B

CONCENTRATION UNITS: ug/kg

CAS	ANALYTE	RESULT	Q	DL	LOD	LOQ
99-35-4	1,3,5-Trinitrobenzene	100	U	42.0	100	200
99-65-0	1,3-Dinitrobenzene	100	U	77.0	100	200
118-96-7	2,4,6-Trinitrotoluene	100	U	51.0	100	200
121-14-2	2,4-Dinitrotoluene	100	U	99.0	100	200
606-20-2	2,6-Dinitrotoluene	100	U	61.0	100	200
35572-78-2	2-Amino-4,6-dinitrotoluene	100	U	98.0	100	200
88-72-2	2-Nitrotoluene	100	U	64.0	100	200
618-87-1	3,5-Dinitroaniline	100	U	83.0	100	200
99-08-1	3-Nitrotoluene	150	U	125	150	200
19406-51-0	4-Amino-2,6-dinitrotoluene	100	U	77.0	100	200
99-99-0	4-Nitrotoluene	100	U	77.0	100	200
2691-41-0	HMX	100	U	26.0	100	200
98-95-3	Nitrobenzene	100	U	36.0	100	200
55-63-0	Nitroglycerin	100	U	74.0	100	200
78-11-5	Pentaerythritol Tetranitrate	150	U	122	150	200
121-82-4	RDX	100	U	18.0	100	200
479-45-8	Tetryl	100	U	41.0	100	200

FORM I ORG-1

3F

SOIL ORGANICS LCS/LCSD RECOVERY

Report No: 218081812

Prep Method: 8330B Prep Batch: 643342

Analytical Method: EPA 8330B Analytical Batch: 643776

GCAL QC ID: 1846371

ANALYTE	*UNITS*	*SPIKE ADDED*	*SAMPLE RESULT*	*LCS RESULT*	*LCS % REC*	#	*QC LIMITS*
1,3,5-Trinitrobenzene	ug/kg	1750	0	2110	121	*	80 - 116
1,3-Dinitrobenzene	ug/kg	1280	0	1620	126	*	73 - 119
2,4,6-Trinitrotoluene	ug/kg	1120	0	1240	111		71 - 120
2,4-Dinitrotoluene	ug/kg	1210	0	1300	107		75 - 121
2,6-Dinitrotoluene	ug/kg	1310	0	1370	104		79 - 117
2-Amino-4,6-dinitrotoluene	ug/kg	1210	0	1250	104		71 - 123
2-Nitrotoluene	ug/kg	3160	0	3540	112		84 - 120
3,5-Dinitroaniline	ug/kg	2690	0	3020	112		86 - 118
3-Nitrotoluene	ug/kg	1360	0	1540	113		67 - 129
4-Amino-2,6-dinitrotoluene	ug/kg	1390	0	1360	98		64 - 127
4-Nitrotoluene	ug/kg	688	0	741	108		71 - 124
HMX	ug/kg	2850	0	3290	116		74 - 124
Nitrobenzene	ug/kg	2340	0	2510	107		80 - 128
Nitroglycerin	ug/kg	3870	0	4540	117		73 - 124
Pentaerythritol Tetranitrate	ug/kg	2650	0	3070	116		72 - 128
RDX	ug/kg	923	0	1030	111		67 - 129
Tetryl	ug/kg	100	0	0	0	*	68 - 135

RPD : 3 out of 17 outside limits

Spike Recovery: 8 out of 34 outside limits

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

FORM III ORG-1

3F

SOIL ORGANICS LCS/LCSD RECOVERY

Report No: 218081812

Prep Method: 8330B Prep Batch: 643342

Analytical Method: EPA 8330B Analytical Batch: 643776

GCAL QC ID: 1846372

ANALYTE	*UNITS*	*SPIKE ADDED*	*LCSD RESULT*	*LCSD % REC*	#	*% RPD*	#	*QC LIMITS REC*	*QC LIMITS RPD*
1,3,5-Trinitrobenzene	ug/kg	1750	2070	119	*	2		80 - 116	0 - 20
1,3-Dinitrobenzene	ug/kg	1280	1420	111		13		73 - 119	0 - 20
2,4,6-Trinitrotoluene	ug/kg	1120	1320	118		6		71 - 120	0 - 20
2,4-Dinitrotoluene	ug/kg	1210	1290	106		1		75 - 121	0 - 20
2,6-Dinitrotoluene	ug/kg	1310	1300	99		5		79 - 117	0 - 20
2-Amino-4,6-dinitrotoluene	ug/kg	1210	1480	122		17		71 - 123	0 - 20
2-Nitrotoluene	ug/kg	3160	3380	107		5		84 - 120	0 - 20
3,5-Dinitroaniline	ug/kg	2690	2880	107		4		86 - 118	0 - 20
3-Nitrotoluene	ug/kg	1360	1970	145	*	24	*	67 - 129	0 - 20
4-Amino-2,6-dinitrotoluene	ug/kg	1390	1330	96		2		64 - 127	0 - 20
4-Nitrotoluene	ug/kg	688	2430	354	*	107	*	71 - 124	0 - 20
HMX	ug/kg	2850	3370	118		2		74 - 124	0 - 20
Nitrobenzene	ug/kg	2340	2480	106		1		80 - 128	0 - 20
Nitroglycerin	ug/kg	3870	4190	108		8		73 - 124	0 - 20
Pentaerythritol Tetranitrate	ug/kg	2650	4410	166	*	36	*	72 - 128	0 - 20
RDX	ug/kg	923	1010	110		2		67 - 129	0 - 20
Tetryl	ug/kg	100	0	0	*	0		68 - 135	0 - 20

RPD : 3 out of 17 outside limits

Spike Recovery: 8 out of 34 outside limits

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

FORM III ORG-1

3F

SOIL ORGANICS MS/MSD RECOVERY

Report No:	218081812	Parent Sample ID:	WIL02DA02A (RE)
Prep Method:	8330B	Prep Batch:	643342
Analytical Method:	EPA 8330B	Analytical Batch:	643776

GCAL QC ID: 21808181214

ANALYTE	*UNITS*	*SPIKE ADDED*	*SAMPLE RESULT*	*MS RESULT*	*MS % REC*	#	*QC LIMITS*
1,3,5-Trinitrobenzene	ug/kg	971	0	828	85		80 - 116
1,3-Dinitrobenzene	ug/kg	971	0	836	86		73 - 119
2,4,6-Trinitrotoluene	ug/kg	971	0	767	79		71 - 120
2,4-Dinitrotoluene	ug/kg	971	0	884	91		75 - 121
2,6-Dinitrotoluene	ug/kg	971	0	803	83		79 - 117
2-Amino-4,6-dinitrotoluene	ug/kg	971	0	889	92		71 - 123
2-Nitrotoluene	ug/kg	971	0	864	89		84 - 120
3,5-Dinitroaniline	ug/kg	971	0	923	95		86 - 118
3-Nitrotoluene	ug/kg	971	0	833	86		67 - 129
4-Amino-2,6-dinitrotoluene	ug/kg	971	0	1030	106		64 - 127
4-Nitrotoluene	ug/kg	971	0	930	96		71 - 124
HMX	ug/kg	971	0	596	61	*	74 - 124
Nitrobenzene	ug/kg	971	0	918	95		80 - 128
Nitroglycerin	ug/kg	971	0	848	87		73 - 124
Pentaerythritol Tetranitrate	ug/kg	971	0	947	98		72 - 128
RDX	ug/kg	971	0	816	84		67 - 129
Tetryl	ug/kg	971	0	734	76		68 - 135

RPD : 2 out of 17 outside limits

Spike Recovery: 1 out of 34 outside limits

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

FORM III ORG-1

3F

SOIL ORGANICS MS/MSD RECOVERY

Report No:	218081812	Parent Sample ID:	WIL02DA02A (RE)
Prep Method:	8330B	Prep Batch:	643342
Analytical Method:	EPA 8330B	Analytical Batch:	643776

GCAL QC ID: 21808181215

ANALYTE	*UNITS*	*SPIKE ADDED*	*MSD RESULT*	*MSD % REC*	#	*% RPD*	#	*QC LIMITS REC*	*QC LIMITS RPD*
1,3,5-Trinitrobenzene	ug/kg	952	956	100		14		80 - 116	0 - 20
1,3-Dinitrobenzene	ug/kg	952	884	93		6		73 - 119	0 - 20
2,4,6-Trinitrotoluene	ug/kg	952	887	93		15		71 - 120	0 - 20
2,4-Dinitrotoluene	ug/kg	952	778	82		13		75 - 121	0 - 20
2,6-Dinitrotoluene	ug/kg	952	1090	114		30	*	79 - 117	0 - 20
2-Amino-4,6-dinitrotoluene	ug/kg	952	818	86		8		71 - 123	0 - 20
2-Nitrotoluene	ug/kg	952	827	87		4		84 - 120	0 - 20
3,5-Dinitroaniline	ug/kg	952	944	99		2		86 - 118	0 - 20
3-Nitrotoluene	ug/kg	952	848	89		2		67 - 129	0 - 20
4-Amino-2,6-dinitrotoluene	ug/kg	952	1040	109		1		64 - 127	0 - 20
4-Nitrotoluene	ug/kg	952	928	97		.2		71 - 124	0 - 20
HMX	ug/kg	952	794	83		29	*	74 - 124	0 - 20
Nitrobenzene	ug/kg	952	927	97		1		80 - 128	0 - 20
Nitroglycerin	ug/kg	952	925	97		9		73 - 124	0 - 20
Pentaerythritol Tetranitrate	ug/kg	952	915	96		3		72 - 128	0 - 20
RDX	ug/kg	952	808	85		.9		67 - 129	0 - 20
Tetryl	ug/kg	952	769	81		5		68 - 135	0 - 20

RPD : 2 out of 17 outside limits

Spike Recovery: 1 out of 34 outside limits

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

FORM III ORG-1

EPA 8330B REPLICATE SUMMARY

Report No:	218081814	Parent Sample ID:	WIL02IS03
Prep Method:	EPA 8330B	Parent GCAL ID:	21808181407
Prep Date:	8/24/2018 6:00:00 PM	Prep Batch:	642680
Analytical Method:	EPA 8330B		

ANALYTE	*CAS*	*UNITS*	*PARENT RESULT*	*REP #1 RESULT (1843104)*	*REP #2 RESULT (1843105)*	*%RSD*	*#*
1,3,5-Trinitrobenzene	99-35-4	ug/Kg	0	0	0	0	
1,3-Dinitrobenzene	99-65-0	ug/Kg	0	0	0	0	
2,4,6-Trinitrotoluene	118-96-7	ug/Kg	0	0	0	0	
2,4-Dinitrotoluene	121-14-2	ug/Kg	0	0	0	0	
2,6-Dinitrotoluene	606-20-2	ug/Kg	0	0	0	0	
2-Amino-4,6-dinitrotoluene	35572-78-2	ug/Kg	0	0	0	0	
2-Nitrotoluene	88-72-2	ug/Kg	0	0	0	0	
3,5-Dinitroaniline	618-87-1	ug/Kg	0	0	0	0	
3-Nitrotoluene	99-08-1	ug/Kg	0	0	0	0	
4-Amino-2,6-dinitrotoluene	19406-51-0	ug/Kg	0	0	0	0	
4-Nitrotoluene	99-99-0	ug/Kg	0	0	0	0	
HMX	2691-41-0	ug/Kg	0	0	0	0	
Nitrobenzene	98-95-3	ug/Kg	0	0	0	0	
Nitroglycerin	55-63-0	ug/Kg	0	0	0	0	
Pentaerythritol Tetranitrate	78-11-5	ug/Kg	0	0	0	0	
RDX	121-82-4	ug/Kg	0	0	0	0	
Tetryl	479-45-8	ug/Kg	0	0	0	0	

*** - RSD greater than 20%**

2F

ORGANIC SURROGATE RECOVERY

Report No: 218081814 Analytical Method: EPA 8330B

Client Sample ID	*GCALSample ID*	*SMC1*	#	*SMC2*	#	*SMC3*	#	*SMC4*	#	*TOT OUT*
WIL02IS01	21808181401	103								0
WIL02IS01 MS	21808181402	99								0
WIL02IS01 MSD	21808181403	95								0
WIL02IS02	21808181404	94								0
WIL02IS03	21808181407	89								0
MB1843101	1843101	110								0
WIL02IS03DUP	1843104	97								0
WIL02IS03DUP	1843105	101								0
GRBLK for HBN 642680 [EXTO/549	1843106	97								0
LCS1843214	1843214	86								0
LCSD1843215	1843215	94								0

QC LIMITS

SMC 1 :	1,2-Dinitrobenzene	50	150
SMC 2 :			
SMC 3 :			
SMC 4 :			

Column to be used to flag recovery limits

* Value outside of QC limits

D Surrogate diluted out

FORM II ORG-2

4C

ORGANIC METHOD BLANK SUMMARY

Report No:	218081814	Method Blank ID:	1843101
Matrix:	Solid	Instrument ID:	HPLC3
Sample Amt:	10 g	Lab File ID:	2180830\A19
Injection Vol.:	1.0 (µL)	GC Column:	ARC18 ID 3 (mm)
Prep Final Vol.:	40000 (µL)	Dilution Factor:	1 Analyst: MEG
Prep Date:	08/24/18	Analysis Date:	08/30/18 Time: 1641
Prep Batch:	642680	Analytical Batch:	643050
Prep Method:	8330B	Analytical Method:	EPA 8330B

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD

	CLIENT SAMPLE ID	GCAL SAMPLE ID	DATE ANALYZED	TIME ANALYZED	INSTRUMENT ID
1.	WIL02IS01	21808181401	08/30/18	1741	HPLC3
2.	WIL02IS01 MS	21808181402	08/30/18	1800	HPLC3
3.	WIL02IS01 MSD	21808181403	08/30/18	1820	HPLC3
4.	WIL02IS02	21808181404	08/30/18	1840	HPLC3
5.	WIL02IS03	21808181407	08/30/18	1900	HPLC3
6.	WIL02IS03DUP	1843105	08/30/18	1919	HPLC3
7.	WIL02IS03DUP	1843104	08/30/18	1939	HPLC3
8.	GRBLK for HBN 642680 [EXTO/549	1843106	08/30/18	1959	HPLC3
9.	LCS1843214	1843214	08/30/18	2019	HPLC3
10.	LCSD1843215	1843215	08/30/18	2039	HPLC3

GCAL ANALYTICAL LABORATORIES, LLC

8330B Explosives Prep Solid

642680

ANALYST/ TECH	DW/B	START DATE/TIME	8/24/18 1800	END DATE/TIME	8/25/18 1702	BATCH	642680

#	CLIENT	TYPE	CLIENT ID	GCAL ID	INITIAL WGT (g)	FINAL VOL (mL)	COMMENT	STANDARDS\ REAGENTS
1	QC	MB	MB 1843101	1843101	10.0	40		8330 Surrogate 4/10ug/ml / Volume 1.0ml 103-27-8
2	QC	LCS	SRM 1843102 ** Use SRM **	1843102	10.0	40		
3	QC	LCSD	SRMD 1843103 ** Use SRM **	1843103	10.0	40		8330 Spike 4/10ug/ml / Volume 1.0ml 103-23-1
4	4838	SAMP	WIL02IS01	21808181401	10.1	40		
5	4838	MS	WIL02IS01 MS	21808181402	10.1	40		Solid Reference Material 427150
6	4838	MSD	WIL02IS01 MSD	21808181403	10.0	40		
7	4838	SAMP	WIL02IS02	21808181404	10.5	40		HPLC Water 426989
8	4838	SAMP	WIL02IS03	21808181407	10.0	40		
9	QC	DUP	DUP 1843105	1843105	10.0	40		Acetonitrile 427054
10	QC	DUP	DUP 1843104	1843104	10.0	40		
11	QC	GRBLK	GRBLK 1843106	1843106	10.0	40		Sand
12	QC	LCS	SRM 1843214 ** Use SRM **	1843214	10.0	40	spike	
13	QC	LCSD	SRMD 1843215 ** Use SRM **	1843215	10.0	40	spike	
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

EQUIPMENT\CONDITIONS

BALANCE ID	03	GRINDER ID - PUCK 01	

NOTES

Matrix-Solid. Batch Batch Rule 8330B_S_EX.

1D

ORGANICS ANALYSIS DATA SHEET

Report No:	218081814	Client Sample ID:	MB1843101
Collect Date:	NA Time: NA	GCAL Sample ID:	1843101
Matrix:	Solid % Moisture: NA	Instrument ID:	HPLC3
Sample Amt:	10 g	Lab File ID:	2180830\A19
Injection Vol.:	1.0 (µL)	GC Column:	ARC18 ID 3 (mm)
Prep Final Vol.:	40000 (µL)	Dilution Factor:	1 Analyst: MEG
Prep Date:	08/24/18	Analysis Date:	08/30/18 Time: 1641
Prep Batch:	642680	Analytical Batch:	643050
Prep Method:	8330B	Analytical Method:	EPA 8330B

CONCENTRATION UNITS: ug/kg

CAS	ANALYTE	RESULT	Q	DL	LOD	LOQ
99-35-4	1,3,5-Trinitrobenzene	100	U	42.0	100	200
99-65-0	1,3-Dinitrobenzene	100	U	77.0	100	200
118-96-7	2,4,6-Trinitrotoluene	100	U	51.0	100	200
121-14-2	2,4-Dinitrotoluene	100	U	99.0	100	200
606-20-2	2,6-Dinitrotoluene	100	U	61.0	100	200
35572-78-2	2-Amino-4,6-dinitrotoluene	100	U	98.0	100	200
88-72-2	2-Nitrotoluene	100	U	64.0	100	200
618-87-1	3,5-Dinitroaniline	100	U	83.0	100	200
99-08-1	3-Nitrotoluene	150	U	125	150	200
19406-51-0	4-Amino-2,6-dinitrotoluene	100	U	77.0	100	200
99-99-0	4-Nitrotoluene	100	U	77.0	100	200
2691-41-0	HMX	100	U	26.0	100	200
98-95-3	Nitrobenzene	100	U	36.0	100	200
55-63-0	Nitroglycerin	100	U	74.0	100	200
78-11-5	Pentaerythritol Tetranitrate	150	U	122	150	200
121-82-4	RDX	100	U	18.0	100	200
479-45-8	Tetryl	100	U	41.0	100	200

FORM I ORG-1

1D

ORGANICS ANALYSIS DATA SHEET

Report No:	218081814	Client Sample ID:	GRBLK for HBN 642680 [EXTO/549
Collect Date:	NA Time: NA	GCAL Sample ID:	1843106
Matrix:	Solid % Moisture: NA	Instrument ID:	HPLC3
Sample Amt:	10 g	Lab File ID:	2180830\A29
Injection Vol.:	1.0 (µL)	GC Column:	ARC18 ID 3 (mm)
Prep Final Vol.:	40000 (µL)	Dilution Factor:	1 Analyst: MEG
Prep Date:	08/24/18	Analysis Date:	08/30/18 Time: 1959
Prep Batch:	642680	Analytical Batch:	643050
Prep Method:	8330B	Analytical Method:	EPA 8330B

CONCENTRATION UNITS: ug/kg

CAS	ANALYTE	RESULT	Q	DL	LOD	LOQ
99-35-4	1,3,5-Trinitrobenzene	100	U	42.0	100	200
99-65-0	1,3-Dinitrobenzene	100	U	77.0	100	200
118-96-7	2,4,6-Trinitrotoluene	100	U	51.0	100	200
121-14-2	2,4-Dinitrotoluene	100	U	99.0	100	200
606-20-2	2,6-Dinitrotoluene	100	U	61.0	100	200
35572-78-2	2-Amino-4,6-dinitrotoluene	100	U	98.0	100	200
88-72-2	2-Nitrotoluene	100	U	64.0	100	200
618-87-1	3,5-Dinitroaniline	100	U	83.0	100	200
99-08-1	3-Nitrotoluene	150	U	125	150	200
19406-51-0	4-Amino-2,6-dinitrotoluene	100	U	77.0	100	200
99-99-0	4-Nitrotoluene	100	U	77.0	100	200
2691-41-0	HMX	100	U	26.0	100	200
98-95-3	Nitrobenzene	100	U	36.0	100	200
55-63-0	Nitroglycerin	100	U	74.0	100	200
78-11-5	Pentaerythritol Tetranitrate	150	U	122	150	200
121-82-4	RDX	100	U	18.0	100	200
479-45-8	Tetryl	100	U	41.0	100	200

FORM I ORG-1

3F

SOIL ORGANICS LCS/LCSD RECOVERY

Report No: 218081814

Prep Method: 8330B | Prep Batch: 642680

Analytical Method: EPA 8330B | Analytical Batch: 643050

GCAL QC ID: 1843214

ANALYTE	*UNITS*	*SPIKE ADDED*	*SAMPLE RESULT*	*LCS RESULT*	*LCS % REC*	#	*QC LIMITS*
1,3,5-Trinitrobenzene	ug/kg	1000	0	807	81		80 - 116
1,3-Dinitrobenzene	ug/kg	1000	0	787	79		73 - 119
2,4,6-Trinitrotoluene	ug/kg	1000	0	747	75		71 - 120
2,4-Dinitrotoluene	ug/kg	1000	0	862	86		75 - 121
2,6-Dinitrotoluene	ug/kg	1000	0	815	81		79 - 117
2-Amino-4,6-dinitrotoluene	ug/kg	1000	0	757	76		71 - 123
2-Nitrotoluene	ug/kg	1000	0	913	91		84 - 120
3,5-Dinitroaniline	ug/kg	1000	0	875	87		86 - 118
3-Nitrotoluene	ug/kg	1000	0	708	71		67 - 129
4-Amino-2,6-dinitrotoluene	ug/kg	1000	0	739	74		64 - 127
4-Nitrotoluene	ug/kg	1000	0	816	82		71 - 124
HMX	ug/kg	1000	0	833	83		74 - 124
Nitrobenzene	ug/kg	1000	0	819	82		80 - 128
Nitroglycerin	ug/kg	1000	0	782	78		73 - 124
Pentaerythritol Tetranitrate	ug/kg	1000	0	836	84		72 - 128
RDX	ug/kg	1000	0	822	82		67 - 129
Tetryl	ug/kg	1000	0	827	83		68 - 135

RPD : 1 out of 17 outside limits

Spike Recovery: 0 out of 34 outside limits

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

FORM III ORG-1

3F

SOIL ORGANICS LCS/LCSD RECOVERY

Report No: 218081814

Prep Method: 8330B | Prep Batch: 642680

Analytical Method: EPA 8330B | Analytical Batch: 643050

GCAL QC ID: 1843215

ANALYTE	*UNITS*	*SPIKE ADDED*	*LCSD RESULT*	*LCSD % REC*	#	*% RPD*	#	*QC LIMITS REC*	*QC LIMITS RPD*
1,3,5-Trinitrobenzene	ug/kg	1000	910	91		12		80 - 116	0 - 20
1,3-Dinitrobenzene	ug/kg	1000	872	87		10		73 - 119	0 - 20
2,4,6-Trinitrotoluene	ug/kg	1000	842	84		12		71 - 120	0 - 20
2,4-Dinitrotoluene	ug/kg	1000	882	88		2		75 - 121	0 - 20
2,6-Dinitrotoluene	ug/kg	1000	877	88		7		79 - 117	0 - 20
2-Amino-4,6-dinitrotoluene	ug/kg	1000	888	89		16		71 - 123	0 - 20
2-Nitrotoluene	ug/kg	1000	959	96		5		84 - 120	0 - 20
3,5-Dinitroaniline	ug/kg	1000	902	90		3		86 - 118	0 - 20
3-Nitrotoluene	ug/kg	1000	845	84		18		67 - 129	0 - 20
4-Amino-2,6-dinitrotoluene	ug/kg	1000	872	87		16		64 - 127	0 - 20
4-Nitrotoluene	ug/kg	1000	1100	110		30	*	71 - 124	0 - 20
HMX	ug/kg	1000	829	83		.4		74 - 124	0 - 20
Nitrobenzene	ug/kg	1000	904	90		10		80 - 128	0 - 20
Nitroglycerin	ug/kg	1000	854	85		9		73 - 124	0 - 20
Pentaerythritol Tetranitrate	ug/kg	1000	839	84		.3		72 - 128	0 - 20
RDX	ug/kg	1000	909	91		10		67 - 129	0 - 20
Tetryl	ug/kg	1000	916	92		10		68 - 135	0 - 20

RPD : 1 out of 17 outside limits

Spike Recovery: 0 out of 34 outside limits

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

FORM III ORG-1

3F

SOIL ORGANICS MS/MSD RECOVERY

Report No:	218081814	Parent Sample ID:	WIL02IS01
Prep Method:	8330B	Prep Batch:	642680
Analytical Method:	EPA 8330B	Analytical Batch:	643050

GCAL QC ID: 21808181402

ANALYTE	*UNITS*	*SPIKE ADDED*	*SAMPLE RESULT*	*MS RESULT*	*MS % REC*	*#*	*QC LIMITS*
1,3,5-Trinitrobenzene	ug/kg	990	0	975	98		80 - 116
1,3-Dinitrobenzene	ug/kg	990	0	916	92		73 - 119
2,4,6-Trinitrotoluene	ug/kg	990	0	908	92		71 - 120
2,4-Dinitrotoluene	ug/kg	990	0	863	87		75 - 121
2,6-Dinitrotoluene	ug/kg	990	0	991	100		79 - 117
2-Amino-4,6-dinitrotoluene	ug/kg	990	0	895	90		71 - 123
2-Nitrotoluene	ug/kg	990	0	909	92		84 - 120
3,5-Dinitroaniline	ug/kg	990	0	889	90		86 - 118
3-Nitrotoluene	ug/kg	990	0	871	88		67 - 129
4-Amino-2,6-dinitrotoluene	ug/kg	990	0	898	91		64 - 127
4-Nitrotoluene	ug/kg	990	0	976	99		71 - 124
HMX	ug/kg	990	0	834	84		74 - 124
Nitrobenzene	ug/kg	990	0	1030	104		80 - 128
Nitroglycerin	ug/kg	990	0	904	91		73 - 124
Pentaerythritol Tetranitrate	ug/kg	990	0	986	100		72 - 128
RDX	ug/kg	990	0	891	90		67 - 129
Tetryl	ug/kg	990	0	720	73		68 - 135

RPD : 0 out of 17 outside limits

Spike Recovery: 0 out of 34 outside limits

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

FORM III ORG-1

3F

SOIL ORGANICS MS/MSD RECOVERY

Report No:	218081814	Parent Sample ID:	WIL02IS01
Prep Method:	8330B	Prep Batch:	642680
Analytical Method:	EPA 8330B	Analytical Batch:	643050

GCAL QC ID: 21808181403

ANALYTE	UNITS	SPIKE ADDED	MSD RESULT	MSD % REC	#	% RPD	#	QC LIMITS REC	QC LIMITS RPD
1,3,5-Trinitrobenzene	ug/kg	1000	922	92		6		80 - 116	0 - 20
1,3-Dinitrobenzene	ug/kg	1000	887	89		3		73 - 119	0 - 20
2,4,6-Trinitrotoluene	ug/kg	1000	903	90		.6		71 - 120	0 - 20
2,4-Dinitrotoluene	ug/kg	1000	896	90		4		75 - 121	0 - 20
2,6-Dinitrotoluene	ug/kg	1000	851	85		15		79 - 117	0 - 20
2-Amino-4,6-dinitrotoluene	ug/kg	1000	910	91		2		71 - 123	0 - 20
2-Nitrotoluene	ug/kg	1000	972	97		7		84 - 120	0 - 20
3,5-Dinitroaniline	ug/kg	1000	872	87		2		86 - 118	0 - 20
3-Nitrotoluene	ug/kg	1000	925	92		6		67 - 129	0 - 20
4-Amino-2,6-dinitrotoluene	ug/kg	1000	958	96		7		64 - 127	0 - 20
4-Nitrotoluene	ug/kg	1000	959	96		2		71 - 124	0 - 20
HMX	ug/kg	1000	798	80		4		74 - 124	0 - 20
Nitrobenzene	ug/kg	1000	872	87		16		80 - 128	0 - 20
Nitroglycerin	ug/kg	1000	879	88		3		73 - 124	0 - 20
Pentaerythritol Tetranitrate	ug/kg	1000	902	90		9		72 - 128	0 - 20
RDX	ug/kg	1000	847	85		5		67 - 129	0 - 20
Tetryl	ug/kg	1000	726	73		.8		68 - 135	0 - 20

RPD : 0 out of 17 outside limits

Spike Recovery: 0 out of 34 outside limits

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

FORM III ORG-1

DATA VALIDATION WORKSHEET
INORGANIC - ICPMS (Sb, Cu, Pb, Zn)

Project: Williston LTA
Reviewer: Naoum Tavantzis
Date: October 24, 2018

SDG No.: 218081812+13+14
Project No.: 60520956

_X_ USEPA CLP National Functional Guidelines for Superfund Inorganic Methods Data Review
_X_ SW-846/DoD QSM v5.1
_X_ Project QAPP/SAP

1.0 Chain of Custody/Sample Condition/Raw Data		**Yes**	**No**	**NA**
1.1	Do Chain-of-Custody forms list all samples which were analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		X	
1.4	Does sample preservation, collection and storage meet method requirement? (For metal: water samples: with Nitric Acid to pH < 2, and soil/sediment samples: 4 ^{O}C $\pm$ 2 ^{O}C). Action: Professional judgement or J-(+)/R(-)	X		
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes. % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	X		
1.6	Were the sediment samples dryed and sieved appropiately?	X		
1.7	Are the measurement read out records legible and complete (properly labeled, and include all samples and QC)?	X		

Note:

2.0 Holding Time		**Yes**	**No**	**NA**
2.1	Have any technical holding times of 6 months, determined from date of collection to date of analysis, been exceeded?		X	
	Action: Use professional judgement, then J-(+)/R(-)			

Note:

3.0 Instrument Calibration		Yes	No	NA
3.1	Are the Quartlery LOD establishment forms provided for each instrument?	X		
3.2	Is the signal/noise ratio less than 3:1? If not, is the determination repeated at a higher concentration?	X		
3.3	Are sufficient standards of a blank + one standard & a RL standard OR 3 standards and a blank with one standard at the RL included in the calibration curve? If not, qualify with "R".	X		
3.3.a	If more than one standard is used, are the correlation coefficients > 0.995? Action: J(+)/UJ(-).	X		
3.4	Was an initial calibration check standard (ICV) analyzed immediately after instrument system had been calibrated? Action: If no, all associated data are rejected "R".	X		
3.5	Was continuing calibration (CCV) analyzed at a minimum frequency of 10% (every 10 samples) during and at the end of the analytical run? If not, document and flag based on professional judgement.	X		
3.6	Are all calibration standard percent recoveries within the control limits of 90%-110%? ICV and CCV:	X		
	< 75% 75%-89% 111%-125% 125%<%R<160% >160%			
	Action: J-(+)/R(-) J-(+)/UJ(-) J+(+) J+(+)(maybe R(+)) R(+)			
3.7	Was the high-level check standard included within 10% of the true value?	X		

Note:

4.0 Blanks		Yes	No	NA
4.1	Were method blank (MB) prepared at the appropriate frequency (one / 20 samples, batch, or matrix)?	X		
4.2	Were calibration blanks (ICB and CCBs) analyzed immediately after each ICV and CCVs?	X		
4.3	Are there reported ICB/CCBs values > DL? If yes, refer to action table.		X	
4.4	Are there negative ICB/CCB blank results with the absolute value > LOD? If yes use 5x rule		X	
4.5	Are there reported MB values > LOD? If yes use 5x rule	X		
4.6	Are there negative method blank results with the absolute value > LOD? If yes use 5x rule		X	
4.7	Are there reported field blank or equipment blank > + DL? If yes use 5x rule	X		

Note: MB in batch 642222 had a detection for zinc at 518 ug/kg. Equipment blank had detections for antimony (0.74 ug/L) and copper (0.26 ug/L)

5.0 Laboratory Control Sample (LCS)		Yes	No	NA
5.1	Was an LCS prepared and analyzed at the correct frequency (one / 20 samples, batch, or matrix)? Action: If no, J(+)/R(-) any sample not associated with LCS results.	X		
5.2	Is any LCS recovery outside the control limits?		X	
	% Recoveries: <40% 40%-LCL% >UCL,<130% >150%			
	J-(+)/R(-) J-(+)/UJ(-) J+(+) R(+/-)			

Note:

6.0 ICP Interference Check Sample (ICS)		Yes	No	NA
6.1	Was ICS analyzed at beginning of each ICP run and every 12 hours?	X		
6.2	Are the ICS AB recoveries within 80% - 120%?	X		
6.3	Are the results for unspiked analytes (in ICS A) <LOQ?	X		
6.4	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?	X		
	Action: Not Spiked Analytes Spiked analytes			
	False negative False Positive < 50% 50%-79% 120%			
	≥DL, but <10x |-[ICS]| ≥DL			
	J-(+)/UJ(-) J+(+) R(-) J-(+)/UJ(-) J+(+)			

Note:

7.0 Laboratory Duplicates (MD)		Yes	No	NA
7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one / 20 samples, batch, or matrix)? If no, J(+), using professional judgement, analytes not associated with duplicate results.	X		
7.2	Are all RPDs less than 20%? If no, qualify all associated field samples J(+)/UJ(-) for the batch.	X		

Note:

8.0 Matrix/Matrix Spike Duplicate		Yes	No	NA
8.1	Was a spiked sample prepared and analyzed at the correct frequency (one / 20 samples, batch, or matrix)? If not, J(+) with professional judgement.	X		
8.2	Are any MS/MSD recovery outside the control limits?	X		
	For all analytes with sample concentration ,4x spike concentration:			
	Matrix Spike %R <30% 30%-74% >125%			
	No PDS, Action: J-(+)/R(-, reanalyze) J-(+)/UJ(-) J+(+)			
	Matrix Spike %R <30% 30%-74% >125%			
	PDS%R <75% ≥75% <75% ≥75% <125% ≥125%			
	Action J-(+)/R(-) J(+)/UJ(-) J-(+)/UJ(-) J(+)/UJ(-) J(+) J+(+)			
8.3	Are all RPDs less than 20%? If no, qualify all associated field samples J(+) for the batch.		X	

Note: Matrix spikes on WIL02DA02A and WIL01IS02 - low recoveries for antimony in MS/MSD; WIL01IS02 high recovery for copper in MS.

9.0 ICP/AA Serial Dilutions (Not for Mercury Analysis)		Yes	No	NA
9.1	Were serial dilutions performed?	X		
9.2	Was a five-fold dilution performed?	X		
9.3	Were results agree within 10% for [sample] > 50 X DL in the original sample? If no, J(+)/UJ(-)		X	
9.4	Where dilution test fails or [sample]<50xLOD, was a post-digestion spike performed? Note any recoveries greater than ±25%D in DV report, but no data qualifying action is required.	X		
9.5	When both dilution test and post-digestion spikes do not pass, was a method of standard additions used to quantitate the reported sample concentration? If not, ask lab to comment.			X

Note: WIL02DA02A in analytical sequence 642309 displayed a percent difference greater than 10% for zinc at 10.9%.

10.0 Field Duplicate Samples		Yes	No	NA
10.1	Were any field duplicates submitted for metal analysis?	X		
	For sample results > 5 x RL, a control limit of ≤35% RPD will be used. For sample results < 5 x RL, a control limit of 2 x RL will be used.			
10.2	Are all analyte duplicate results within control limits? If not, J(+) the parent samples.	X		

Note:

11.0 Result Verification/ Internal Standards/ Tune		Yes	No	NA
11.1	Are all DLs/RLs equal to or less than the reporting limits specified?	X		
11.2	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?	X		
11.3	Were all dilutions reflected in the positive results and detection limits?	X		
11.4	Is there an Internal Standard associated with all analytes? R(+/-)	X		
11.5	Were the Internal Standard recoveries within control limits? If not, J(+)/UJ(-)	X		
11.6	Was a tune performed? If not, R(+/-) all associated samples.	X		
11.7	Were the tunes run at a minimum of four times with RSD < 5% for analytes in solution? Action: J(+)/UJ(-)	X		
11.8	Were the tune mass calibrations < 0.1 amu from the true value? Action: J(+)/UJ(-)	X		
11.9	Was the resolution check peak width < 0.9 amu at 10% peak height? Action: J(+)/UJ(-)	X		

Note:

12.0 Completeness Calculation		Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit 90%)	X		
12.2	Number of samples:_____16_____			
12.3	Number of target compounds in each analysis:_____4_____			
12.4	Number of results rejected and not reported:_____0_____			
	% Completeness = (12.1.1 x 12.1.2 - 12.1.3) x 100/(12.1.1 x 12.1.2)			
	% Completeness = ____100%_____			

XIV
ANALYSIS RUN LOG

Report No: 218081813 Analytical Batch: 642309 Start Date: 08/20/18

Instrument ID: ICPMS2 Analytical Method: EPA 6020B End Date: 08/20/18

CLIENT SAMPLE ID	GCAL SAMPLE ID	PF	D/F	TIME	Analyte Symbols																																
					Al	Sb	As	Ba	Be	B	Cd	Ca	Cr	Co	Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	K	Se	Si	Ag	Na	Sr	Tl	Sn	Ti	V	Zn	Zr
ITUNE	1150	*	1	1252		X									X		X																	X	
IICALB	1300	*	1	1305		X									X		X																	X	
IICAL2	1302	*	1	1309		X									X		X																	X	
IICAL4	1304	*	1	1313		X									X		X																	X	
IICAL5	1305	*	1	1317		X									X		X																	X	
IICAL6	1306	*	1	1320		X									X		X																	X	
ICV	1600	*	1	1324		X									X		X																	X	
ICB	1700	*	1	1342		X									X		X																	X	
LLCCV	1803	*	1	1353		X									X		X																	X	
ICSA	2000	*	1	1356		X									X		X																	X	
ICSAB	2100	*	1	1400		X									X		X																	X	
LDR	2500	*	1	1403		X									X		X																	X	
CCV	1800	*	1	1734		X									X		X																	X	
CCB	1900	*	1	1738		X									X		X																	X	
MB1841052	1841052	*	1	1827		X									X		X																	X	
LCS1841053	1841053	*	1	1831		X									X		X																	X	
CCV	1800	*	1	1838		X									X		X																	X	
CCB	1900	*	1	1841		X									X		X																	X	

FORM XIV - IN

XIV
ANALYSIS RUN LOG

Report No: 218081812 Analytical Batch: 642309 Start Date: 08/20/18

Instrument ID: ICPMS2 Analytical Method: EPA 6020B End Date: 08/20/18

CLIENT SAMPLE ID	GCAL SAMPLE ID	PF	D/F	TIME	Analyte Symbols																																		
					Al	Sb	As	Ba	Be	B	Cd	Ca	Cr	Co	Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	K	Se	Si	Ag	Na	Sr	Tl	Sn	Ti	V	Zn	Zr					
ITUNE	1150	*	1	1252		X									X		X																X							
IICALB	1300	*	1	1305		X									X		X																X							
IICAL2	1302	*	1	1309		X									X		X																X							
IICAL4	1304	*	1	1313		X									X		X																X							
IICAL5	1305	*	1	1317		X									X		X																X							
IICAL6	1306	*	1	1320		X									X		X																X							
ICV	1600	*	1	1324		X									X		X																X							
ICB	1700	*	1	1342		X									X		X																X							
LLCCV	1803	*	1	1353		X									X		X																X							
ICSA	2000	*	1	1356		X									X		X																X							
ICSAB	2100	*	1	1400		X									X		X																X							
LDR	2500	*	1	1403		X									X		X																X							
CCV	1800	*	1	1734		X									X		X																X							
CCB	1900	*	1	1738		X									X		X																X							
WIL02DA02A	21808181206	*	10	1802		X									X		X																X							
WIL02DA02A MS	21808181207	*	10	1806		X									X		X																X							
WIL02DA02A MSD	21808181208	*	10	1810		X									X		X																X							
WIL02DA02APDS	1841231	*	10	1813		X									X		X																X							
WIL02DA02ASD	1841232	*	50	1817		X									X		X																X							
WIL02DA01A	21808181209	*	10	1820		X									X		X																X							
WIL02DA01B	21808181210	*	10	1824		X									X		X																X							
CCV	1800	*	1	1838		X									X		X																X							
CCB	1900	*	1	1841		X									X		X																X							

FORM XIV - IN

VIII
ICP-MS TUNE

Report No:	218081812	GCAL QC ID:	1150
Instrument ID:	ICPMS2	Lab File ID:	2180820B_MS2.b\QCTune\2180820B_MS2-QCTu
Analyst:	AWG	Analytical Batch:	642309
Analysis Date:	08/20/18 Time: 1253	Analytical Method:	EPA 6020B

ELEMENT - MASS	AVG MEASURED MASS (amu)	PEAK WIDTH AT 5% PEAK HEIGHT (amu)	%RSD
Be-9	9.05	.7887	.7645
Mg-24	24	.7914	.9917
Mg-25	25	.7928	1.2727
Mg-26	26	.8258	.4753
Co-59	58.95	.7864	.6309
In-115	115	.7729	1.2881
Pb-206	206	.8291	2.0969
Pb-207	206.95	.7931	1.9959
Pb-208	207.95	.8279	2.4434

FORM VIII - IN

II

INITIAL CALIBRATION VERIFICATION (ICV) STANDARD

Report No:	218081812	GCAL QC ID:	1600
Instrument ID:	ICPMS2	Lab File ID:	2180820B_MS2.b\009_ICV.d
Analyst:	LWZ	Analytical Batch:	642309
Analysis Date:	08/20/18 Time: 1324	Analytical Method:	EPA 6020B

ANALYTE	*TRUE*	*FOUND*	*%RECOVERY*	*Q*	*UNITS*
Antimony	50.0	54.6	109		ug/L
Copper	50.0	52.0	104		ug/L
Lead	50.0	49.3	99		ug/L
Zinc	1000	1010	101		ug/L

CONTROL LIMITS 90-110%

FORM II - IN

III

INITIAL CALIBRATION BLANK

Report No:	218081812	Blank ID:	1700
Instrument ID:	ICPMS2	Lab File ID:	2180820B_MS2.b\1211_ICB.d
Analyst:	LWZ	Analytical Batch:	642309
Analysis Date:	08/20/18 Time: 1342	Analytical Method:	EPA 6020B

ANALYTE	RESULT	UNITS	Q	DL	LOD	LOQ
Antimony	1.00	ug/L	U	0.50	1.00	2.00
Copper	0.50	ug/L	U	0.25	0.50	1.00
Lead	0.50	ug/L	U	0.25	0.50	1.00
Zinc	10.0	ug/L	U	5.00	10.0	20.0

FORM III - IN

II

LOW LEVEL CONTINUING CALIBRATION VERIFICATION (LLCCV) STANDARD

Report No:	218081812	GCAL QC ID:	1803
Instrument ID:	ICPMS2	Lab File ID:	2180820B_MS2.b\121211CCV1.d
Analyst:	LWZ	Analytical Batch:	642309
Analysis Date:	08/20/18 Time: 1353	Analytical Method:	EPA 6020B

ANALYTE	*TRUE*	*FOUND*	*%RECOVERY*	*Q*	*UNITS*
Antimony	2.00	1.90	95		ug/L
Copper	1.00	1.06	106		ug/L
Lead	1.00	0.990	99		ug/L
Zinc	20.0	21.2	106		ug/L

CONTROL LIMITS 80-120%

FORM II - IN

IV

ICPMS INTERFERENCE CHECKS

Report No:	218081812	ICSA \ AB ID:	2000 \ 2100
Instrument ID:	ICPMS2	Analytical Batch:	642309
Analyst:	LWZ	Analytical Method:	EPA 6020B
Lab File ID ICSA1:	2180820B_MS2.b\121212ICSA.d	Lab File ID ICSAB1:	2180820B_MS2.b\121213ICSB.d
Lab File ID ICSA2:		Lab File ID ICSAB2:	

Concentration Units: ug/L

		Analyzed (A/AB):	08/20/18 1356	08/20/18 1400				
ANALYTE	***TRUE A***	***TRUE AB***	***ICSA1***	***ICSAB1***	***%R***	***ICSA2***	***ICSAB2***	***%R***
Aluminum	1000	1000	1010	999	100			
Antimony	0	0	0.039	0.031				
Arsenic	0	10.0	0.0030	10.3	103			
Barium	0	0	-0.0040	0.016				
Beryllium	0	0	-0.0010	-0.0010				
Boron	0	20.0	0.17	20.2	101			
Cadmium	0	10.0	0.017	10.1	101			
Calcium	3000	3000	2950	2980	99			
Chromium	0	20.0	0.088	20.8	104			
Cobalt	0	20.0	0.0040	21.0	105			
Copper	0	20.0	0.18	21.5	108			
Iron	2500	2500	2570	2510	100			
Lead	0	0	0.0040	-0.0020				
Lithium	0	20.0	-0.069	23.9	120			
Magnesium	1000	1000	1020	1020	102			
Manganese	0	20.0	0.035	20.6	103			
Molybdenum	20.0	20.0	19.5	19.3	96			
Nickel	0	20.0	0.032	21.3	106			
Potassium	1000	1000	1010	1010	101			
Selenium	0	10.0	-0.040	10.1	101			
Silicon	0	1000	-4500	-3500	-351			
Silver	0	5.00	0.0060	5.15	103			
Sodium	2500	2500	2540	2540	102			
Strontium	0	10.0	0.10	10.1	101			
Thallium	0	0	0.0	-0.0010				
Tin	0	10.0	0.040	7.34	73			
Titanium	20.0	20.0	19.4	19.3	96			
Vanadium	0	20.0	-0.015	17.6	88			
Zinc	0	20.0	0.029	21.1	106			
Zirconium	0	20.0	0.017	19.1	96			

FORM IV - IN

II

LINEAR DYNAMIC RANGE (LDR) STANDARD

Report No:	218081812	GCAL QC ID:	2500
Instrument ID:	ICPMS2	Lab File ID:	2180820B_MS2.b\121214_QC1.d
Analyst:	LWZ	Analytical Batch:	642309
Analysis Date:	08/20/18 Time: 1403	Analytical Method:	EPA 6020B

ANALYTE	TRUE	FOUND	%RECOVERY	Q	UNITS
Antimony	1000	924	92		ug/L
Copper	1000	929	93		ug/L
Lead	1000	915	92		ug/L
Zinc	20000	18100	91		ug/L

CONTROL LIMITS 90-110%

FORM II - IN

II

CONTINUING CALIBRATION VERIFICATION (CCV) STANDARD

Report No:	218081812	GCAL QC ID:	1800
Instrument ID:	ICPMS2	Lab File ID:	2180820B_MS2.b\121269_CCV.d
Analyst:	LWZ	Analytical Batch:	642309
Analysis Date:	08/20/18 Time: 1734	Analytical Method:	EPA 6020B

ANALYTE	*TRUE*	*FOUND*	*%RECOVERY*	*Q*	*UNITS*
Antimony	20.0	19.9	99		ug/L
Copper	10.0	10.2	102		ug/L
Lead	10.0	9.84	98		ug/L
Zinc	200	201	100		ug/L

CONTROL LIMITS 90-110%

FORM II - IN

III

CONTINUING CALIBRATION BLANK

Report No:	218081812	Blank ID:	1900
Instrument ID:	ICPMS2	Lab File ID:	2180820B_MS2.b\121270_CCB.d
Analyst:	LWZ	Analytical Batch:	642309
Analysis Date:	08/20/18 Time: 1738	Analytical Method:	EPA 6020B

ANALYTE	RESULT	UNITS	Q	DL	LOD	LOQ
Antimony	1.00	ug/L	U	0.50	1.00	2.00
Copper	0.50	ug/L	U	0.25	0.50	1.00
Lead	0.50	ug/L	U	0.25	0.50	1.00
Zinc	10.0	ug/L	U	5.00	10.0	20.0

FORM III - IN

II

CONTINUING CALIBRATION VERIFICATION (CCV) STANDARD

Report No:	218081812	GCAL QC ID:	1800
Instrument ID:	ICPMS2	Lab File ID:	2180820B_MS2.b\121287_CCV.d
Analyst:	LWZ	Analytical Batch:	642309
Analysis Date:	08/20/18 Time: 1838	Analytical Method:	EPA 6020B

ANALYTE	*TRUE*	*FOUND*	*%RECOVERY*	*Q*	*UNITS*
Antimony	20.0	19.7	99		ug/L
Copper	10.0	10.4	104		ug/L
Lead	10.0	9.61	96		ug/L
Zinc	200	196	98		ug/L

CONTROL LIMITS 90-110%

FORM II - IN

III

CONTINUING CALIBRATION BLANK

Report No:	218081812	Blank ID:	1900
Instrument ID:	ICPMS2	Lab File ID:	2180820B_MS2.b\121288_CCB.d
Analyst:	LWZ	Analytical Batch:	642309
Analysis Date:	08/20/18 Time: 1841	Analytical Method:	EPA 6020B

ANALYTE	RESULT	UNITS	Q	DL	LOD	LOQ
Antimony	1.00	ug/L	U	0.50	1.00	2.00
Copper	0.50	ug/L	U	0.25	0.50	1.00
Lead	0.50	ug/L	U	0.25	0.50	1.00
Zinc	10.0	ug/L	U	5.00	10.0	20.0

FORM III - IN

XV (He)

ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY

Report No:	218081812	Start Date:	08/20/18
Instrument ID:	ICPMS2	End Date:	08/20/18
Analytical Method	EPA 6020B	Analytical Batch:	642309

			Internal Standards %RI For:													
CLIENT SAMPLE ID	GCAL SAMPLE ID	TIME	ISTD1	Q	ISTD2	Q	ISTD3	Q	ISTD4	Q	ISTD5	Q	ISTD6	Q	ISTD7	Q
WIL02DA02A	21808181206	1802	107		105		104		110		104		105		108	
WIL02DA02A MS	21808181207	1806	108		105		103		110		104		105		109	
WIL02DA02A MSD	21808181208	1810	111		106		106		113		104		105		110	
WIL02DA02APDS	1841231	1813	113		107		106		116		106		108		113	
WIL02DA02ASD	1841232	1817	112		107		107		113		107		101		112	
WIL02DA01A	21808181209	1820	112		106		105		113		104		106		110	
WIL02DA01B	21808181210	1824	115		108		109		116		108		107		114	

ISTD 1: Bismuth (He)
ISTD 2: Germanium (He)
ISTD 3: Indium (He)
ISTD 4: Lutetium (He)
ISTD 5: Rhodium (He)
ISTD 6: Scandium (He)
ISTD 7: Terbium (He)

FORM XV - IN

XV (No Gas)

ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY

Report No:	218081812	Start Date:	08/20/18
Instrument ID:	ICPMS2	End Date:	08/20/18
Analytical Method	EPA 6020B	Analytical Batch:	642309

			Internal Standards %RI For:													
CLIENT SAMPLE ID	GCAL SAMPLE ID	TIME	ISTD8	Q	ISTD9	Q	ISTD10	Q	ISTD11	Q	ISTD12	Q	ISTD13	Q	ISTD14	Q
WIL02DA02A	21808181206	1802	92		99		98		99		97		106		99	
WIL02DA02A MS	21808181207	1806	100		102		102		107		101		109		107	
WIL02DA02A MSD	21808181208	1810	100		101		102		106		100		110		105	
WIL02DA02APDS	1841231	1813	104		103		105		110		103		110		109	
WIL02DA02ASD	1841232	1817	109		105		109		113		107		105		111	
WIL02DA01A	21808181209	1820	104		103		106		110		102		110		108	
WIL02DA01B	21808181210	1824	101		102		105		108		101		108		107	

ISTD 8: Bismuth (No Gas)
ISTD 9: Germanium (No Gas)
ISTD 10 Indium (No Gas)
ISTD 11 Lutetium (No Gas)
ISTD 12 Rhodium (No Gas)
ISTD 13 Scandium (No Gas)
ISTD 14 Terbium (No Gas)

FORM XV - IN

XV (He)

ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY

Report No:	218081813	Start Date:	08/20/18
Instrument ID:	ICPMS2	End Date:	08/20/18
Analytical Method	EPA 6020B	Analytical Batch:	642309

			Internal Standards %RI For:													
CLIENT SAMPLE ID	*GCAL SAMPLE ID*	*TIME*	*ISTD1*	*Q*	*ISTD2*	*Q*	*ISTD3*	*Q*	*ISTD4*	*Q*	*ISTD5*	*Q*	*ISTD6*	*Q*	*ISTD7*	*Q*
MB1841052	1841052	1827	114		102		107		111		108		96		110	
LCS1841053	1841053	1831	116		105		109		118		108		97		116	

ISTD 1: Bismuth (He)
ISTD 2: Germanium (He)
ISTD 3: Indium (He)
ISTD 4: Lutetium (He)
ISTD 5: Rhodium (He)
ISTD 6: Scandium (He)
ISTD 7: Terbium (He)

FORM XV - IN

XV (No Gas)

ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY

Report No:	218081813	Start Date:	08/20/18
Instrument ID:	ICPMS2	End Date:	08/20/18
Analytical Method	EPA 6020B	Analytical Batch:	642309

			Internal Standards %RI For:													
CLIENT SAMPLE ID	*GCAL SAMPLE ID*	*TIME*	*ISTD8*	*Q*	*ISTD9*	*Q*	*ISTD10*	*Q*	*ISTD11*	*Q*	*ISTD12*	*Q*	*ISTD13*	*Q*	*ISTD14*	*Q*
MB1841052	1841052	1827	105		101		107		109		107		102		108	
LCS1841053	1841053	1831	108		105		112		117		107		104		115	

ISTD 8: Bismuth (No Gas)
ISTD 9: Germanium (No Gas)
ISTD 10 Indium (No Gas)
ISTD 11 Lutetium (No Gas)
ISTD 12 Rhodium (No Gas)
ISTD 13 Scandium (No Gas)
ISTD 14 Terbium (No Gas)

FORM XV - IN

XIV
ANALYSIS RUN LOG

Report No: 218081812 Analytical Batch: 642381 Start Date: 08/21/18

Instrument ID: ICPMS1 Analytical Method: EPA 6020B End Date: 08/21/18

CLIENT SAMPLE ID	GCAL SAMPLE ID	PF	D/F	TIME	Analyte Symbols																																		
					Al	Sb	As	Ba	Be	B	Cd	Ca	Cr	Co	Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	K	Se	Si	Ag	Na	Sr	Tl	Sn	Ti	V	Zn	Zr
ITUNE	1150	*	1	0930		X									X		X																	X	
IICALB	1300	*	1	1023		X									X		X																	X	
IICAL2	1302	*	1	1027		X									X		X																	X	
IICAL4	1304	*	1	1033		X									X		X																	X	
IICAL5	1305	*	1	1037		X									X		X																	X	
IICAL6	1306	*	1	1042		X									X		X																	X	
ICV	1600	*	1	1046		X									X		X																	X	
ICB	1700	*	1	1055		X									X		X																	X	
LLCCV	1803	*	1	1108		X									X		X																	X	
ICSA	2000	*	1	1112		X									X		X																	X	
ICSAB	2100	*	1	1117		X									X		X																	X	
LDR	2500	*	1	1121		X									X		X																	X	
MB1840818	1840818	*	1	1138		X									X		X																	X	
LCS1840819	1840819	*	1	1143		X									X		X																	X	
CCV	1800	*	1	1156		X									X		X																	X	
CCB	1900	*	1	1200		X									X		X																	X	

FORM XIV - IN

XIV
ANALYSIS RUN LOG

Report No: 218081813 Analytical Batch: 642381 Start Date: 08/21/18

Instrument ID: ICPMS1 Analytical Method: EPA 6020B End Date: 08/21/18

CLIENT SAMPLE ID	GCAL SAMPLE ID	PF	D/F	TIME	Analyte Symbols																																		
					Al	Sb	As	Ba	Be	B	Cd	Ca	Cr	Co	Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	K	Se	Si	Ag	Na	Sr	Tl	Sn	Ti	V	Zn	Zr
ITUNE	1150	*	1	0930		X									X		X																	X	
IICALB	1300	*	1	1023		X									X		X																	X	
IICAL2	1302	*	1	1027		X									X		X																	X	
IICAL4	1304	*	1	1033		X									X		X																	X	
IICAL5	1305	*	1	1037		X									X		X																	X	
IICAL6	1306	*	1	1042		X									X		X																	X	
ICV	1600	*	1	1046		X									X		X																	X	
ICB	1700	*	1	1055		X									X		X																	X	
LLCCV	1803	*	1	1108		X									X		X																	X	
ICSA	2000	*	1	1112		X									X		X																	X	
ICSAB	2100	*	1	1117		X									X		X																	X	
LDR	2500	*	1	1121		X									X		X																	X	
WIL03IS00	21808181303	*	1	1151		X									X		X																	X	
CCV	1800	*	1	1156		X									X		X																	X	
CCB	1900	*	1	1200		X									X		X																	X	

FORM XIV - IN

VIII
ICP-MS TUNE

Report No:	218081812	GCAL QC ID:	1150
Instrument ID:	ICPMS1	Lab File ID:	2180821A_MS1.b\QCTune\2180821A_MS1-QCTu
Analyst:	AWG	Analytical Batch:	642381
Analysis Date:	08/21/18 Time: 0931	Analytical Method:	EPA 6020B

ELEMENT - MASS	AVG MEASURED MASS (amu)	PEAK WIDTH AT 5% PEAK HEIGHT (amu)	%RSD
Be-9	9	.7803	.2982
Mg-24	23.9	.7774	.8215
Mg-25	24.9	.7735	.9524
Mg-26	25.9	.7497	.5087
Co-59	58.95	.7688	.6382
In-115	115	.7517	.5548
Pb-206	206	.7916	.8925
Pb-207	207	.8145	1.0512
Pb-208	208	.8111	.8122

FORM VIII - IN

II

INITIAL CALIBRATION VERIFICATION (ICV) STANDARD

Report No:	218081812	GCAL QC ID:	1600
Instrument ID:	ICPMS1	Lab File ID:	2180821A_MS1.b\009_ICV.d
Analyst:	LWZ	Analytical Batch:	642381
Analysis Date:	08/21/18 Time: 1046	Analytical Method:	EPA 6020B

ANALYTE	*TRUE*	*FOUND*	*%RECOVERY*	*Q*	*UNITS*
Antimony	50.0	52.2	104		ug/L
Copper	50.0	50.1	100		ug/L
Lead	50.0	48.8	98		ug/L
Zinc	1000	994	99		ug/L

CONTROL LIMITS 90-110%

FORM II - IN

III

INITIAL CALIBRATION BLANK

Report No:	218081812	Blank ID:	1700
Instrument ID:	ICPMS1	Lab File ID:	2180821A_MS1.b\011_ICB.d
Analyst:	LWZ	Analytical Batch:	642381
Analysis Date:	08/21/18 Time: 1055	Analytical Method:	EPA 6020B

ANALYTE	*RESULT*	*UNITS*	*Q*	*DL*	*LOD*	*LOQ*
Antimony	1.00	ug/L	U	0.50	1.00	2.00
Copper	0.50	ug/L	U	0.25	0.50	1.00
Lead	0.50	ug/L	U	0.25	0.50	1.00
Zinc	10.0	ug/L	U	5.00	10.0	20.0

FORM III - IN

II

LOW LEVEL CONTINUING CALIBRATION VERIFICATION (LLCCV) STANDARD

Report No:	218081812	GCAL QC ID:	1803
Instrument ID:	ICPMS1	Lab File ID:	2180821A_MS1.b\014CCV1.d
Analyst:	LWZ	Analytical Batch:	642381
Analysis Date:	08/21/18 Time: 1108	Analytical Method:	EPA 6020B

ANALYTE	*TRUE*	*FOUND*	*%RECOVERY*	*Q*	*UNITS*
Antimony	2.00	2.07	103		ug/L
Copper	1.00	0.810	81		ug/L
Lead	1.00	0.980	98		ug/L
Zinc	20.0	20.8	104		ug/L

CONTROL LIMITS 80-120%

FORM II - IN

IV
ICPMS INTERFERENCE CHECKS

Report No:	218081812	ICSA \ AB ID:	2000 \ 2100
Instrument ID:	ICPMS1	Analytical Batch:	642381
Analyst:	LWZ	Analytical Method:	EPA 6020B
Lab File ID ICSA1:	2180821A_MS1.b\015ICSA.d	Lab File ID ICSAB1:	2180821A_MS1.b\016ICSB.d
Lab File ID ICSA2:		Lab File ID ICSAB2:	

Concentration Units: ug/L

		Analyzed (A/AB):	08/21/18 1112	08/21/18 1117				
ANALYTE	***TRUE A***	***TRUE AB***	***ICSA1***	***ICSAB1***	***%R***	***ICSA2***	***ICSAB2***	***%R***
Aluminum	1000	1000	1010	1010	101			
Antimony	0	0	0.063	0.065				
Arsenic	0	10.0	-0.0010	10.3	103			
Barium	0	0	0.039	0.034				
Beryllium	0	0	0.0	0.0				
Boron	0	20.0	1.21	20.2	101			
Cadmium	0	10.0	0.027	10.1	101			
Calcium	3000	3000	2960	3010	100			
Chromium	0	20.0	0.0060	20.4	102			
Cobalt	0	20.0	0.014	20.8	104			
Copper	0	20.0	-0.17	20.2	101			
Iron	2500	2500	2530	2510	100			
Lead	0	0	-0.0040	-0.0090				
Lithium	0	20.0	-0.051	22.7	114			
Magnesium	1000	1000	1010	1010	101			
Manganese	0	20.0	0.031	20.8	104			
Molybdenum	20.0	20.0	19.2	19.0	95			
Nickel	0	20.0	0.022	21.2	106			
Potassium	1000	1000	1020	992	99			
Selenium	0	10.0	0.063	10.1	101			
Silicon	0	1000	-23	1100	110			
Silver	0	5.00	0.0070	5.15	103			
Sodium	2500	2500	2590	2570	103			
Strontium	0	10.0	0.094	9.55	96			
Thallium	0	0	-0.067	-0.069				
Tin	0	10.0	0.010	7.32	73			
Titanium	20.0	20.0	20.5	20.0	100			
Vanadium	0	20.0	-0.0020	17.4	87			
Zinc	0	20.0	0.27	21.6	108			
Zirconium	0	20.0	0.027	18.8	94			

FORM IV - IN

II

LINEAR DYNAMIC RANGE (LDR) STANDARD

Report No:	218081812	GCAL QC ID:	2500
Instrument ID:	ICPMS1	Lab File ID:	2180821A_MS1.b\017_QC1.d
Analyst:	LWZ	Analytical Batch:	642381
Analysis Date:	08/21/18 Time: 1121	Analytical Method:	EPA 6020B

ANALYTE	*TRUE*	*FOUND*	*%RECOVERY*	*Q*	*UNITS*
Antimony	1000	901	90		ug/L
Copper	1000	1030	103		ug/L
Lead	1000	928	93		ug/L
Zinc	20000	18500	93		ug/L

CONTROL LIMITS 90-110%

FORM II - IN

II

CONTINUING CALIBRATION VERIFICATION (CCV) STANDARD

Report No:	218081812	GCAL QC ID:	1800
Instrument ID:	ICPMS1	Lab File ID:	2180821A_MS1.b\024_CCV.d
Analyst:	LWZ	Analytical Batch:	642381
Analysis Date:	08/21/18 Time: 1156	Analytical Method:	EPA 6020B

ANALYTE	*TRUE*	*FOUND*	*%RECOVERY*	*Q*	*UNITS*
Antimony	20.0	20.0	100		ug/L
Copper	10.0	10.1	101		ug/L
Lead	10.0	9.57	96		ug/L
Zinc	200	205	102		ug/L

CONTROL LIMITS 90-110%

FORM II - IN

III

CONTINUING CALIBRATION BLANK

Report No:	218081812	Blank ID:	1900
Instrument ID:	ICPMS1	Lab File ID:	2180821A_MS1.b\025_CCB.d
Analyst:	LWZ	Analytical Batch:	642381
Analysis Date:	08/21/18 Time: 1200	Analytical Method:	EPA 6020B

ANALYTE	*RESULT*	*UNITS*	*Q*	*DL*	*LOD*	*LOQ*
Antimony	1.00	ug/L	U	0.50	1.00	2.00
Copper	0.50	ug/L	U	0.25	0.50	1.00
Lead	0.50	ug/L	U	0.25	0.50	1.00
Zinc	10.0	ug/L	U	5.00	10.0	20.0

FORM III - IN

XV (He)

ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY

Report No:	218081812	Start Date:	08/21/18
Instrument ID:	ICPMS1	End Date:	08/21/18
Analytical Method	EPA 6020B	Analytical Batch:	642381

			Internal Standards %RI For:															
CLIENT SAMPLE ID	GCAL SAMPLE ID	TIME	ISTD1	Q	ISTD2	Q	ISTD3	Q	ISTD4	Q	ISTD5	Q	ISTD6	Q	ISTD7	Q
MB1840818	1840818	1138	103		114		113		119		108		117		109	
LCS1840819	1840819	1143	98		107		108		116		104		113		105	

ISTD 1: Bismuth (He)
ISTD 2: Germanium (He)
ISTD 3: Indium (He)
ISTD 4: Lutetium (He)
ISTD 5: Rhodium (He)
ISTD 6: Scandium (He)
ISTD 7: Terbium (He)

FORM XV - IN

XV (No Gas)

ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY

Report No:	218081812	Start Date:	08/21/18
Instrument ID:	ICPMS1	End Date:	08/21/18
Analytical Method	EPA 6020B	Analytical Batch:	642381

			Internal Standards %RI For:															
CLIENT SAMPLE ID	GCAL SAMPLE ID	TIME	ISTD8	Q	ISTD9	Q	ISTD10	Q	ISTD11	Q	ISTD12	Q	ISTD13	Q	ISTD14	Q
MB1840818	1840818	1138	95		105		101		97		104		108		100	
LCS1840819	1840819	1143	93		104		100		97		100		107		99	

ISTD 8: Bismuth (No Gas)
ISTD 9: Germanium (No Gas)
ISTD 10 Indium (No Gas)
ISTD 11 Lutetium (No Gas)
ISTD 12 Rhodium (No Gas)
ISTD 13 Scandium (No Gas)
ISTD 14 Terbium (No Gas)

FORM XV - IN

XV (He)

ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY

Report No:	218081813	Start Date:	08/21/18
Instrument ID:	ICPMS1	End Date:	08/21/18
Analytical Method	EPA 6020B	Analytical Batch:	642381

			Internal Standards %RI For:													
CLIENT SAMPLE ID	*GCAL SAMPLE ID*	*TIME*	*ISTD1*	*Q*	*ISTD2*	*Q*	*ISTD3*	*Q*	*ISTD4*	*Q*	*ISTD5*	*Q*	*ISTD6*	*Q*	*ISTD7*	*Q*
WIL03IS00	21808181303	1151	100		102		101		108		103		104		101	

ISTD 1: Bismuth (He)
ISTD 2: Germanium (He)
ISTD 3: Indium (He)
ISTD 4: Lutetium (He)
ISTD 5: Rhodium (He)
ISTD 6: Scandium (He)
ISTD 7: Terbium (He)

FORM XV - IN

XV (No Gas)

ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY

Report No:	218081813	Start Date:	08/21/18
Instrument ID:	ICPMS1	End Date:	08/21/18
Analytical Method	EPA 6020B	Analytical Batch:	642381

			Internal Standards %RI For:													
CLIENT SAMPLE ID	GCAL SAMPLE ID	TIME	ISTD8	Q	ISTD9	Q	ISTD10	Q	ISTD11	Q	ISTD12	Q	ISTD13	Q	ISTD14	Q
WIL03IS00	21808181303	1151	100		105		102		99		104		104		101	

ISTD 8: Bismuth (No Gas)
ISTD 9: Germanium (No Gas)
ISTD 10 Indium (No Gas)
ISTD 11 Lutetium (No Gas)
ISTD 12 Rhodium (No Gas)
ISTD 13 Scandium (No Gas)
ISTD 14 Terbium (No Gas)

FORM XV - IN

XIV
ANALYSIS RUN LOG

Report No: 218081813 Analytical Batch: 642536 Start Date: 08/23/18

Instrument ID: ICPMS1 Analytical Method: EPA 6020B End Date: 08/23/18

CLIENT SAMPLE ID	GCAL SAMPLE ID	PF	D/F	TIME	Analyte Symbols																																				
					Al	Sb	As	Ba	Be	B	Cd	Ca	Cr	Co	Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	K	Se	Si	Ag	Na	Sr	Tl	Sn	Ti	V	Zn	Zr
ITUNE	1150	*	1	0902		X									X		X																	X	
IICALB	1300	*	1	1014		X									X		X																	X	
IICAL2	1302	*	1	1018		X									X		X																	X	
IICAL4	1304	*	1	1023		X									X		X																	X	
IICAL5	1305	*	1	1027		X									X		X																	X	
IICAL6	1306	*	1	1032		X									X		X																	X	
ICV	1600	*	1	1036		X									X		X																	X	
ICB	1700	*	1	1041		X									X		X																	X	
LLCCV	1803	*	1	1045		X									X		X																	X	
ICSA	2000	*	1	1049		X									X		X																	X	
ICSAB	2100	*	1	1054		X									X		X																	X	
LDR	2500	*	1	1058		X									X		X																	X	
MB1841866	1841866	*	1	1129		X									X		X																	X	
LCS1841867	1841867	*	1	1134		X									X		X																	X	
CCV	1800	*	1	1200		X									X		X																	X	
CCB	1900	*	1	1205		X									X		X																	X	
WIL01IS02	21808181302	*	10	1209		X									X		X																	X	
WIL01IS02MS	1842047	*	10	1214		X									X		X																	X	
WIL01IS02MSD	1842048	*	10	1218		X									X		X																	X	
WIL01IS02PDS	1842322	*	10	1222		X									X		X																	X	
WIL01IS02SD	1842323	*	50	1227		X									X		X																	X	
WIL04IS03	21808181304	*	10	1231		X									X		X																	X	
WIL04IS01	21808181305	*	10	1235		X									X		X																	X	
WIL04IS02	21808181306	*	10	1240		X									X		X																	X	
CCV	1800	*	1	1328		X									X		X																	X	
CCB	1900	*	1	1332		X									X		X																	X	

FORM XIV - IN

VIII
ICP-MS TUNE

Report No:	218081813	GCAL QC ID:	1150
Instrument ID:	ICPMS1	Lab File ID:	2180823A_MS1.b\QCTune\2180823A_MS1-QCTu
Analyst:	AWG	Analytical Batch:	642536
Analysis Date:	08/23/18 Time: 0902	Analytical Method:	EPA 6020B

ELEMENT - MASS	*AVG MEASURED MASS (amu)*	*PEAK WIDTH AT 5% PEAK HEIGHT (amu)*	*%RSD*
Be-9	9	.7775	.4292
Mg-24	23.9	.7434	.3034
Mg-25	24.95	.735	1.0936
Mg-26	25.9	.7422	1.4023
Co-59	58.95	.7335	.5488
In-115	115	.7328	.6735
Pb-206	206	.7673	1.1793
Pb-207	207	.7794	.977
Pb-208	208	.8013	.4759

FORM VIII - IN

II

INITIAL CALIBRATION VERIFICATION (ICV) STANDARD

Report No:	218081813	GCAL QC ID:	1600
Instrument ID:	ICPMS1	Lab File ID:	2180823A_MS1.b\017_ICV.d
Analyst:	LWZ	Analytical Batch:	642536
Analysis Date:	08/23/18 Time: 1036	Analytical Method:	EPA 6020B

ANALYTE	*TRUE*	*FOUND*	*%RECOVERY*	*Q*	*UNITS*
Antimony	50.0	49.7	99		ug/L
Copper	50.0	50.9	102		ug/L
Lead	50.0	48.8	98		ug/L
Zinc	1000	1000	100		ug/L

CONTROL LIMITS 90-110%

FORM II - IN

III

INITIAL CALIBRATION BLANK

Report No:	218081813	Blank ID:	1700
Instrument ID:	ICPMS1	Lab File ID:	2180823A_MS1.b\018_ICB.d
Analyst:	LWZ	Analytical Batch:	642536
Analysis Date:	08/23/18 Time: 1041	Analytical Method:	EPA 6020B

ANALYTE	RESULT	UNITS	Q	DL	LOD	LOQ
Antimony	1.00	ug/L	U	0.50	1.00	2.00
Copper	0.50	ug/L	U	0.25	0.50	1.00
Lead	0.50	ug/L	U	0.25	0.50	1.00
Zinc	10.0	ug/L	U	5.00	10.0	20.0

FORM III - IN

II

LOW LEVEL CONTINUING CALIBRATION VERIFICATION (LLCCV) STANDARD

Report No:	218081813	GCAL QC ID:	1803
Instrument ID:	ICPMS1	Lab File ID:	2180823A_MS1.b\019CCV1.d
Analyst:	LWZ	Analytical Batch:	642536
Analysis Date:	08/23/18 Time: 1045	Analytical Method:	EPA 6020B

ANALYTE	*TRUE*	*FOUND*	*%RECOVERY*	*Q*	*UNITS*
Antimony	2.00	1.95	98		ug/L
Copper	1.00	0.960	96		ug/L
Lead	1.00	0.980	98		ug/L
Zinc	20.0	20.4	102		ug/L

CONTROL LIMITS 80-120%

FORM II - IN

IV

ICPMS INTERFERENCE CHECKS

Report No:	218081813	ICSA \ AB ID:	2000 \ 2100
Instrument ID:	ICPMS1	Analytical Batch:	642536
Analyst:	LWZ	Analytical Method:	EPA 6020B
Lab File ID ICSA1:	2180823A_MS1.b\020ICSA.d	Lab File ID ICSAB1:	2180823A_MS1.b\021ICSB.d
Lab File ID ICSA2:		Lab File ID ICSAB2:	

Concentration Units: ug/L

		Analyzed (A/AB):	08/23/18 1049	08/23/18 1054				
ANALYTE	***TRUE A***	***TRUE AB***	***ICSA1***	***ICSAB1***	***%R***	***ICSA2***	***ICSAB2***	***%R***
Aluminum	1000	1000	1010	999	100			
Antimony	0	0	-0.0020	-0.012				
Arsenic	0	10.0	0.0040	10.0	100			
Barium	0	0	0.025	0.025				
Beryllium	0	0	-0.0010	-0.0050				
Boron	0	20.0	0.42	19.5	98			
Cadmium	0	10.0	0.020	10.1	101			
Calcium	3000	3000	2870	2960	99			
Chromium	0	20.0	0.0	19.9	100			
Cobalt	0	20.0	0.0040	20.2	101			
Copper	0	20.0	-0.098	20.6	103			
Iron	2500	2500	2490	2480	99			
Lead	0	0	0.0010	-0.010				
Lithium	0	20.0	-0.026	22.4	112			
Magnesium	1000	1000	997	991	99			
Manganese	0	20.0	0.028	20.2	101			
Molybdenum	20.0	20.0	19.5	19.3	96			
Nickel	0	20.0	-0.0080	20.5	102			
Potassium	1000	1000	1010	998	100			
Selenium	0	10.0	0.021	10.4	104			
Silicon	0	1000	-1.4	1090	109			
Silver	0	5.00	0.0070	5.16	103			
Sodium	2500	2500	2600	2520	101			
Strontium	0	10.0	0.10	9.92	99			
Thallium	0	0	-0.026	-0.034				
Tin	0	10.0	-0.038	7.41	74			
Titanium	20.0	20.0	20.0	20.8	104			
Vanadium	0	20.0	-0.011	17.1	86			
Zinc	0	20.0	-0.13	19.8	99			
Zirconium	0	20.0	0.021	19.1	96			

FORM IV - IN

II

LINEAR DYNAMIC RANGE (LDR) STANDARD

Report No:	218081813	GCAL QC ID:	2500
Instrument ID:	ICPMS1	Lab File ID:	2180823A_MS1.b\022_QC1.d
Analyst:	LWZ	Analytical Batch:	642536
Analysis Date:	08/23/18 Time: 1058	Analytical Method:	EPA 6020B

ANALYTE	TRUE	FOUND	%RECOVERY	Q	UNITS
Antimony	1000	909	91		ug/L
Copper	1000	923	92		ug/L
Lead	1000	952	95		ug/L
Zinc	20000	19600	98		ug/L

CONTROL LIMITS 90-110%

FORM II - IN

II

CONTINUING CALIBRATION VERIFICATION (CCV) STANDARD

Report No:	218081813	GCAL QC ID:	1800
Instrument ID:	ICPMS1	Lab File ID:	2180823A_MS1.b\036_CCV.d
Analyst:	LWZ	Analytical Batch:	642536
Analysis Date:	08/23/18 Time: 1200	Analytical Method:	EPA 6020B

ANALYTE	TRUE	FOUND	%RECOVERY	Q	UNITS
Antimony	20.0	19.5	98		ug/L
Copper	10.0	9.97	100		ug/L
Lead	10.0	9.44	94		ug/L
Zinc	200	198	99		ug/L

CONTROL LIMITS 90-110%

FORM II - IN

III

CONTINUING CALIBRATION BLANK

Report No:	218081813	Blank ID:	1900
Instrument ID:	ICPMS1	Lab File ID:	2180823A_MS1.b\037_CCB.d
Analyst:	LWZ	Analytical Batch:	642536
Analysis Date:	08/23/18 Time: 1205	Analytical Method:	EPA 6020B

ANALYTE	*RESULT*	*UNITS*	*Q*	*DL*	*LOD*	*LOQ*
Antimony	1.00	ug/L	U	0.50	1.00	2.00
Copper	0.50	ug/L	U	0.25	0.50	1.00
Lead	0.50	ug/L	U	0.25	0.50	1.00
Zinc	10.0	ug/L	U	5.00	10.0	20.0

FORM III - IN

II

CONTINUING CALIBRATION VERIFICATION (CCV) STANDARD

Report No:	218081813	GCAL QC ID:	1800
Instrument ID:	ICPMS1	Lab File ID:	2180823A_MS1.b\056_CCV.d
Analyst:	LWZ	Analytical Batch:	642536
Analysis Date:	08/23/18 Time: 1328	Analytical Method:	EPA 6020B

ANALYTE	*TRUE*	*FOUND*	*%RECOVERY*	*Q*	*UNITS*
Antimony	20.0	19.8	99		ug/L
Copper	10.0	10.1	101		ug/L
Lead	10.0	9.43	94		ug/L
Zinc	200	199	100		ug/L

CONTROL LIMITS 90-110%

FORM II - IN

III

CONTINUING CALIBRATION BLANK

Report No:	218081813	Blank ID:	1900
Instrument ID:	ICPMS1	Lab File ID:	2180823A_MS1.b\057_CCB.d
Analyst:	LWZ	Analytical Batch:	642536
Analysis Date:	08/23/18 Time: 1332	Analytical Method:	EPA 6020B

ANALYTE	*RESULT*	*UNITS*	*Q*	*DL*	*LOD*	*LOQ*
Antimony	1.00	ug/L	U	0.50	1.00	2.00
Copper	0.50	ug/L	U	0.25	0.50	1.00
Lead	0.50	ug/L	U	0.25	0.50	1.00
Zinc	10.0	ug/L	U	5.00	10.0	20.0

FORM III - IN

XV (He)

ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY

Report No:	218081813	Start Date:	08/23/18
Instrument ID:	ICPMS1	End Date:	08/23/18
Analytical Method	EPA 6020B	Analytical Batch:	642536

			Internal Standards %RI For:															
CLIENT SAMPLE ID	GCAL SAMPLE ID	TIME	ISTD1	Q	ISTD2	Q	ISTD3	Q	ISTD4	Q	ISTD5	Q	ISTD6	Q	ISTD7	Q
MB1841866	1841866	1129	102		108		109		112		105		110		107	
LCS1841867	1841867	1134	99		105		106		107		101		109		105	
WIL01IS02	21808181302	1209	90		97		93		96		91		102		97	
WIL01IS02MS	1842047	1214	84		95		92		95		88		100		95	
WIL01IS02MSD	1842048	1218	87		96		92		95		88		101		95	
WIL01IS02PDS	1842322	1222	86		97		92		95		89		101		96	
WIL01IS02SD	1842323	1227	100		101		100		100		99		101		101	
WIL04IS03	21808181304	1231	93		99		95		97		91		101		98	
WIL04IS01	21808181305	1235	90		98		95		98		92		101		98	
WIL04IS02	21808181306	1240	93		98		95		98		94		102		98	

ISTD 1: Bismuth (He)
ISTD 2: Germanium (He)
ISTD 3: Indium (He)
ISTD 4: Lutetium (He)
ISTD 5: Rhodium (He)
ISTD 6: Scandium (He)
ISTD 7: Terbium (He)

FORM XV - IN

XV (No Gas)

ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY

Report No:	218081813	Start Date:	08/23/18
Instrument ID:	ICPMS1	End Date:	08/23/18
Analytical Method	EPA 6020B	Analytical Batch:	642536

			Internal Standards %RI For:															
CLIENT SAMPLE ID	GCAL SAMPLE ID	TIME	ISTD8	Q	ISTD9	Q	ISTD10	Q	ISTD11	Q	ISTD12	Q	ISTD13	Q	ISTD14	Q
MB1841866	1841866	1129	98		103		103		101		102		106		102	
LCS1841867	1841867	1134	96		103		101		102		101		105		103	
WIL01IS02	21808181302	1209	96		105		101		103		100		109		104	
WIL01IS02MS	1842047	1214	95		103		100		102		98		108		102	
WIL01IS02MSD	1842048	1218	95		102		97		100		96		107		101	
WIL01IS02PDS	1842322	1222	95		104		99		101		98		108		102	
WIL01IS02SD	1842323	1227	101		103		103		103		103		104		104	
WIL04IS03	21808181304	1231	97		104		101		102		100		108		104	
WIL04IS01	21808181305	1235	97		105		101		103		100		108		104	
WIL04IS02	21808181306	1240	98		105		102		104		102		108		105	

ISTD 8: Bismuth (No Gas)
ISTD 9: Germanium (No Gas)
ISTD 10 Indium (No Gas)
ISTD 11 Lutetium (No Gas)
ISTD 12 Rhodium (No Gas)
ISTD 13 Scandium (No Gas)
ISTD 14 Terbium (No Gas)

FORM XV - IN

XIV
ANALYSIS RUN LOG

Report No: 218081813 Analytical Batch: 642829 Start Date: 08/28/18

Instrument ID: ICPMS2 Analytical Method: EPA 6020B End Date: 08/28/18

CLIENT SAMPLE ID	GCAL SAMPLE ID	PF	D/F	TIME	Analyte Symbols																																			
					Al	Sb	As	Ba	Be	B	Cd	Ca	Cr	Co	Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	K	Se	Si	Ag	Na	Sr	Tl	Sn	Ti	V	Zn	Zr
ITUNE	1150	*	1	0931		X									X		X																	X	
IICALB	1300	*	1	1024		X									X		X																	X	
IICAL2	1302	*	1	1028		X									X		X																	X	
IICAL4	1304	*	1	1031		X									X		X																	X	
IICAL5	1305	*	1	1035		X									X		X																	X	
IICAL6	1306	*	1	1039		X									X		X																	X	
ICV	1600	*	1	1042		X									X		X																	X	
ICB	1700	*	1	1050		X									X		X																	X	
LLCCV	1803	*	1	1100		X									X		X																	X	
ICSA	2000	*	1	1104		X									X		X																	X	
ICSAB	2100	*	1	1107		X									X		X																	X	
LDR	2500	*	1	1111		X									X		X																	X	
CCV	1800	*	1	1240		X									X		X																	X	
CCB	1900	*	1	1243		X									X		X																	X	
MB1842310	1842310	*	1	1247		X									X		X																	X	
LCS1842311	1842311	*	1	1250		X									X		X																	X	
WIL03IS01	21808181301	*	10	1305		X									X		X																	X	
WIL03IS02	21808181308	*	10	1308		X									X		X																	X	
CCV	1800	*	1	1337		X									X		X																	X	
CCB	1900	*	1	1340		X									X		X																	X	
WIL03IS03	21808181307	*	10	1355		X									X		X																	X	
CCV	1800	*	1	1358		X									X		X																	X	
CCB	1900	*	1	1402		X									X		X																	X	
ICSA	2000	*	1	1800		X									X		X																	X	
ICSAB	2100	*	1	1804		X									X		X																	X	

FORM XIV - IN

XIV
ANALYSIS RUN LOG

Report No: 218081814 Analytical Batch: 642829 Start Date: 08/28/18

Instrument ID: ICPMS2 Analytical Method: EPA 6020B End Date: 08/28/18

CLIENT SAMPLE ID	GCAL SAMPLE ID	PF	D/F	TIME	Analyte Symbols																																
					Al	Sb	As	Ba	Be	B	Cd	Ca	Cr	Co	Cu	Fe	Pb	Li	Mg	Mn	Hg	Mo	Ni	K	Se	Si	Ag	Na	Sr	Tl	Sn	Ti	V	Zn	Zr
ITUNE	1150	*	1	0931		X									X		X																X	
IICALB	1300	*	1	1024		X									X		X																X	
IICAL2	1302	*	1	1028		X									X		X																X	
IICAL4	1304	*	1	1031		X									X		X																X	
IICAL5	1305	*	1	1035		X									X		X																X	
IICAL6	1306	*	1	1039		X									X		X																X	
ICV	1600	*	1	1042		X									X		X																X	
ICB	1700	*	1	1050		X									X		X																X	
LLCCV	1803	*	1	1100		X									X		X																X	
ICSA	2000	*	1	1104		X									X		X																X	
ICSAB	2100	*	1	1107		X									X		X																X	
LDR	2500	*	1	1111		X									X		X																X	
CCV	1800	*	1	1240		X									X		X																X	
CCB	1900	*	1	1243		X									X		X																X	
MB1842310	1842310	*	1	1247		X									X		X																X	
LCS1842311	1842311	*	1	1250		X									X		X																X	
WIL02IS01	21808181401	*	10	1312		X									X		X																X	
WIL02IS01 MS	21808181402	*	10	1315		X									X		X																X	
WIL02IS01 MSD	21808181403	*	10	1319		X									X		X																X	
WIL02IS01PDS	1843727	*	10	1322		X									X		X																X	
WIL02IS01SD	1843728	*	50	1326		X									X		X																X	
WIL02IS02	21808181404	*	10	1329		X									X		X																X	
WIL01IS03	21808181405	*	10	1333		X									X		X																X	
CCV	1800	*	1	1337		X									X		X																X	
CCB	1900	*	1	1340		X									X		X																X	
WIL01IS01	21808181406	*	10	1344		X									X		X																X	
WIL02IS03	21808181407	*	10	1347		X									X		X																X	
CCV	1800	*	1	1358		X									X		X																X	
CCB	1900	*	1	1402		X									X		X																X	

FORM XIV - IN

VIII
ICP-MS TUNE

Report No:	218081813	GCAL QC ID:	1150
Instrument ID:	ICPMS2	Lab File ID:	2180828A_MS2.b\QCTune\2180828A_MS2-QCTu
Analyst:	AWG	Analytical Batch:	642829
Analysis Date:	08/28/18 Time: 0932	Analytical Method:	EPA 6020B

ELEMENT - MASS	AVG MEASURED MASS (amu)	PEAK WIDTH AT 5% PEAK HEIGHT (amu)	%RSD
Be-9	9	.785	.4858
Mg-24	24	.7864	.6731
Mg-25	25	.7931	1.2316
Mg-26	26	.7857	.6112
Co-59	59	.7733	.4029
In-115	115.05	.7179	.2559
Pb-206	206.05	.7639	1.0553
Pb-207	207.05	.744	.4899
Pb-208	208.05	.7747	.8738

FORM VIII - IN

II

INITIAL CALIBRATION VERIFICATION (ICV) STANDARD

Report No:	218081813	GCAL QC ID:	1600
Instrument ID:	ICPMS2	Lab File ID:	2180828B_MS2.b\015_ICV_2180828A_MS2.D
Analyst:	LWZ	Analytical Batch:	642829
Analysis Date:	08/28/18 Time: 1042	Analytical Method:	EPA 6020B

ANALYTE	TRUE	FOUND	%RECOVERY	Q	UNITS
Antimony	50.0	50.9	102		ug/L
Copper	50.0	51.6	103		ug/L
Lead	50.0	49.6	99		ug/L
Zinc	1000	1010	101		ug/L

CONTROL LIMITS 90-110%

FORM II - IN

III

INITIAL CALIBRATION BLANK

Report No:	218081813	Blank ID:	1700
Instrument ID:	ICPMS2	Lab File ID:	2180828B_MS2.b\017_ICB_2180828A_MS2.D
Analyst:	LWZ	Analytical Batch:	642829
Analysis Date:	08/28/18 Time: 1050	Analytical Method:	EPA 6020B

ANALYTE	RESULT	UNITS	Q	DL	LOD	LOQ
Antimony	1.00	ug/L	U	0.50	1.00	2.00
Copper	0.50	ug/L	U	0.25	0.50	1.00
Lead	0.50	ug/L	U	0.25	0.50	1.00
Zinc	10.0	ug/L	U	5.00	10.0	20.0

FORM III - IN

II

LOW LEVEL CONTINUING CALIBRATION VERIFICATION (LLCCV) STANDARD

Report No:	218081813	GCAL QC ID:	1803
Instrument ID:	ICPMS2	Lab File ID:	2180828B_MS2.b\1811CCV1_2180828A_MS2.D
Analyst:	LWZ	Analytical Batch:	642829
Analysis Date:	08/28/18 Time: 1100	Analytical Method:	EPA 6020B

ANALYTE	*TRUE*	*FOUND*	*%RECOVERY*	*Q*	*UNITS*
Antimony	2.00	1.91	95		ug/L
Copper	1.00	1.08	108		ug/L
Lead	1.00	0.980	98		ug/L
Zinc	20.0	19.1	95		ug/L

CONTROL LIMITS 80-120%

FORM II - IN

IV
ICPMS INTERFERENCE CHECKS

Report No:	218081813	ICSA \ AB ID:	2000 \ 2100
Instrument ID:	ICPMS2	Analytical Batch:	642829
Analyst:	LWZ	Analytical Method:	EPA 6020B
Lab File ID ICSA1:	2180828B_MS2.b\1812ICSA_2180828A_MS2.D	Lab File ID ICSAB1:	2180828B_MS2.b\1813ICSB_2180828A_MS2.D
Lab File ID ICSA2:	2180828C_MS2.b\070ICSA.d	Lab File ID ICSAB2:	2180828C_MS2.b\071ICSB.d

Concentration Units: ug/L

		Analyzed (A/AB):	08/28/18 1104	08/28/18 1107		08/28/18 1800	08/28/18 1804	
ANALYTE	***TRUE A***	***TRUE AB***	***ICSA1***	***ICSAB1***	***%R***	***ICSA2***	***ICSAB2***	***%R***
Aluminum	1000	1000	1020	1030	103	988	988	99
Antimony	0	0	-0.059	-0.057		-0.062	-0.069	
Arsenic	0	10.0	-0.0030	10.3	103	-0.018	10.1	101
Barium	0	0	-0.0040	0.014		0.0060	0.021	
Beryllium	0	0	-0.0070	-0.0060		-0.0080	-0.010	
Boron	0	20.0	-0.11	20.1	100	-0.71	18.5	92
Cadmium	0	10.0	0.014	9.83	98	0.0080	9.90	99
Calcium	3000	3000	2950	3030	101	2980	3010	100
Chromium	0	20.0	0.0010	20.4	102	-0.11	19.4	97
Cobalt	0	20.0	0.0070	20.8	104	0.0050	20.2	101
Copper	0	20.0	0.027	21.7	108	0.098	21.1	106
Iron	2500	2500	2550	2550	102	2430	2450	98
Lead	0	0	-0.0050	-0.0030		-0.0050	-0.0070	
Lithium	0	20.0	0.11	23.9	120	-0.24	22.7	114
Magnesium	1000	1000	1020	1040	104	981	980	98
Manganese	0	20.0	-0.010	20.4	102	-0.028	19.7	98
Molybdenum	20.0	20.0	19.4	19.1	96	19.7	19.5	98
Nickel	0	20.0	-0.0020	21.0	105	-0.030	20.3	102
Potassium	1000	1000	991	1020	102	992	985	98
Selenium	0	10.0	-0.020	9.83	98	-0.0070	9.48	95
Silicon	0	1000	-1200	-80	-8	-5500	-4500	-454
Silver	0	5.00	0.0040	5.00	100	0.0030	5.06	101
Sodium	2500	2500	2520	2590	104	2450	2470	99
Strontium	0	10.0	0.10	10.3	103	0.11	10.4	104
Thallium	0	0	-0.023	-0.025		-0.043	-0.041	
Tin	0	10.0	-0.028	9.84	98	0.0060	10.1	101
Titanium	20.0	20.0	19.4	20.3	102	19.7	20.0	100
Vanadium	0	20.0	-0.020	17.5	88	-0.026	16.9	84
Zinc	0	20.0	-0.92	19.5	98	-1.0	18.8	94
Zirconium	0	20.0	0.023	19.4	97	0.0060	19.3	96

FORM IV - IN

II

LINEAR DYNAMIC RANGE (LDR) STANDARD

Report No:	218081813	GCAL QC ID:	2500
Instrument ID:	ICPMS2	Lab File ID:	2180828B_MS2.b\1814_QC1_2180828A_MS2.D
Analyst:	LWZ	Analytical Batch:	642829
Analysis Date:	08/28/18 Time: 1111	Analytical Method:	EPA 6020B

ANALYTE	TRUE	FOUND	%RECOVERY	Q	UNITS
Antimony	1000	955	96		ug/L
Copper	1000	950	95		ug/L
Lead	1000	972	97		ug/L
Zinc	20000	18900	94		ug/L

CONTROL LIMITS 90-110%

FORM II - IN

II

CONTINUING CALIBRATION VERIFICATION (CCV) STANDARD

Report No:	218081813	GCAL QC ID:	1800
Instrument ID:	ICPMS2	Lab File ID:	2180828B_MS2.b\1834_CCV_2180828A_MS2.D
Analyst:	LWZ	Analytical Batch:	642829
Analysis Date:	08/28/18 Time: 1240	Analytical Method:	EPA 6020B

ANALYTE	TRUE	FOUND	%RECOVERY	Q	UNITS
Antimony	20.0	20.1	100		ug/L
Copper	10.0	10.7	107		ug/L
Lead	10.0	9.83	98		ug/L
Zinc	200	205	102		ug/L

CONTROL LIMITS 90-110%

FORM II - IN

III

CONTINUING CALIBRATION BLANK

Report No:	218081813	Blank ID:	1900
Instrument ID:	ICPMS2	Lab File ID:	2180828B_MS2.b\1835_CCB_2180828A_MS2.D
Analyst:	LWZ	Analytical Batch:	642829
Analysis Date:	08/28/18 Time: 1243	Analytical Method:	EPA 6020B

ANALYTE	RESULT	UNITS	Q	DL	LOD	LOQ
Antimony	1.00	ug/L	U	0.50	1.00	2.00
Copper	0.50	ug/L	U	0.25	0.50	1.00
Lead	0.50	ug/L	U	0.25	0.50	1.00
Zinc	10.0	ug/L	U	5.00	10.0	20.0

FORM III - IN

II

CONTINUING CALIBRATION VERIFICATION (CCV) STANDARD

Report No:	218081813	GCAL QC ID:	1800
Instrument ID:	ICPMS2	Lab File ID:	2180828B_MS2.b\1850_CCV_2180828A_MS2.D
Analyst:	LWZ	Analytical Batch:	642829
Analysis Date:	08/28/18 Time: 1337	Analytical Method:	EPA 6020B

ANALYTE	*TRUE*	*FOUND*	*%RECOVERY*	*Q*	*UNITS*
Antimony	20.0	19.7	99		ug/L
Copper	10.0	10.6	106		ug/L
Lead	10.0	9.67	97		ug/L
Zinc	200	203	102		ug/L

CONTROL LIMITS 90-110%

FORM II - IN

III

CONTINUING CALIBRATION BLANK

Report No:	218081813	Blank ID:	1900
Instrument ID:	ICPMS2	Lab File ID:	2180828B_MS2.b\1851_CCB_2180828A_MS2.D
Analyst:	LWZ	Analytical Batch:	642829
Analysis Date:	08/28/18 Time: 1340	Analytical Method:	EPA 6020B

ANALYTE	RESULT	UNITS	Q	DL	LOD	LOQ
Antimony	1.00	ug/L	U	0.50	1.00	2.00
Copper	0.50	ug/L	U	0.25	0.50	1.00
Lead	0.50	ug/L	U	0.25	0.50	1.00
Zinc	10.0	ug/L	U	5.00	10.0	20.0

FORM III - IN

II

CONTINUING CALIBRATION VERIFICATION (CCV) STANDARD

Report No:	218081813	GCAL QC ID:	1800
Instrument ID:	ICPMS2	Lab File ID:	2180828C_MS2.b\002_CCV.d
Analyst:	LWZ	Analytical Batch:	642829
Analysis Date:	08/28/18 Time: 1358	Analytical Method:	EPA 6020B

ANALYTE	TRUE	FOUND	%RECOVERY	Q	UNITS
Antimony	20.0	20.2	101		ug/L
Copper	10.0	10.5	105		ug/L
Lead	10.0	9.64	96		ug/L
Zinc	200	203	102		ug/L

CONTROL LIMITS 90-110%

FORM II - IN

III

CONTINUING CALIBRATION BLANK

Report No:	218081813	Blank ID:	1900
Instrument ID:	ICPMS2	Lab File ID:	2180828C_MS2.b\003_CCB.d
Analyst:	LWZ	Analytical Batch:	642829
Analysis Date:	08/28/18 Time: 1402	Analytical Method:	EPA 6020B

ANALYTE	RESULT	UNITS	Q	DL	LOD	LOQ
Antimony	1.00	ug/L	U	0.50	1.00	2.00
Copper	0.50	ug/L	U	0.25	0.50	1.00
Lead	0.50	ug/L	U	0.25	0.50	1.00
Zinc	10.0	ug/L	U	5.00	10.0	20.0

FORM III - IN

XV (He)

ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY

Report No:	218081813	Start Date:	08/28/18
Instrument ID:	ICPMS2	End Date:	08/28/18
Analytical Method	EPA 6020B	Analytical Batch:	642829

			Internal Standards %RI For:													
CLIENT SAMPLE ID	GCAL SAMPLE ID	TIME	ISTD1	Q	ISTD2	Q	ISTD3	Q	ISTD4	Q	ISTD5	Q	ISTD6	Q	ISTD7	Q
MB1842310	1842310	1247	126		115		121		122		114		113		119	
LCS1842311	1842311	1250	130		119		124		128		115		115		125	
WIL03IS01	21808181301	1305	87		100		94		77		93		101		83	
WIL03IS02	21808181308	1308	91		101		95		79		96		100		85	
WIL03IS03	21808181307	1355	94		102		99		83		99		101		90	

ISTD 1: Bismuth (He)
ISTD 2: Germanium (He)
ISTD 3: Indium (He)
ISTD 4: Lutetium (He)
ISTD 5: Rhodium (He)
ISTD 6: Scandium (He)
ISTD 7: Terbium (He)

FORM XV - IN

XV (No Gas)

ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY

Report No:	218081813	Start Date:	08/28/18
Instrument ID:	ICPMS2	End Date:	08/28/18
Analytical Method	EPA 6020B	Analytical Batch:	642829

			Internal Standards %RI For:																	
CLIENT SAMPLE ID	*GCAL SAMPLE ID*	*TIME*	*ISTD8*	*Q*	*ISTD9*	*Q*	*ISTD10*	*Q*	*ISTD11*	*Q*	*ISTD12*	*Q*	*ISTD13*	*Q*	*ISTD14*	*Q*
MB1842310	1842310	1247	110		103		106		108		104		98		107	
LCS1842311	1842311	1250	113		104		108		112		105		99		110	
WIL03IS01	21808181301	1305	87		95		89		84		89		97		86	
WIL03IS02	21808181308	1308	90		96		92		86		91		97		88	
WIL03IS03	21808181307	1355	92		98		94		92		94		98		94	

ISTD 8: Bismuth (No Gas)
ISTD 9: Germanium (No Gas)
ISTD 10 Indium (No Gas)
ISTD 11 Lutetium (No Gas)
ISTD 12 Rhodium (No Gas)
ISTD 13 Scandium (No Gas)
ISTD 14 Terbium (No Gas)

FORM XV - IN

XV (He)

ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY

Report No:	218081814	Start Date:	08/28/18
Instrument ID:	ICPMS2	End Date:	08/28/18
Analytical Method	EPA 6020B	Analytical Batch:	642829

			Internal Standards %RI For:															
CLIENT SAMPLE ID	GCAL SAMPLE ID	TIME	ISTD1	Q	ISTD2	Q	ISTD3	Q	ISTD4	Q	ISTD5	Q	ISTD6	Q	ISTD7	Q
MB1842310	1842310	1247	126		115		121		122		114		113		119	
LCS1842311	1842311	1250	130		119		124		128		115		115		125	
WIL02IS01	21808181401	1312	88		101		95		78		95		102		84	
WIL02IS01 MS	21808181402	1315	85		100		94		75		95		102		79	
WIL02IS01 MSD	21808181403	1319	87		101		94		76		94		102		81	
WIL02IS01PDS	1843727	1322	90		101		97		79		95		102		84	
WIL02IS01SD	1843728	1326	92		99		97		79		97		96		85	
WIL02IS02	21808181404	1329	92		101		96		80		96		100		88	
WIL01IS03	21808181405	1333	89		99		94		77		96		99		83	
WIL01IS01	21808181406	1344	89		101		97		78		97		100		85	
WIL02IS03	21808181407	1347	94		102		98		83		98		102		90	

ISTD 1: Bismuth (He)
ISTD 2: Germanium (He)
ISTD 3: Indium (He)
ISTD 4: Lutetium (He)
ISTD 5: Rhodium (He)
ISTD 6: Scandium (He)
ISTD 7: Terbium (He)

FORM XV - IN

XV (No Gas)

ICP-MS INTERNAL STANDARDS RELATIVE INTENSITY SUMMARY

Report No:	218081814	Start Date:	08/28/18
Instrument ID:	ICPMS2	End Date:	08/28/18
Analytical Method	EPA 6020B	Analytical Batch:	642829

			Internal Standards %RI For:															
CLIENT SAMPLE ID	GCAL SAMPLE ID	TIME	ISTD8	Q	ISTD9	Q	ISTD10	Q	ISTD11	Q	ISTD12	Q	ISTD13	Q	ISTD14	Q
MB1842310	1842310	1247	110		103		106		108		104		98		107	
LCS1842311	1842311	1250	113		104		108		112		105		99		110	
WIL02IS01	21808181401	1312	88		96		92		87		91		99		89	
WIL02IS01 MS	21808181402	1315	85		93		89		82		89		96		84	
WIL02IS01 MSD	21808181403	1319	89		96		91		85		91		98		87	
WIL02IS01PDS	1843727	1322	90		96		93		88		91		98		89	
WIL02IS01SD	1843728	1326	92		96		94		89		94		95		90	
WIL02IS02	21808181404	1329	92		96		93		89		93		98		91	
WIL01IS03	21808181405	1333	89		97		94		88		92		97		90	
WIL01IS01	21808181406	1344	89		96		93		87		92		98		89	
WIL02IS03	21808181407	1347	90		98		95		90		94		99		92	

ISTD 8: Bismuth (No Gas)
ISTD 9: Germanium (No Gas)
ISTD 10 Indium (No Gas)
ISTD 11 Lutetium (No Gas)
ISTD 12 Rhodium (No Gas)
ISTD 13 Scandium (No Gas)
ISTD 14 Terbium (No Gas)

FORM XV - IN

XIII
PREPARATION LOG

Report No: 218081812

Prep Method: EPA 3050B Prep Batch: 642222

CLIENT SAMPLE ID	GCAL SAMPLE ID	PREP DATE	WEIGHT	UNITS	VOLUME	UNITS
LCS1840819	1840819	08/20/18	1.25	g	50	mL
MB1840818	1840818	08/20/18	1.25	g	50	mL
WIL02DA01A	21808181209	08/20/18	1.45	g	50	mL
WIL02DA01B	21808181210	08/20/18	1.33	g	50	mL
WIL02DA02A	21808181206	08/20/18	1.25	g	50	mL
WIL02DA02A MS	21808181207	08/20/18	1.25	g	50	mL
WIL02DA02A MSD	21808181208	08/20/18	1.25	g	50	mL

FORM XIII - IN

III

METHOD BLANK

Report No:	218081812	Blank ID:	MB1840818
Instrument ID:	ICPMS1	Lab File ID:	2180821A_MS1.b\020SMPL.d
Analyst:	LWZ	Analytical Batch:	642381
Analysis Date:	08/21/18 Time: 1138	Analytical Method:	EPA 6020B

ANALYTE	RESULT	UNITS	Q	DL	LOD	LOQ
Antimony	21.7	ug/kg	J	20.0	40.0	80.0
Copper	13.0	ug/kg	J	10.0	20.0	40.0
Lead	20.0	ug/kg	U	10.0	20.0	40.0
Zinc	518	ug/kg	J	200	400	800

FORM III - IN

VII

LABORATORY CONTROL SAMPLE

Report No:	218081812	GCAL ID:	1840819 (LCS)
Matrix:	Solid	Instrument ID:	ICPMS1
Analyst:	LWZ	Lab File ID:	2180821A_MS1.b\021SMPL.d
Prep Date:	08/20/18 Time: 1100	Analysis Date:	08/21/18 Time: 1143
Prep Batch:	642222	Analytical Batch:	642381
Prep Method:	3050B	Analytical Method:	EPA 6020B

ANALYTE	*UNITS*	*TRUE*	*FOUND*	*% R*	*Q*	*LCL*	*UCL*
Antimony	ug/kg	4000	3800	95		72	124
Copper	ug/kg	2000	1990	100		84	119
Lead	ug/kg	2000	1970	99		84	118
Zinc	ug/kg	40000	34700	87		82	119

FORM VII - IN

V1
MS/MSD RECOVERY

Report No:	218081812	Parent Sample ID:	WIL02DA02A
Prep Method:	3050B	Parent GCAL ID:	21808181206
Prep Date:	08/20/18 Time: 1100	Prep Batch:	642222
Analytical Method:	EPA 6020B	Analytical Batch:	642309

GCAL QC ID:	**21808181207 MS**	Instrument ID:	ICPMS2
Analyst:	LWZ	Lab File ID:	2180820B_MS2.b\121278SMPL.d
Analysis Date:	08/20/18 1806	Dilution:	10

ANALYTE	UNITS	SPIKE ADDED	SAMPLE RESULT	MS RESULT	MS % REC	#	QC LIMITS
Antimony	ug/kg	5740	0	373	7	*	72 - 124
Copper	ug/kg	2870	35400	36500	38	*	84 - 119
Lead	ug/kg	2870	18900	20800	67	*	84 - 118
Zinc	ug/kg	57400	101000	157000	98		82 - 119

GCAL QC ID:	**21808181208 MSD**	Instrument ID:	ICPMS2
Analyst:	LWZ	Lab File ID:	2180820B_MS2.b\121279SMPL.d
Analysis Date:	08/20/18 1810	Dilution:	10

ANALYTE	UNITS	SPIKE ADDED	MSD RESULT	MSD % REC	#	% RPD	#	QC LIMITS %REC	QC LIMITS RPD
Antimony	ug/kg	5740	314	5	*	17		72 - 124	0 - 20
Copper	ug/kg	2870	42100	232	*	14		84 - 119	0 - 20
Lead	ug/kg	2870	23000	141	*	10		84 - 118	0 - 20
Zinc	ug/kg	57400	170000	121	*	8		82 - 119	0 - 20

RPD : 0 out of 4 outside limits
Spike Recovery: 7 out of 8 outside limits

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

FORM V (PART 1) - IN

V2

POST DIGEST SPIKE SAMPLE RECOVERY

Report No:	218081812	GCAL PDS ID:	1841231
Matrix:	Solid	Parent Sample ID:	WIL02DA02A (21808181206)
Analyst:	LWZ	Instrument ID:	ICPMS2
Analysis Date:	08/20/18 Time: 1813	Lab File ID:	2180820B_MS2.b\121280SMPL.d
Analytical Method:	EPA 6020B	Analytical Batch:	642309

ANALYTE	UNITS	SPIKED SAMPLE RESULT	C	SAMPLE RESULT	C	SPIKE ADDED	% R	Q	LCL	UCL
Antimony	ug/kg	54000		0	U	57400	94		80	120
Copper	ug/kg	64600		35400		28700	102		80	120
Lead	ug/kg	48100		18900		28700	102		80	120
Zinc	ug/kg	652000		101000		574000	96		80	120

FORM V (PART 2) - IN

IX
SERIAL DILUTIONS

Report No:	218081812	GCAL SD ID:	1841232
Matrix:	Solid	Parent Sample ID:	WIL02DA02A (21808181206)
Analyst:	LWZ	Instrument ID:	ICPMS2
Analysis Date:	08/20/18 Time: 1817	Lab File ID:	2180820B_MS2.b\121281SMPL.d
Analytical Method:	EPA 6020B	Analytical Batch:	642309

ANALYTE	UNITS	PARENT SAMPLE RESULT	C	SERIAL DILUTION RESULT	C	% DIFF	Q	LCL	UCL
Antimony	ug/kg	0	U	0	U				
Copper	ug/kg	35400		38200		7.9		0	10
Lead	ug/kg	18900		19600		3.7		0	10
Zinc	ug/kg	101000		112000		10.9	E	0	10

FORM IX - IN

GCAL ANALYTICAL LABORATORIES, LLC

3010A Metals Water Preparation

642277

ANALYST/ TECH		START DATE/TIME	11:30 8.7.18	END DATE/TIME	12:55	BATCH	642277

#	CLIENT	TYPE	CLIENT ID	GCAL ID	INITIAL VOL (mL)	FINAL VOL (mL)	COMMENT	STANDARDS\ REAGENTS
1	QC	MB	MB 1841052	1841052	80	90		GCAL - 8 - 250uL 171918
2	QC	LCS	LCS 1841053	1841053	↓	↓		
3	4989	SAMP	#14	21808166103	5mL			Sb,Ag,Se SPIKE - 250uL 316-652
4	0042	SAMP	Nickel Catalyst #2...	21808173601	5mL			
5	QC	MS	Nickel Catalyst #2...MS	1841056				LI,B,Zr SPIKE - 250uL 316 666-2
6	QC	MSD	Nickel Catalyst #2...MSD	1841057				
7	4629	SAMP	PMW-3A	21808180601	50mL			SI SPIKE - 250uL 171775
8	4629	SAMP	MW-65	21808180602				
9	4838	SAMP	WIL03IS00	21808181303				1:1 HNO3 176 2746
10	0176	SAMP	SARA Separator Eff...	21808201101				
11	0176	SAMP	SARA ACLA Sump	21808201102				1:1 HCL 176 28-1
12	0176	SAMP	U31PS201G	21808201401	↓	↓		
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								Digestion Vessel Lot# 180516
28								
29								
30								

EQUIPMENT\CONDITIONS

DIGESTION BLOCK	A1	TEMPERATURE	94°	

NOTES

TCLPs are reduced in volume due to sample matrix. Matrix-Water. 6020_W_EX

XIII
PREPARATION LOG

Report No: 218081813

Prep Method: EPA 3010A Prep Batch: 642277

CLIENT SAMPLE ID	GCAL SAMPLE ID	PREP DATE	WEIGHT	UNITS	VOLUME	UNITS
LCS1841053	1841053	08/20/18			50	mL
MB1841052	1841052	08/20/18			50	mL
Nickel Catalyst ...MS	1841056	08/20/18			50	mL
Nickel Catalyst...MSD	1841057	08/20/18			50	mL
WIL03IS00	21808181303	08/20/18			50	mL

FORM XIII - IN

III
METHOD BLANK

Report No:	218081813	Blank ID:	MB1841052
Instrument ID:	ICPMS2	Lab File ID:	2180820B_MS2.b\121284SMPL.d
Analyst:	LWZ	Analytical Batch:	642309
Analysis Date:	08/20/18 Time: 1827	Analytical Method:	EPA 6020B

ANALYTE	RESULT	UNITS	Q	DL	LOD	LOQ
Antimony	1.00	ug/L	U	0.50	1.00	2.00
Copper	0.50	ug/L	U	0.25	0.50	1.00
Lead	0.50	ug/L	U	0.25	0.50	1.00
Zinc	10.0	ug/L	U	5.00	10.0	20.0

FORM III - IN

VII
LABORATORY CONTROL SAMPLE

Report No:	218081813	GCAL ID:	1841053 (LCS)
Matrix:	Water	Instrument ID:	ICPMS2
Analyst:	LWZ	Lab File ID:	2180820B_MS2.b\121285SMPL.d
Prep Date:	08/20/18 Time: 1130	Analysis Date:	08/20/18 Time: 1831
Prep Batch:	642277	Analytical Batch:	642309
Prep Method:	3010A	Analytical Method:	EPA 6020B

ANALYTE	UNITS	TRUE	FOUND	% R	Q	LCL	UCL
Antimony	ug/L	100	106	106		85	117
Copper	ug/L	50.0	56.2	112		85	118
Lead	ug/L	50.0	51.9	104		88	115
Zinc	ug/L	1000	1020	102		83	119

FORM VII - IN

GCAL ANALYTICAL LABORATORIES, LLC

3050B Metals Solid Preparation

642442

ANALYST/ TECH	TSL	START DATE/TIME	12:18 8-27-19	END DATE/TIME	15:10	BATCH	642442

#	CLIENT	TYPE	CLIENT ID	GCAL ID	INITIAL WGT (g)	FINAL VOL (mL)	COMMENT	STANDARDS\ REAGENTS
1	QC	MB	MB 1841866	1841866	1.25	50		GCAL - 8 - 250uL 212918
2	QC	LCS	LCS 1841867	1841867	1.25			
3	4838	SAMP	WIL01IS02	21808181302	1.25			Sb,Ag,Se SPIKE - 250uL 316.64-2
4	4838	SAMP	WIL04IS03	21808181304	1.33			
5	4838	SAMP	WIL04IS01	21808181305	1.35			LI,B,Zr SPIKE - 250uL 316.64-2
6	4838	SAMP	WIL04IS02	21808181306	1.32			
7	4612	SAMP	ADA-25X38-A03-SP07...	21808210501	1.32			Si SPIKE - 250uL 212775
8	QC	MS	WIL011S02 MS	1842047	1.25	50		
9	QC	MSD	WIL011S02 MSD	1842048	1.25			HNO3 301 11-5
10								
11								H2O2 212907
12								
13								HCL N/A
14								
15								1:1 HNO3
16								226.28-2
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								Digestion Vessel Lot # 180513
28								
29								
30								

EQUIPMENT\CONDITIONS

DIGESTION BLOCK	B2	TEMPERATURE	93°	

NOTES

Matrix-Soil. 6020_S_EX

XIII
PREPARATION LOG

Report No: 218081813

Prep Method: EPA 3050B Prep Batch: 642442

CLIENT SAMPLE ID	GCAL SAMPLE ID	PREP DATE	WEIGHT	UNITS	VOLUME	UNITS
LCS1841867	1841867	08/22/18	1.25	g	50	mL
MB1841866	1841866	08/22/18	1.25	g	50	mL
WIL01IS02	21808181302	08/22/18	1.25	g	50	mL
WIL01IS02MS	1842047	08/22/18	1.25	g	50	mL
WIL01IS02MSD	1842048	08/22/18	1.25	g	50	mL
WIL04IS01	21808181305	08/22/18	1.35	g	50	mL
WIL04IS02	21808181306	08/22/18	1.32	g	50	mL
WIL04IS03	21808181304	08/22/18	1.33	g	50	mL

FORM XIII - IN

III
METHOD BLANK

Report No:	218081813	Blank ID:	MB1841866
Instrument ID:	ICPMS1	Lab File ID:	2180823A_MS1.b\029SMPL.d
Analyst:	LWZ	Analytical Batch:	642536
Analysis Date:	08/23/18 Time: 1129	Analytical Method:	EPA 6020B

ANALYTE	RESULT	UNITS	Q	DL	LOD	LOQ
Antimony	40.0	ug/kg	U	20.0	40.0	80.0
Copper	20.0	ug/kg	U	10.0	20.0	40.0
Lead	20.0	ug/kg	U	10.0	20.0	40.0
Zinc	400	ug/kg	U	200	400	800

FORM III - IN

VII

LABORATORY CONTROL SAMPLE

Report No:	218081813	GCAL ID:	1841867 (LCS)
Matrix:	Solid	Instrument ID:	ICPMS1
Analyst:	LWZ	Lab File ID:	2180823A_MS1.b\030SMPL.d
Prep Date:	08/22/18 Time: 1210	Analysis Date:	08/23/18 Time: 1134
Prep Batch:	642442	Analytical Batch:	642536
Prep Method:	3050B	Analytical Method:	EPA 6020B

ANALYTE	*UNITS*	*TRUE*	*FOUND*	*% R*	*Q*	*LCL*	*UCL*
Antimony	ug/kg	4000	3820	96		72	124
Copper	ug/kg	2000	1960	98		84	119
Lead	ug/kg	2000	1990	99		84	118
Zinc	ug/kg	40000	36700	92		82	119

FORM VII - IN

V1
MS/MSD RECOVERY

Report No:	218081813	Parent Sample ID:	WIL01IS02
Prep Method:	3050B	Parent GCAL ID:	21808181302
Prep Date:	08/22/18 Time: 1210	Prep Batch:	642442
Analytical Method:	EPA 6020B	Analytical Batch:	642536

GCAL QC ID:	**1842047 MS**	Instrument ID:	ICPMS1
Analyst:	LWZ	Lab File ID:	2180823A_MS1.b\039SMPL.d
Analysis Date:	08/23/18 1214	Dilution:	10

ANALYTE	UNITS	SPIKE ADDED	SAMPLE RESULT	MS RESULT	MS % REC	#	QC LIMITS
Antimony	ug/kg	4270	0	471	11	*	72 - 124
Copper	ug/kg	2140	21100	23800	132	*	84 - 119
Lead	ug/kg	2140	63500	66800	152	*	84 - 118
Zinc	ug/kg	42700	61200	110000	114		82 - 119

GCAL QC ID:	**1842048 MSD**	Instrument ID:	ICPMS1
Analyst:	LWZ	Lab File ID:	2180823A_MS1.b\040SMPL.d
Analysis Date:	08/23/18 1218	Dilution:	10

ANALYTE	UNITS	SPIKE ADDED	MSD RESULT	MSD % REC	#	% RPD	#	QC LIMITS %REC	QC LIMITS RPD
Antimony	ug/kg	4270	496	12	*	5		72 - 124	0 - 20
Copper	ug/kg	2140	23500	115		2		84 - 119	0 - 20
Lead	ug/kg	2140	61100	0	*	9		84 - 118	0 - 20
Zinc	ug/kg	42700	112000	119		2		82 - 119	0 - 20

RPD : 0 out of 4 outside limits
Spike Recovery: 5 out of 8 outside limits

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

FORM V (PART 1) - IN

V2

POST DIGEST SPIKE SAMPLE RECOVERY

Report No:	218081813	GCAL PDS ID:	1842322
Matrix:	Solid	Parent Sample ID:	WIL01IS02 (21808181302)
Analyst:	LWZ	Instrument ID:	ICPMS1
Analysis Date:	08/23/18 Time: 1222	Lab File ID:	2180823A_MS1.b\041SMPL.d
Analytical Method:	EPA 6020B	Analytical Batch:	642536

ANALYTE	UNITS	SPIKED SAMPLE RESULT	C	SAMPLE RESULT	C	SPIKE ADDED	% R	Q	LCL	UCL
Antimony	ug/kg	38600		0	U	42700	90		80	120
Copper	ug/kg	40700		21100		21400	92		80	120
Lead	ug/kg	84900		63500		21400	100		80	120
Zinc	ug/kg	478000		61200		427000	97		80	120

FORM V (PART 2) - IN

IX
SERIAL DILUTIONS

Report No:	218081813	GCAL SD ID:	1842323
Matrix:	Solid	Parent Sample ID:	WIL01IS02 (21808181302)
Analyst:	LWZ	Instrument ID:	ICPMS1
Analysis Date:	08/23/18 Time: 1227	Lab File ID:	2180823A_MS1.b\042SMPL.d
Analytical Method:	EPA 6020B	Analytical Batch:	642536

ANALYTE	UNITS	PARENT SAMPLE RESULT	C	SERIAL DILUTION RESULT	C	% DIFF	Q	LCL	UCL
Antimony	ug/kg	0	U	2150	J				
Copper	ug/kg	21000		22200		5.7		0	10
Lead	ug/kg	63500		62500		1.6		0	10
Zinc	ug/kg	61200		63600		3.9		0	10

FORM IX - IN

GCAL ANALYTICAL LABORATORIES, LLC

3050B Metals Solid Preparation

642531

ANALYST/ TECH	JL	START DATE/TIME	8:15 8/25/18	END DATE/TIME	11:15	BATCH	642531

#	CLIENT	TYPE	CLIENT ID	GCAL ID	INITIAL WGT (g)	FINAL VOL (mL)	COMMENT	STANDARDS\ REAGENTS
1	QC	MB	MB 1842310	1842310	1.13	50		GCAL - 8 - 250uL 7126918
2	QC	LCS	LCS 1842311	1842311	1.25			
3	4957	SAMP	A013 D1 (0-1)	21808223401	1.33			Sb,Ag,Se SPIKE - 250uL 316 LS-2
4	4957	SAMP	A013 D1 (1-2)	21808223402	1.25			
5	4957	SAMP	A013 D1 (2-3)	21808223403	1.44			LI,B,Zr SPIKE - 250uL 316 LLL-2
6	4838	SAMP	WIL03IS01	21808181301	1.35			
7	4838	SAMP	WIL03IS02	21808181308	1.28			Si SPIKE - 250uL 7126775
8	4838	SAMP	WIL02IS01	21808181401	1.25			
9	4838	MS	WIL02IS01 MS	21808181402	1.25			HNO3 301-11-16
10	4838	MSD	WIL02IS01 MSD	21808181403	1.25			
11	4838	SAMP	WIL02IS02	21808181404	1.31			H2O2 7126997
12	4838	SAMP	WIL01IS03	21808181405	1.40			
13	4838	SAMP	WIL01IS01	21808181406	1.26			HCL N/A
14	4838	SAMP	WIL02IS03	21808181407	1.34			
15	4838	SAMP	WIL03IS03	21808181307	1.26	↓		1:1 HNO3 726 78-2
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								Digestion Vessel Lot # 180521
28								
29								
30								

EQUIPMENT\CONDITIONS

DIGESTION BLOCK	A1	TEMPERATURE	94°	

NOTES

Matrix-Soil. 6020_S_EX

XIII
PREPARATION LOG

Report No: 218081813

Prep Method: EPA 3050B Prep Batch: 642531

CLIENT SAMPLE ID	GCAL SAMPLE ID	PREP DATE	WEIGHT	UNITS	VOLUME	UNITS
LCS1842311	1842311	08/25/18	1.25	g	50	mL
MB1842310	1842310	08/25/18	1.25	g	50	mL
WIL02IS01 MS	21808181402	08/25/18	1.25	g	50	mL
WIL02IS01 MSD	21808181403	08/25/18	1.25	g	50	mL
WIL03IS01	21808181301	08/25/18	1.35	g	50	mL
WIL03IS02	21808181308	08/25/18	1.28	g	50	mL
WIL03IS03	21808181307	08/25/18	1.26	g	50	mL

FORM XIII - IN

XIII
PREPARATION LOG

Report No: 218081814

Prep Method: EPA 3050B Prep Batch: 642531

CLIENT SAMPLE ID	GCAL SAMPLE ID	PREP DATE	WEIGHT	UNITS	VOLUME	UNITS
LCS1842311	1842311	08/25/18	1.25	g	50	mL
MB1842310	1842310	08/25/18	1.25	g	50	mL
WIL01IS01	21808181406	08/25/18	1.26	g	50	mL
WIL01IS03	21808181405	08/25/18	1.4	g	50	mL
WIL02IS01	21808181401	08/25/18	1.25	g	50	mL
WIL02IS01 MS	21808181402	08/25/18	1.25	g	50	mL
WIL02IS01 MSD	21808181403	08/25/18	1.25	g	50	mL
WIL02IS02	21808181404	08/25/18	1.31	g	50	mL
WIL02IS03	21808181407	08/25/18	1.34	g	50	mL

FORM XIII - IN

III

METHOD BLANK

Report No:	218081813	Blank ID:	MB1842310
Instrument ID:	ICPMS2	Lab File ID:	2180828B_MS2.b\1836SMPL_2180828A_MS2.D
Analyst:	LWZ	Analytical Batch:	642829
Analysis Date:	08/28/18 Time: 1247	Analytical Method:	EPA 6020B

ANALYTE	RESULT	UNITS	Q	DL	LOD	LOQ
Antimony	40.0	ug/kg	U	20.0	40.0	80.0
Copper	20.0	ug/kg	U	10.0	20.0	40.0
Lead	20.0	ug/kg	U	10.0	20.0	40.0
Zinc	400	ug/kg	U	200	400	800

FORM III - IN

VII
LABORATORY CONTROL SAMPLE

Report No:	218081813	GCAL ID:	1842311 (LCS)
Matrix:	Solid	Instrument ID:	ICPMS2
Analyst:	LWZ	Lab File ID:	2180828B_MS2.b\1837SMPL_2180828A_MS2.D
Prep Date:	08/25/18 Time: 0815	Analysis Date:	08/28/18 Time: 1250
Prep Batch:	642531	Analytical Batch:	642829
Prep Method:	3050B	Analytical Method:	EPA 6020B

ANALYTE	*UNITS*	*TRUE*	*FOUND*	*% R*	*Q*	*LCL*	*UCL*
Antimony	ug/kg	4000	4190	105		72	124
Copper	ug/kg	2000	2010	101		84	119
Lead	ug/kg	2000	2030	102		84	118
Zinc	ug/kg	40000	40300	101		82	119

FORM VII - IN

V1
MS/MSD RECOVERY

Report No:	218081814	Parent Sample ID:	WIL02IS01
Prep Method:	EPA 3050B \ ISM	Parent GCAL ID:	21808181401
Prep Date:	08/25/18 Time: 0815	Prep Batch:	642531
Analytical Method:	EPA 6020B	Analytical Batch:	642829

GCAL QC ID:	**21808181402 MS**	Instrument ID:	ICPMS2
Analyst:	LWZ	Lab File ID:	2180828B_MS2.b\1844SMPL_2180828A_MS2.D
Analysis Date:	08/28/18 1315	Dilution:	10

ANALYTE	UNITS	SPIKE ADDED	SAMPLE RESULT	MS RESULT	MS % REC	#	QC LIMITS
Antimony	ug/kg	4690	0	315	7	*	72 - 124
Copper	ug/kg	2340	38400	40000	67	*	84 - 119
Lead	ug/kg	2340	15800	18400	109		84 - 118
Zinc	ug/kg	46900	88500	136000	101		82 - 119

GCAL QC ID:	**21808181403 MSD**	Instrument ID:	ICPMS2
Analyst:	LWZ	Lab File ID:	2180828B_MS2.b\1845SMPL_2180828A_MS2.D
Analysis Date:	08/28/18 1319	Dilution:	10

ANALYTE	UNITS	SPIKE ADDED	MSD RESULT	MSD % REC	#	% RPD	#	QC LIMITS %REC	QC LIMITS RPD
Antimony	ug/kg	4690	361	8	*	14		72 - 124	0 - 20
Copper	ug/kg	2340	39900	66	*	0		84 - 119	0 - 20
Lead	ug/kg	2340	17600	75	*	4		84 - 118	0 - 20
Zinc	ug/kg	46900	133000	95		2		82 - 119	0 - 20

RPD : 0 out of 4 outside limits
Spike Recovery: 5 out of 8 outside limits

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

FORM V (PART 1) - IN

V2

POST DIGEST SPIKE SAMPLE RECOVERY

Report No:	218081814	GCAL PDS ID:	1843727
Matrix:	Solid	Parent Sample ID:	WIL02IS01 (21808181401)
Analyst:	LWZ	Instrument ID:	ICPMS2
Analysis Date:	08/28/18 Time: 1322	Lab File ID:	2180828C_MS2.b\1846SMPL_2180828A_MS2.D
Analytical Method:	EPA 6020B	Analytical Batch:	642829

ANALYTE	UNITS	SPIKED SAMPLE RESULT	C	SAMPLE RESULT	C	SPIKE ADDED	% R	Q	LCL	UCL
Antimony	ug/kg	47000		0	U	46900	100		80	120
Copper	ug/kg	61200		38400		23400	97		80	120
Lead	ug/kg	38400		15800		23400	96		80	120
Zinc	ug/kg	553000		88500		469000	99		80	120

FORM V (PART 2) - IN

IX
SERIAL DILUTIONS

Report No:	218081814	GCAL SD ID:	1843728
Matrix:	Solid	Parent Sample ID:	WIL02IS01 (21808181401)
Analyst:	LWZ	Instrument ID:	ICPMS2
Analysis Date:	08/28/18 Time: 1326	Lab File ID:	2180828C_MS2.b\1847SMPL_2180828A_MS2.D
Analytical Method:	EPA 6020B	Analytical Batch:	642829

ANALYTE	UNITS	PARENT SAMPLE RESULT	C	SERIAL DILUTION RESULT	C	% DIFF	Q	LCL	UCL
Antimony	ug/kg	0	U	0	U				
Copper	ug/kg	38400		40100		4.4		0	10
Lead	ug/kg	15900		15900		0		0	10
Zinc	ug/kg	88500		88300		.2		0	10

FORM IX - IN

Sample Summary

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21808181206	WIL02DA02A	Solid	08/16/2018 10:20	08/18/2018 10:45
21808181207	WIL02DA02A MS	Solid	08/16/2018 10:20	08/18/2018 10:45
21808181208	WIL02DA02A MSD	Solid	08/16/2018 10:20	08/18/2018 10:45
21808181209	WIL02DA01A	Solid	08/16/2018 09:30	08/18/2018 10:45
21808181210	WIL02DA01B	Solid	08/16/2018 09:35	08/18/2018 10:45
21808181213	WIL02DA02A (RE)	Solid	08/16/2018 10:20	08/18/2018 10:45
21808181214	WIL02DA02A MS (RE)	Solid	08/16/2018 10:20	08/18/2018 10:45
21808181215	WIL02DA02A MSD (RE)	Solid	08/16/2018 10:20	08/18/2018 10:45
21808181216	WIL02DA01A (RE)	Solid	08/16/2018 09:30	08/18/2018 10:45
21808181217	WIL02DA01B (RE)	Solid	08/16/2018 09:35	08/18/2018 10:45

Sample Summary

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21808181301	WIL03IS01	Solid	08/14/2018 16:00	08/18/2018 10:45
21808181302	WIL01IS02	Solid	08/14/2018 13:50	08/18/2018 10:45
21808181303	WIL03IS00	Water	08/16/2018 08:20	08/18/2018 10:45
21808181304	WIL04IS03	Solid	08/15/2018 16:10	08/18/2018 10:45
21808181305	WIL04IS01	Solid	08/15/2018 16:00	08/18/2018 10:45
21808181306	WIL04IS02	Solid	08/15/2018 16:05	08/18/2018 10:45
21808181307	WIL03IS03	Solid	08/14/2018 16:10	08/18/2018 10:45
21808181308	WIL03IS02	Solid	08/14/2018 16:05	08/18/2018 10:45

Sample Summary

GCAL ID	Client ID	Matrix	Collect Date/Time	Receive Date/Time
21808181401	WIL02IS01	Solid	08/15/2018 12:00	08/18/2018 10:45
21808181402	WIL02IS01 MS	Solid	08/15/2018 12:00	08/18/2018 10:45
21808181403	WIL02IS01 MSD	Solid	08/15/2018 12:00	08/18/2018 10:45
21808181404	WIL02IS02	Solid	08/15/2018 12:10	08/18/2018 10:45
21808181405	WIL01IS03	Solid	08/14/2018 14:00	08/18/2018 10:45
21808181406	WIL01IS01	Solid	08/14/2018 13:40	08/18/2018 10:45
21808181407	WIL02IS03	Solid	08/15/2018 12:20	08/18/2018 10:45

Case Narrative

Client: AECOM **Report:** 218081812

Gulf Coast Analytical Laboratories received and analyzed the sample(s) listed on the Report Sample Summary page of this report. Receipt of the sample(s) is documented by the attached chain of custody. This applies only to the sample(s) listed in this report. No sample integrity or quality control exceptions were identified unless noted below.

This report was completed in accordance with DOD QSM 5.1 as specified in the contract.

PROJECT MANAGER COMMENTS

Per Jennifer Li's email on 10/5/18, hold samples do not need to be analyzed. (Amanda Cobb 10/05/2018 10:30)

HIGH PERFORMANCE LIQUID CHROMATOGRAPHY

In the EPA 8330B analysis for prep batch 642698, the MS/MSD exhibited RPD failures. The LCS and/or LCSD (standard reference material) recoveries for all analytes were below the lower DOD control limit. The LCS/LCSD exhibited RPD failures. All samples were re-extracted outside holding time in prep batch 643342. The recovery for the surrogate is below the lower control limit for the LCSD (1843191).

In the EPA 8330B analysis for prep batch 643342, all samples were outside the holding time. The samples are reported as samples 21808181213-21808181217 with (RE) added to the client ID. The MS/MSD exhibited recovery and RPD failures. The LCS and/or LCSD (standard reference material) recoveries are above the upper control limit for 1,3,5-Trinitrobenzene, 1,3-Dinitrobenzene, 3-Nitrotoluene, 4-Nitrotoluene, and Pentaerythritol Tetranitrate. These analytes werre not detected in the associated samples. The LCS/LCSD recoveries are 0% for Tetryl. This is a poor performing analyte.

METALS

In the EPA 6020B analysis for prep batch 642222, the MS and/or MSD recovery is outside the control limits for Antimony and Zinc. The LCS recovery is within control limits. This indicates the analysis is in control and the sample is affected by matrix interference or the element is non-homogeneous in the sample. A post-digestion spike was performed. The MS/MSD recoveries and RPD are not applicable for Copper and Lead because the sample concentration is greater than four times the spike concentration. Zinc is flagged E on the serial dilution form due to the fact that the % difference between the original result and the serial dilution result for the batch QC sample is greater than 10.

Case Narrative

Client: AECOM **Report:** 218081813

Gulf Coast Analytical Laboratories received and analyzed the sample(s) listed on the Report Sample Summary page of this report. Receipt of the sample(s) is documented by the attached chain of custody. This applies only to the sample(s) listed in this report. No sample integrity or quality control exceptions were identified unless noted below.

This report was completed in accordance with DOD QSM 5.1 as specified in the contract.

METALS

In the EPA 6020B analysis for prep batch 642442, the MS and/or MSD recovery is outside the control limits for Antimony. The LCS recovery is within control limits. This indicates the analysis is in control and the sample is affected by matrix interference or the element is non-homogeneous in the sample. A post-digestion spike was performed. The MS/MSD recoveries and RPD are not applicable for Copper and Lead because the sample concentration is greater than four times the spike concentration.

Case Narrative

Client: AECOM **Report:** 218081814

Gulf Coast Analytical Laboratories received and analyzed the sample(s) listed on the Report Sample Summary page of this report. Receipt of the sample(s) is documented by the attached chain of custody. This applies only to the sample(s) listed in this report. No sample integrity or quality control exceptions were identified unless noted below.

This report was completed in accordance with DOD QSM 5.1 as specified in the contract.

HIGH PERFORMANCE LIQUID CHROMATOGRAPHY

In the EPA 8330B analysis for prep batch 642680, the LCS/LCSD RPD is above the control limit for 4-Nitrotoluene. All recoveries are acceptable.

METALS

In the EPA 6020B analysis for prep batch 642531, the MS and/or MSD recovery is outside the control limits for Antimony. The LCS recovery is within control limits. This indicates the analysis is in control and the sample is affected by matrix interference or the element is non-homogeneous in the sample. A post-digestion spike was performed. The MS/MSD recoveries and RPD are not applicable for Copper and Lead because the sample concentration is greater than four times the spike concentration.

Q Flag Summary

Client Sample ID: **WIL02DA02A** Lab Sample ID: **21808181206**

Method: **EPA 8330B**	Analysis Date: **9/13/2018 5:40:10 AM**					
Analyte	**CAS**	**CCV OUL**	**LCS/LCSD OUL**	**SURROGATE OUL**	**IS OUL**	**CLCCV OUL**
1,3,5-Trinitrobenzene	99-35-4		X			
1,3-Dinitrobenzene	99-65-0		X			
2,4,6-Trinitrotoluene	118-96-7		X			
2,4-Dinitrotoluene	121-14-2		X			
2,6-Dinitrotoluene	606-20-2		X			
2-Amino-4,6-dinitrotoluene	35572-78-2		X			
2-Nitrotoluene	88-72-2		X			
3,5-Dinitroaniline	618-87-1		X			
3-Nitrotoluene	99-08-1		X			
4-Amino-2,6-dinitrotoluene	19406-51-0		X			
4-Nitrotoluene	99-99-0		X			
HMX	2691-41-0		X			
Nitrobenzene	98-95-3		X			
Nitroglycerin	55-63-0		X			
Pentaerythritol Tetranitrate	78-11-5		X			
RDX	121-82-4		X			
Tetryl	479-45-8		X			

Client Sample ID: **WIL02DA01A** Lab Sample ID: **21808181209**

Method: **EPA 8330B**	Analysis Date: **9/13/2018 6:39:30 AM**					
Analyte	**CAS**	**CCV OUL**	**LCS/LCSD OUL**	**SURROGATE OUL**	**IS OUL**	**CLCCV OUL**
1,3,5-Trinitrobenzene	99-35-4		X			
1,3-Dinitrobenzene	99-65-0		X			
2,4,6-Trinitrotoluene	118-96-7		X			
2,4-Dinitrotoluene	121-14-2		X			
2,6-Dinitrotoluene	606-20-2		X			
2-Amino-4,6-dinitrotoluene	35572-78-2		X			
2-Nitrotoluene	88-72-2		X			
3,5-Dinitroaniline	618-87-1		X			
3-Nitrotoluene	99-08-1		X			
4-Amino-2,6-dinitrotoluene	19406-51-0		X			
4-Nitrotoluene	99-99-0		X			
HMX	2691-41-0		X			
Nitrobenzene	98-95-3		X			
Nitroglycerin	55-63-0		X			
Pentaerythritol Tetranitrate	78-11-5		X			
RDX	121-82-4		X			
Tetryl	479-45-8		X			

Client Sample ID: **WIL02DA01B** Lab Sample ID: **21808181210**

Method: **EPA 8330B**	Analysis Date: **9/13/2018 6:59:16 AM**					
Analyte	**CAS**	**CCV OUL**	**LCS/LCSD OUL**	**SURROGATE OUL**	**IS OUL**	**CLCCV OUL**
1,3,5-Trinitrobenzene	99-35-4		X			
1,3-Dinitrobenzene	99-65-0		X			
2,4,6-Trinitrotoluene	118-96-7		X			
2,4-Dinitrotoluene	121-14-2		X			
2,6-Dinitrotoluene	606-20-2		X			
2-Amino-4,6-dinitrotoluene	35572-78-2		X			
2-Nitrotoluene	88-72-2		X			
3,5-Dinitroaniline	618-87-1		X			
3-Nitrotoluene	99-08-1		X			
4-Amino-2,6-dinitrotoluene	19406-51-0		X			

4-Nitrotoluene	99-99-0		X			
HMX	2691-41-0		X			
Nitrobenzene	98-95-3		X			
Nitroglycerin	55-63-0		X			
Pentaerythritol Tetranitrate	78-11-5		X			
RDX	121-82-4		X			
Tetryl	479-45-8		X			

Client Sample ID: **WIL02DA02A (RE)** Lab Sample ID: **21808181213**

Method: **EPA 8330B**	Analysis Date: **9/13/2018 8:18:22 AM**					
Analyte	**CAS**	**CCV OUL**	**LCS/LCSD OUL**	**SURROGATE OUL**	**IS OUL**	**CLCCV OUL**
1,3,5-Trinitrobenzene	99-35-4		X			
3-Nitrotoluene	99-08-1		X			
4-Nitrotoluene	99-99-0		X			
Pentaerythritol Tetranitrate	78-11-5		X			
Tetryl	479-45-8		X			

Client Sample ID: **WIL02DA01A (RE)** Lab Sample ID: **21808181216**

Method: **EPA 8330B**	Analysis Date: **9/13/2018 9:17:42 AM**					
Analyte	**CAS**	**CCV OUL**	**LCS/LCSD OUL**	**SURROGATE OUL**	**IS OUL**	**CLCCV OUL**
1,3,5-Trinitrobenzene	99-35-4		X			
3-Nitrotoluene	99-08-1		X			
4-Nitrotoluene	99-99-0		X			
Pentaerythritol Tetranitrate	78-11-5		X			
Tetryl	479-45-8		X			

Client Sample ID: **WIL02DA01B (RE)** Lab Sample ID: **21808181217**

Method: **EPA 8330B**	Analysis Date: **9/13/2018 9:37:28 AM**					
Analyte	**CAS**	**CCV OUL**	**LCS/LCSD OUL**	**SURROGATE OUL**	**IS OUL**	**CLCCV OUL**
1,3,5-Trinitrobenzene	99-35-4		X			
3-Nitrotoluene	99-08-1		X			
4-Nitrotoluene	99-99-0		X			
Pentaerythritol Tetranitrate	78-11-5		X			
Tetryl	479-45-8		X			

CCV OUL=CCV out of limits
LCS/LCSD OUL=LCS/LCSD out of limits
SURROGATE OUL=Surrogate out of limits
IS OUL=Internal Standard out of limits
CLCCV OUL=Closing CCV out of limits

Q Flag Summary

Client Sample ID: **WIL02IS01** Lab Sample ID: **21808181401**

Method: **EPA 8330B** Analysis Date: **8/30/2018 5:41:00 PM**						
Analyte	**CAS**	**CCV OUL**	**LCS/LCSD OUL**	**SURROGATE OUL**	**IS OUL**	**CLCCV OUL**
4-Nitrotoluene	99-99-0		X			

Client Sample ID: **WIL02IS02** Lab Sample ID: **21808181404**

Method: **EPA 8330B** Analysis Date: **8/30/2018 6:40:20 PM**						
Analyte	**CAS**	**CCV OUL**	**LCS/LCSD OUL**	**SURROGATE OUL**	**IS OUL**	**CLCCV OUL**
4-Nitrotoluene	99-99-0		X			

Client Sample ID: **WIL02IS03** Lab Sample ID: **21808181407**

Method: **EPA 8330B** Analysis Date: **8/30/2018 7:00:07 PM**						
Analyte	**CAS**	**CCV OUL**	**LCS/LCSD OUL**	**SURROGATE OUL**	**IS OUL**	**CLCCV OUL**
4-Nitrotoluene	99-99-0		X			

CCV OUL=CCV out of limits
LCS/LCSD OUL=LCS/LCSD out of limits
SURROGATE OUL=Surrogate out of limits
IS OUL=Internal Standard out of limits
CLCCV OUL=Closing CCV out of limits

SAMPLE RECEIVING CHECKLIST

GCAL ANALYTICAL LABORATORIES, LLC

218081813

SAMPLE DELIVERY GROUP 218081813	
Client PM AEC 4838 - AECOM	**Transport Method** FEDEX
Profile Number 277537	**Received By** Savage, Tiffany R
Line Item(s) 1 - ISM- Explosives/Metals 3 - Water	**Receive Date(s)** 08/18/18

CHECKLIST	YES	NO
Samples received with proper thermal preservation?	☑	☐
Radioactivity is <1600 cpm? If no, record cpm value in notes section.	☑	☐
COC relinquished and complete (including sampleIDs, collect times, and sampler)?	☑	☐
All containers received in good condition and within hold time?	☑	☐
All sample labels and containers received match the chain of custody?	☑	☐
Preservative added to any containers?	☐	☑
If received, was headspace for VOC water containers < 6mm?	☑	☐
Samples collected in containers provided by GCAL?	☐	☑

COOLERS

Airbill	Thermometer ID: E29	Temp °C
7823-5315-3431		3.2
		2.4
		1.9

DISCREPANCIES

None

LAB PRESERVATIONS

None

NOTES

Revision 1.6

SAMPLE RECEIVING CHECKLIST

SAMPLE DELIVERY GROUP 218081814

Client PM AEC 4838 - AECOM	**Transport Method** FEDEX
Profile Number 277537	**Received By** Savage, Tiffany R
Line Item(s) 1 - ISM- Explosives/Metals	**Receive Date(s)** 08/18/18

CHECKLIST	YES	NO
Samples received with proper thermal preservation?	☑	☐
Radioactivity is <1600 cpm? If no, record cpm value in notes section.	☑	☐
COC relinquished and complete (including sampleIDs, collect times, and sampler)?	☑	☐
All containers received in good condition and within hold time?	☑	☐
All sample labels and containers received match the chain of custody?	☑	☐
Preservative added to any containers?	☐	☑
If received, was headspace for VOC water containers < 6mm?	☑	☐
Samples collected in containers provided by GCAL?	☐	☑

COOLERS

Airbill	Thermometer ID: E29	Temp °C
7823-5315-3431		3.2
		2.4
		1.9

DISCREPANCIES

None

LAB PRESERVATIONS

None

NOTES

Revision 1.6

SAMPLE RECEIVING CHECKLIST

* 2 1 8 0 8 1 8 1 2 *

SAMPLE DELIVERY GROUP 218081812	
Client PM AEC 4838 - AECOM	**Transport Method** FEDEX
Profile Number 277537	**Received By** Savage, Tiffany R
Line Item(s) 2 - S-Metals/Explosives	**Receive Date(s)** 08/18/18

CHECKLIST	YES	NO
Samples received with proper thermal preservation?	☑	☐
Radioactivity is <1600 cpm? If no, record cpm value in notes section.	☑	☐
COC relinquished and complete (including sampleIDs, collect times, and sampler)?	☑	☐
All containers received in good condition and within hold time?	☑	☐
All sample labels and containers received match the chain of custody?	☑	☐
Preservative added to any containers?	☐	☑
If received, was headspace for VOC water containers < 6mm?	☑	☐
Samples collected in containers provided by GCAL?	☑	☐

COOLERS

Airbill	Thermometer ID: E29	Temp °C
7823-5315-3431		3.2
		2.4
		1.9

DISCREPANCIES

None

LAB PRESERVATIONS

None

NOTES

Revision 1.6

GCAL ANALYTICAL LABORATORIES, LLC

CHAIN OF CUSTODY RECORD

7979 Innovation Park Dr., Baton Rouge, LA 70820-7402
Phone: 225.769.4900 • Fax: 225.767.5717 • www.gcal.com

Client ID: 4838 - AECOM
SDG: 218081813
PM: AEC

Report to:
Client: AECom
Address: 12420 Milestone Center Dr, 150 Germantown, MD 20876
Contact: Jennifer Li
Phone: 301-820-3476
E-mail: jennifer.j.li@aecom.com

Bill to:
Client:
Address:
Same as "Report to:"
Contact:
Phone:
E-mail:

P.O. Number:
Project Name/Number: Williston LTA, # 60520956
Sampled By:

Analytical Requests & Method

GCAL use only:
Custody Seal used ☐ yes ☐ no
Intact ☑ yes ☐ no EZT
Temperature °C 3,2,2,4,1.9
33,38,45 LPM
☐ Dissolved Analysis Requested
☐ Field filtered
☐ Lab filtered

Matrix[1]	Date	Time (2400)	Comp	Grab	Sample Description	No Containers	Total Metals (6020B) Sb, Cu, Pb, Zn	Explosives (8330B)	Preservative
SOIL	8-14-18	1600	X		WIL03ISO1	1	X		-1
SOIL	8-14-18	1350	X		WIL01ISO2	1	X		-2
WATER	8-16-18	0820		X	WIL03ISO0	1	X		-3
SOIL	8-15-18	1610	X		WIL04ISO3	1	X		-4
SOIL	8-15-18	1600	X		WIL04ISO1	1	X		-5
SOIL	8-15-18	1605	X		WIL04ISO2	1	X		-6
SOIL	8-14-18	1610	X		WIL03ISO3	1	X		-7
SOIL	8-14-18	1605	X		WIL03ISO2	1	X		-8

Air Bill No: 7823-5315-3431

Turn Around Time (Business Days): ☐ 24h* ☐ 48h* ☐ 3 days* ☐ 1 week* ☒ Standard (Per Contract/Quote)

Relinquished by: (Signature)	Date: 8/17/18	Time: 1100	Received by: (Signature)	Date:	Time:
Relinquished by: (Signature) FedEx	Date: 8/18/18	Time: 1045	Received by: (Signature)	Date: 8/18/18	Time: 1045
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:

Note:

By submitting these samples, you agree to GCAL's terms and conditions contained in our most recent schedule of services.

Matrix[1]: W = water, S = solid, L = liquid, T = tissue

*Requires prior approval, rush charges may apply.

We cannot accept verbal changes. Please email written changes to your PM.

WHITE: CLIENT FINAL REPORT - CANARY: CLIENT

CHAIN OF CUSTODY RECORD

GCAL ANALYTICAL LABORATORIES, LLC
7979 Innovation Park Dr., Baton Rouge, LA 70820-7402
Phone: 225.769.4900 • Fax: 225.767.5717 • www.gcal.com

Client ID: 4838 - AECOM
SDG: 218081814
PM: AEC

Report to:
Client: AECOM
Address: 12420 Milestone Center Dr. St. 150, Germantown, MD 20876
Contact: Jennifer Li
Phone: 301-820-3476
E-mail: Jennifer.j.li@aecom.com

Bill to:
Client:
Address: Same as
Contact: "Report to:"
Phone:
E-mail:

P.O. Number
Project Name/Number: Williston LTA, #60520456
Sampled By:

Analytical Requests & Method: Total Metals (6020B) Sb, Cu, Zn, Pb; Explosives (8330B)

GCAL use only:
Custody Seal used ☐ yes ☐ no intact ☐ yes ☐ no
E29
Temperature °C 3,2,2,4,1,9
33,38,45 cpm
☐ Dissolved Analysis Requested
☐ Field filtered
☐ Lab filtered

Matrix[1]	Date	Time (2400)	Comp	Grab	Sample Description	No Containers	Total Metals (6020B) Sb, Cu, Zn, Pb	Explosives (8330B)	Preservative
SOIL	8-15-18	1200	X		WIL02ISO1	1	X	X	MS/MSD extra volume
SOIL	8-15-18	1210	X		WIL02ISO2	1	X	X	-4
SOIL	8-14-18	1400	X		WIL01ISO3	1	X		-5
SOIL	8-14-18	1340	X		WIL01ISO1	1	X		-6
SOIL	8-15-18	1220	X		WIL02ISO3	1	X	X	-7

Air Bill No: 7823-5315-3431

Turn Around Time (Business Days): ☐ 24h* ☐ 48h* ☐ 3 days* ☐ 1 week* ☒ Standard (Per Contract/Quote)

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
	8/17/18	11:00			
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
	8/18/18	1045		8/18/18	1045
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:

Note: 1 of 4 Sample coolers
MS/MSD from WIL02ISO1

By submitting these samples, you agree to GCAL's terms and conditions contained in our most recent schedule of services.

Matrix[1]: W = water, S = solid, L = liquid, T = tissue

*Requires prior approval, rush charges may apply.

We cannot accept verbal changes. Please email written changes to your PM.

WHITE: CLIENT FINAL REPORT - CANARY: CLIENT

CHAIN OF CUSTODY RECORD

GCAL ANALYTICAL LABORATORIES, LLC
7979 Innovation Park Dr., Baton Rouge, LA 70820-7402
Phone: 225.769.4900 • Fax: 225.767.5717 • www.gcal.com

Client ID: 4838 - AECOM
SDG: 218081812
PM: AEC

Report to:
Client: AECOM
Address: 12420 Milestone Center Dr. St. 150 Germantown, MD, 20876
Contact: Jennifer Li
Phone: 301-820-3476
E-mail: Jennifer.j.li@aecom.com

Bill to:
Client:
Address: Same as "Report to:"
Contact:
Phone:
E-mail:

P.O. Number:
Project Name/Number: Williston LTA, # 60520956
Sampled By:

Analytical Requests & Method: Total Metals (6020B) Sb, Cu, Pb, Cr; Explosives (8330B); TCLP Metals (lead) 1311/6020B

GCAL use only:
Custody Seal used ☐ yes ☐ no intact ☐ yes ☐ no — EDA
Temperature °C 3.2, 2.4, 1.9
33, 38, 45 CPM
☐ Dissolved Analysis Requested
☐ Field filtered
☐ Lab filtered

Matrix[1]	Date	Time (2400)	Comp	Grab	Sample Description	No Containers	Total Metals (6020B) Sb, Cu, Pb, Cr	Explosives (8330B)	TCLP Metals (lead) 1311/6020B	Preservative
SOIL	8-16-18	1100		X	WIL03X18E	1			X	Hold pending ISM Result
SOIL	8-16-18	0920		X	WIL02X22E	1			X	Hold "
SOIL	8-16-18	1115		X	WIL01X21E	1			X	Hold "
SOIL	8-16-18	1030		X	WIL02DB02A	2	X	X		Hold pending "DA" result
SOIL	8-16-18	0950		X	WIL02DB01A	2	X	X		Hold "
SOIL	8-16-18	1020		X	WIL02DA02A	6	X	X		
SOIL	8-16-18	0930		X	WIL02DA01A	2	X	X		
SOIL	8-16-18	0935		X	WIL02DA01B	2	X	X		

Air Bill No: 7823-5315-3431

Turn Around Time (Business Days): ☐ 24h* ☐ 48h* ☐ 3 days* ☐ 1 week* ☒ Standard (Per Contract/Quote)

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date	Time:
	8/17/18	1100			
Relinquished by: (Signature) FedEx	8/18/18	1045	Received by: (Signature)	8/18/18	1045
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date	Time:

Note: WIL02DA02A is an MS/MSD

By submitting these samples, you agree to GCAL's terms and conditions contained in our most recent schedule of services.

Matrix[1]: W = water, S = solid, L = liquid, T = tissue

*Requires prior approval, rush charges may apply.

We cannot accept verbal changes. Please email written changes to your PM.

WHITE: CLIENT FINAL REPORT — CANARY: CLIENT

Data Qualifying Codes

Two types of data qualifying codes or flags are applied in the course of the data review. The data validation flags indicate data that are not usable for decision-making, more than normally biased and/or variable, or not representative of field conditions. These codes and their definitions are presented below in the hierarchy stipulated in the USEPA Contract Laboratory Program National Functional Guidelines for Organic and Inorganic (January 2017) Data Review.

Data Validation Flags

Flag	Interpretation
R	The sample results are unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in the sample.
U	The analyte was analyzed for, but not detected at a level greater than or equal to the level of the adjusted Detection Limit (DL) for sample and method.
J+	Inorganic analyte present. Reported value may not be accurate or precise, but the result may be biased high.
J-	Inorganic analyte present. Reported value may not be accurate or precise, but the result may be biased low.
J	The analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample (due either to the quality of the data generated because certain quality control criteria were not met, or the concentration of the analyte was below the Limit of Detection (LOD).
NJ	The analysis indicates the presence of an analyte that has been “tentatively identified” and the associated numerical value represents its approximate concentration.
UJ	The analyte was not detected at a level greater than or equal to the adjusted DL. However, the reported adjusted DL is approximate and may be inaccurate or imprecise.
C	This qualifier applies to pesticide and Aroclor results when the identification has been confirmed by gas Chromatograph/Mass Spectrometer (GC/MS)
X	This qualifier applies to pesticide and Aroclor results when GC/MS analysis was attempted but was unsuccessful.

The other type of code used by URS is a “Reason Code”. The reason code indicates the type of quality control failure that led to the application of the data validation flag.

Reason Codes

GC/MS Organics		GC and HPLC Organics		Inorganics and Conventionals	
Code	Interpretation	Code	Interpretation	Code	Interpretation
a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence	a	Incorrect or incomplete analytical sequence
b	Bubble found in vial >6mm	b	Instrument performance failure	b	Laboratory duplicate imprecision
c	Calibration failure; poor or unstable response	c	Calibration failure; poor or unstable response	c	Calibration failure
d	MS/MSD imprecision	d	MS/MSD imprecision	d	MS/MSD imprecision
e	LCSD imprecision	e	LCSD imprecision	e	LCSD imprecision
f	Field duplicate imprecision	f	Field duplicate imprecision	f	Field duplicate imprecision
g	Tuning failure or poor mass spec performance	g	Dual column confirmation imprecision	g	Duel isotope imprecision
h	Holding time violation	h	Holding time violation	h	Holding time violation
i	Internal standard failure	i	Internal standard failure	k	Cooler receipt temperature exceeds limits
k	Cooler receipt temperature exceeds limits	k	Cooler receipt temperature exceeds limits	l	LCS recovery failure
l	LCS recovery failure	l	LCS recovery failure	m	MS/MSD recovery failure
m	MS/MSD recovery failure	m	MS/MSD recovery failure	n	ICS failure
p	Poor chromatography	p	Poor chromatography	o	Calibration blank contamination
q	Concentration exceeded the linear range	q	Concentration exceeded the linear range	q	Concentration exceeded the linear range
r	Linearity failure in initial calibration	r	Linearity failure in initial calibration	r	Linearity failure in calibration or MSA
s	Surrogate failure	s	Surrogate failure	s	Serial dilution failure
t	TIC	t	Blender blank contamination	t	Carboy Lot detection
w	Identification criteria failure	u	No confirmation column	u	BOD minimum depletion did not exceed 2mg/L
x	Field blank contamination	w	Retention time failure	v	Post-digestion spike failure
y	Trip blank contamination	x	Field blank contamination	w	CRDL Standard Failure
z	Method blank contamination	z	Method blank contamination	x	Field blank contamination
				z	Preparation/Method blank contamination