M67001.AR.006913
MCB CAMP LEJUENE
5090.3a

VALIDATED DATA PACKAGE, 1506290, MCB CAMP LEJUENE NC
8/15/2015
DATAQUAL ENVIRONMENTAL SERVICES, LLC

DataQual
Environmental Services, LLC

CH2M HILL
14120 Ballantyne Corporate Place
Suite 200
Charlotte, NC 28277

August 15, 2015
SDG# 1506290, Empirical
MCB Camp Lejeune-CTO-WE9A

Dear Ms. Kleist,

The following Data Validation report is provided as requested for the parameters noted in the table below for SDG #1506290. The data validation was performed in accordance with the SW846 Methods 8260B for volatiles, as well as good professional judgment. Also used in the validation of these samples were The National Functional Guidelines for Organic Data Review (June, 2008) as applicable. All areas of concern are discussed in the body of the report and a summary of data qualifications is provided.

Sample ID	Lab ID	Matrix	VOA
IR06-GW91UCH-15B	1506290-01	water	X
IR82-GW39LCH-15B	1506290-02	water	X
IR82-GW36UCH-15B	1506290-03	water	X
IR82-GW36UCHD-15B	1506290-04	water	X
IR06-GW83D-15B	1506290-05	water	X
IR06-GW83-15B	1506290-06	water	X
IR06-GW84UCH-15B	1506290-07	water	X
IR06-GW85LCH-15B	1506290-08	water	X
IR82-EB-062615	1506290-09	water	X
IR82-TB-062615	1506290-11	water	X
IR06-GW91UCH-15B MS	1506290-01MS	water	X
IR06-GW91UCH-15B MSD	1506290-01MSD	water	X
IR82-GW39LCH-15B MS	1506290-02MS	water	X
IR82-GW39LCH-15B MSD	1506290-02MSD	water	X

The following quality control samples were provided with this SDG: sample IR82-GW36UCHD-15B- field duplicate of sample IR82-GW36UCH-15B; sample IR06-GW83D-15B-field duplicate of sample IR06-GW83-15; sample IR06-TB-062515 -trip blank and sample IR82-EB-062615- equipment blank.

The samples were evaluated based on the following criteria:

- Data Completeness *
- Technical Holding Times *
- GC/MS Tunes *
- Initial/Continuing Calibrations *

- Blanks *
- GC/MS Internal Standards *
- Surrogates *
- Laboratory Control Samples *
- Matrix Spike Recoveries *
- Matrix Spike Duplicate RPDs *
- Field Duplicates *
- Identification/Quantitation *
- Reporting Limits *

* - indicates that no qualifications were required based on this criteria

Overall Evaluation of Data/Potential Usability Issues

A summary of qualifications applied to the sample results are noted below for the fractions validated. Specific details regarding qualification of the data are addressed in the Specific Evaluation section of this narrative. If an issue is not addressed there were no actions required based on unmet quality criteria. When more than one qualifier is associated with a compound/analyte the validator has chosen the qualifier that best indicates possible bias in the results and flagged the data accordingly. However, information regarding all quality control issues is provided in the body of the report and on the qualification summary page. Please note that when a compound or analyte is flagged due to blank contamination the BL qualifier code takes precedence over all other qualifier codes except a code that explains rejected data.

VOA

No qualifications were required to the data.

Specific Evaluation of Data

Data Completeness

The SDG was received complete and intact. Resubmissions were not required.

Technical Holding Times

According to chain of custody records, sampling was performed on 6/26/15and samples were received at the laboratory between 6/27/15. All sample preparation and analysis was performed within method holding time requirements.

A summary of qualifications required is provided on the following page. Please do not hesitate to contact DataQual ES with any questions regarding this validation report.

Sincerely,

Laura Maschhoff
President

Summary of Data Qualifications

VOA

Sample ID	Compound	Results	Q-Flag	Q Code
no qualifications				

Glossary of Qualification Flags and Abbreviations

Qualification Flags (Q-Flags)

U	not detected above the reported sample quantitation limit
J	estimated value
UJ	reported quantitation limit is qualified as estimated
R	result is rejected; the presence or absence of the analyte cannot be verified
NJ	analyte has been tentatively identified, estimated value
L/J-	analyte present, biased low
UL	not detected, quantitation limit is probably higher
K/J+	analyte present, biased high

Inorganic Field/Lab Blank Qualification Flags (Q-Flags)

NA	The sample result for the blank contaminant is greater than the sample RL and is greater than 10X the blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.
RL-U	The sample result for the blank contaminant is less than the sample RL and the result is raised to the RL and flagged U.
R or J_+	The blank contaminant concentration was greater than the RL and the sample result is greater than the RL but less than 10X the blank contaminant concentration. The reported results are flagged either as rejected R or biased high J+ based on the professional judgment of the validator.

Organic Field/Lab Blank Qualification Flags (Q-Flags)

NA	The sample result for the blank contaminant is greater than the sample RL. The sample result for the blank contaminant is not qualified with any blank qualifiers.
RL-U	The sample result for the blank contaminant is less than the sample RL, so the result is raised to the RL and flagged U.

General Abbreviations

RL	reporting limit
DL	detection limit
LOD	limit of detection
LOQ	limit of quantitation
Q Code	qualifier code
+ / -	positive result/non-detect result

QUALIFIER CODE REFERENCE

Qualifier	Description
TN	Tune
BSL	Blank Spike/LCS - High Recovery
BSH	Blank Spike/LCS - Low Recovery
BD	Blank Spike/Blank Spike Duplicate (LCS/LCSD) Precision
BRL	Below Reporting Limit
ISL	Internal Standard - Low Recovery
ISH	Internal Standard - High Recovery
MSL	Matrix Spike and/or Matrix Spike Duplicate - Low Recovery
MSH	Matrix Spike and/or Matrix Spike Duplicate - High Recovery
MI	Matrix interference obscuring the raw data
MDP	Matrix Spike/Matrix Spike Duplicate Precision
2S	Second Source - Bad reproducibility between tandem detectors
SSL	Spiked Surrogate - Low Recovery
SSH	Spiked Surrogate - High Recovery
SD	Serial Dilution Reproducibility
ICL	Initial Calibration - Low Relative Response Factors (RRF)
ICH	Initial Calibration - High Relative Response Factors (RRF)
ICB	Initial Calibration - Bad Linearity or Curve Function
CCL	Continuing Calibration - Low Recovery or %Difference
CCH	Continuing Calibration - High Recovery or %Difference
CC	Continuing Calibration
LD	Lab Duplicate Reproducibility
HT	Holding Time
PD	Pesticide Degradation
2C	Second Column - Poor Dual Column Reproducibility
LR	Concentration Exceeds Linear Range
BL	Blank Contamination (MBL, EBL, FBL, TBL)
RE	Redundant Result - due to Re-analysis or Re-extraction
DL	Redundant Result - due to Dilution
FD	Field Duplicate
OT	Other - explained in data validation report
%SOL	High moisture content

016

ANALYSIS DATA SHEET

IR06-GW91UCH-15B

Laboratory:	Empirical Laboratories, LLC			SDG:	1506290
Client:	ENCO			Project:	Lejeune CTO-WE9A
Matrix:	Water	Laboratory ID:	1506290-01	File ID:	0629001B.D
Sampled:	06/26/15 15:30	Prepared:	06/29/15 08:59	Analyzed:	06/29/15 08:59
Solids:		Preparation:	5030B	Dilution:	1
Batch:	5F29001	Sequence:	5F18025	Calibration:	5103002
Instrument:	MS-VOA4				

CAS NO.	COMPOUND	CONC. (ug/L)	DL	LOD	LOQ	Q
71-43-2	Benzene	**0.306**	0.250	0.500	1.00	J
108-90-7	Chlorobenzene		0.250	0.500	1.00	U
67-66-3	Chloroform	**16.1**	0.250	0.500	1.00	
74-87-3	Chloromethane		0.250	0.500	1.00	U
106-46-7	1,4-Dichlorobenzene		0.250	0.500	1.00	U
107-06-2	1,2-Dichloroethane		0.250	0.500	1.00	U
75-35-4	1,1-Dichloroethene		0.250	0.500	1.00	U
156-59-2	cis-1,2-Dichloroethene	**1.49**	0.250	0.500	1.00	
156-60-5	trans-1,2-Dichloroethene		0.250	0.500	1.00	U
78-87-5	1,2-Dichloropropane		0.250	0.500	1.00	U
100-41-4	Ethylbenzene		0.250	0.500	1.00	U
79-34-5	1,1,2,2-Tetrachloroethane		0.250	0.500	1.00	U
127-18-4	Tetrachloroethene	**1.21**	0.250	0.500	1.00	
79-00-5	1,1,2-Trichloroethane		0.250	0.500	1.00	U
79-01-6	Trichloroethene	**0.331**	0.250	0.500	1.00	J
75-01-4	Vinyl chloride		0.250	0.500	1.00	U

Total Target Analytes Reported 16 Project Analytes: 16

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
Bromofluorobenzene	30.00	27.90	93.0	85 - 114	
Dibromofluoromethane	30.00	32.71	109	80 - 119	
1,2-Dichloroethane-d4	30.00	29.17	97.2	81 - 118	
Toluene-d8	30.00	28.92	96.4	89 - 112	

VM 081515

007

ANALYSIS DATA SHEET

IR82-GW39LCH-15B

Laboratory: Empirical Laboratories, LLC SDG: 1506290

Client: ENCO Project: Lejeune CTO-WE9A

Matrix: Water Laboratory ID: 1506290-02 File ID: 0629002B.D

Sampled: 06/26/15 12:40 Prepared: 06/29/15 09:28 Analyzed: 06/29/15 09:28

Solids: Preparation: 5030B Dilution: 10

Batch: 5F29001 Sequence: 5F18025 Calibration: 5103002 Instrument: MS-VOA4

CAS NO.	COMPOUND	CONC. (ug/L)	DL	LOD	LOQ	Q
71-43-2	Benzene		2.50	5.00	10.0	U
108-90-7	Chlorobenzene		2.50	5.00	10.0	U
67-66-3	Chloroform		2.50	5.00	10.0	U
74-87-3	Chloromethane		2.50	5.00	10.0	U
106-46-7	1,4-Dichlorobenzene		2.50	5.00	10.0	U
107-06-2	1,2-Dichloroethane		2.50	5.00	10.0	U
75-35-4	1,1-Dichloroethene		2.50	5.00	10.0	U
156-59-2	cis-1,2-Dichloroethene	**66.3**	2.50	5.00	10.0	~~D~~
156-60-5	trans-1,2-Dichloroethene	**8.03**	2.50	5.00	10.0	~~JD~~
78-87-5	1,2-Dichloropropane		2.50	5.00	10.0	U
100-41-4	Ethylbenzene		2.50	5.00	10.0	U
79-34-5	1,1,2,2-Tetrachloroethane		2.50	5.00	10.0	U
127-18-4	Tetrachloroethene		2.50	5.00	10.0	U
79-00-5	1,1,2-Trichloroethane		2.50	5.00	10.0	U
79-01-6	Trichloroethene	**1830**	2.50	5.00	10.0	~~ND~~
75-01-4	Vinyl chloride		2.50	5.00	10.0	U

Total Target Analytes Reported 16 Project Analytes: 16

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
Bromofluorobenzene	30.00	29.58	98.6	85 - 114	
Dibromofluoromethane	30.00	33.72	112	80 - 119	
1,2-Dichloroethane-d4	30.00	28.06	93.5	81 - 118	
Toluene-d8	30.00	31.17	104	89 - 112	

LM 081575

ANALYSIS DATA SHEET

IR82-GW36UCH-15B

Laboratory: Empirical Laboratories, LLC SDG: 1506290

Client: ENCO Project: Lejeune CTO-WE9A

Matrix: Water Laboratory ID: 1506290-03 File ID: 0629003B.D

Sampled: 06/26/15 14:05 Prepared: 06/29/15 09:58 Analyzed: 06/29/15 09:58

Solids: Preparation: 5030B Dilution: 1

Batch: 5F29001 Sequence: 5F18025 Calibration: 5103002 Instrument: MS-VOA4

CAS NO.	COMPOUND	CONC. (ug/L)	DL	LOD	LOQ	Q
71-43-2	Benzene		0.250	0.500	1.00	U
108-90-7	Chlorobenzene		0.250	0.500	1.00	U
67-66-3	Chloroform	**0.840**	0.250	0.500	1.00	J
74-87-3	Chloromethane		0.250	0.500	1.00	U
106-46-7	1,4-Dichlorobenzene		0.250	0.500	1.00	U
107-06-2	1,2-Dichloroethane		0.250	0.500	1.00	U
75-35-4	1,1-Dichloroethene	**1.29**	0.250	0.500	1.00	
156-59-2	cis-1,2-Dichloroethene	**6.07**	0.250	0.500	1.00	
156-60-5	trans-1,2-Dichloroethene	**0.418**	0.250	0.500	1.00	J
78-87-5	1,2-Dichloropropane		0.250	0.500	1.00	U
100-41-4	Ethylbenzene		0.250	0.500	1.00	U
79-34-5	1,1,2,2-Tetrachloroethane		0.250	0.500	1.00	U
127-18-4	Tetrachloroethene	**0.846**	0.250	0.500	1.00	J
79-00-5	1,1,2-Trichloroethane		0.250	0.500	1.00	U
79-01-6	Trichloroethene	**1.75**	0.250	0.500	1.00	
75-01-4	Vinyl chloride		0.250	0.500	1.00	U

Total Target Analytes Reported 16 Project Analytes: 16

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
Bromofluorobenzene	30.00	28.96	96.5	85 - 114	
Dibromofluoromethane	30.00	34.59	115	80 - 119	
1,2-Dichloroethane-d4	30.00	30.50	102	81 - 118	
Toluene-d8	30.00	28.75	95.8	89 - 112	

WM 081515

009

ANALYSIS DATA SHEET

IR82-GW36UCHD-15B

Laboratory: Empirical Laboratories, LLC SDG: 1506290

Client: ENCO Project: Lejeune CTO-WE9A

Matrix: Water Laboratory ID: 1506290-04 File ID: 0629004B.D

Sampled: 06/26/15 14:10 Prepared: 06/29/15 10:27 Analyzed: 06/29/15 10:27

Solids: Preparation: 5030B Dilution: 1

Batch: 5F29001 Sequence: 5F18025 Calibration: 5103002 Instrument: MS-VOA4

CAS NO.	COMPOUND	CONC. (ug/L)	DL	LOD	LOQ	Q
71-43-2	Benzene		0.250	0.500	1.00	U
108-90-7	Chlorobenzene		0.250	0.500	1.00	U
67-66-3	Chloroform	**0.920**	0.250	0.500	1.00	J
74-87-3	Chloromethane		0.250	0.500	1.00	U
106-46-7	1,4-Dichlorobenzene		0.250	0.500	1.00	U
107-06-2	1,2-Dichloroethane		0.250	0.500	1.00	U
75-35-4	1,1-Dichloroethene	**1.40**	0.250	0.500	1.00	
156-59-2	cis-1,2-Dichloroethene	**6.75**	0.250	0.500	1.00	
156-60-5	trans-1,2-Dichloroethene	**0.490**	0.250	0.500	1.00	J
78-87-5	1,2-Dichloropropane		0.250	0.500	1.00	U
100-41-4	Ethylbenzene		0.250	0.500	1.00	U
79-34-5	1,1,2,2-Tetrachloroethane		0.250	0.500	1.00	U
127-18-4	Tetrachloroethene	**0.959**	0.250	0.500	1.00	J
79-00-5	1,1,2-Trichloroethane		0.250	0.500	1.00	U
79-01-6	Trichloroethene	**1.69**	0.250	0.500	1.00	
75-01-4	Vinyl chloride		0.250	0.500	1.00	U

Total Target Analytes Reported 16 Project Analytes: 16

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
Bromofluorobenzene	30.00	27.79	92.6	85 - 114	
Dibromofluoromethane	30.00	33.28	111	80 - 119	
1,2-Dichloroethane-d4	30.00	28.35	94.5	81 - 118	
Toluene-d8	30.00	29.37	97.9	89 - 112	

081515

010

ANALYSIS DATA SHEET

IR06-GW83D-15B

Laboratory: Empirical Laboratories, LLC SDG: 1506290

Client: ENCO Project: Lejeune CTO-WE9A

Matrix: Water Laboratory ID: 1506290-05 File ID: 0629005B.D

Sampled: 06/26/15 09:40 Prepared: 06/29/15 10:56 Analyzed: 06/29/15 10:56

Solids: Preparation: 5030B Dilution: 1

Batch: 5F29001 Sequence: 5F18025 Calibration: 5103002 Instrument: MS-VOA4

CAS NO.	COMPOUND	CONC. (ug/L)	DL	LOD	LOQ	Q
71-43-2	Benzene		0.250	0.500	1.00	U
108-90-7	Chlorobenzene		0.250	0.500	1.00	U
67-66-3	Chloroform	**0.324**	0.250	0.500	1.00	J
74-87-3	Chloromethane		0.250	0.500	1.00	U
106-46-7	1,4-Dichlorobenzene		0.250	0.500	1.00	U
107-06-2	1,2-Dichloroethane		0.250	0.500	1.00	U
75-35-4	1,1-Dichloroethene		0.250	0.500	1.00	U
156-59-2	cis-1,2-Dichloroethene		0.250	0.500	1.00	U
156-60-5	trans-1,2-Dichloroethene		0.250	0.500	1.00	U
78-87-5	1,2-Dichloropropane		0.250	0.500	1.00	U
100-41-4	Ethylbenzene		0.250	0.500	1.00	U
79-34-5	1,1,2,2-Tetrachloroethane		0.250	0.500	1.00	U
127-18-4	Tetrachloroethene		0.250	0.500	1.00	U
79-00-5	1,1,2-Trichloroethane		0.250	0.500	1.00	U
79-01-6	Trichloroethene		0.250	0.500	1.00	U
75-01-4	Vinyl chloride		0.250	0.500	1.00	U

Total Target Analytes Reported 16 Project Analytes: 16

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
Bromofluorobenzene	30.00	29.59	98.6	85 - 114	
Dibromofluoromethane	30.00	34.09	114	80 - 119	
1,2-Dichloroethane-d4	30.00	29.03	96.8	81 - 118	
Toluene-d8	30.00	30.19	101	89 - 112	

VM 081515

011

ANALYSIS DATA SHEET

IR06-GW83-15B

Laboratory:	Empirical Laboratories, LLC			SDG:	1506290
Client:	ENCO			Project:	Lejeune CTO-WE9A
Matrix:	Water	Laboratory ID:	1506290-06	File ID:	0629006B.D
Sampled:	06/26/15 09:35	Prepared:	06/29/15 11:25	Analyzed:	06/29/15 11:25
Solids:		Preparation:	5030B	Dilution:	1
Batch:	5F29001	Sequence:	5F18025	Calibration:	5103002
Instrument:	MS-VOA4				

CAS NO.	COMPOUND	CONC. (ug/L)	DL	LOD	LOQ	Q
71-43-2	Benzene		0.250	0.500	1.00	U
108-90-7	Chlorobenzene		0.250	0.500	1.00	U
67-66-3	Chloroform	**0.307**	0.250	0.500	1.00	J
74-87-3	Chloromethane		0.250	0.500	1.00	U
106-46-7	1,4-Dichlorobenzene		0.250	0.500	1.00	U
107-06-2	1,2-Dichloroethane		0.250	0.500	1.00	U
75-35-4	1,1-Dichloroethene		0.250	0.500	1.00	U
156-59-2	cis-1,2-Dichloroethene		0.250	0.500	1.00	U
156-60-5	trans-1,2-Dichloroethene		0.250	0.500	1.00	U
78-87-5	1,2-Dichloropropane		0.250	0.500	1.00	U
100-41-4	Ethylbenzene		0.250	0.500	1.00	U
79-34-5	1,1,2,2-Tetrachloroethane		0.250	0.500	1.00	U
127-18-4	Tetrachloroethene		0.250	0.500	1.00	U
79-00-5	1,1,2-Trichloroethane		0.250	0.500	1.00	U
79-01-6	Trichloroethene		0.250	0.500	1.00	U
75-01-4	Vinyl chloride		0.250	0.500	1.00	U

Total Target Analytes Reported 16 Project Analytes: 16

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
Bromofluorobenzene	30.00	28.69	95.6	85 - 114	
Dibromofluoromethane	30.00	33.18	111	80 - 119	
1,2-Dichloroethane-d4	30.00	28.36	94.5	81 - 118	
Toluene-d8	30.00	29.74	99.1	89 - 112	

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012

ANALYSIS DATA SHEET

IR06-GW84UCH-15B

Laboratory:	Empirical Laboratories, LLC			SDG:	1506290
Client:	ENCO			Project:	Lejeune CTO-WE9A
Matrix:	Water	Laboratory ID:	1506290-07	File ID:	0629007B.D
Sampled:	06/26/15 08:55	Prepared:	06/29/15 11:54	Analyzed:	06/29/15 11:54
Solids:		Preparation:	5030B	Dilution:	1
Batch:	5F29001	Sequence:	5F18025	Calibration:	5103002
Instrument:	MS-VOA4				

CAS NO.	COMPOUND	CONC. (ug/L)	DL	LOD	LOQ	Q
71-43-2	Benzene	**1.44**	0.250	0.500	1.00	
108-90-7	Chlorobenzene		0.250	0.500	1.00	U
67-66-3	Chloroform	**7.52**	0.250	0.500	1.00	
74-87-3	Chloromethane		0.250	0.500	1.00	U
106-46-7	1,4-Dichlorobenzene		0.250	0.500	1.00	U
107-06-2	1,2-Dichloroethane		0.250	0.500	1.00	U
75-35-4	1,1-Dichloroethene		0.250	0.500	1.00	U
156-59-2	cis-1,2-Dichloroethene	**33.9**	0.250	0.500	1.00	
156-60-5	trans-1,2-Dichloroethene	**0.427**	0.250	0.500	1.00	J
78-87-5	1,2-Dichloropropane		0.250	0.500	1.00	U
100-41-4	Ethylbenzene		0.250	0.500	1.00	U
79-34-5	1,1,2,2-Tetrachloroethane		0.250	0.500	1.00	U
127-18-4	Tetrachloroethene	**1.16**	0.250	0.500	1.00	
79-00-5	1,1,2-Trichloroethane		0.250	0.500	1.00	U
79-01-6	Trichloroethene	**40.6**	0.250	0.500	1.00	
75-01-4	Vinyl chloride		0.250	0.500	1.00	U

Total Target Analytes Reported 16 Project Analytes: 16

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
Bromofluorobenzene	30.00	27.97	93.2	85 - 114	
Dibromofluoromethane	30.00	34.74	116	80 - 119	
1,2-Dichloroethane-d4	30.00	29.28	97.6	81 - 118	
Toluene-d8	30.00	28.83	96.1	89 - 112	

MM 081515

013

ANALYSIS DATA SHEET

IR06-GW85LCH-15B

Laboratory:	Empirical Laboratories, LLC			SDG:	1506290
Client:	ENCO			Project:	Lejeune CTO-WE9A
Matrix:	Water	Laboratory ID:	1506290-08	File ID:	0629008B.D
Sampled:	06/26/15 11:05	Prepared:	06/29/15 12:23	Analyzed:	06/29/15 12:23
Solids:		Preparation:	5030B	Dilution:	1
Batch:	5F29001	Sequence:	5F18025	Calibration:	5103002
Instrument:	MS-VOA4				

CAS NO.	COMPOUND	CONC. (ug/L)	DL	LOD	LOQ	Q
71-43-2	Benzene		0.250	0.500	1.00	U
108-90-7	Chlorobenzene		0.250	0.500	1.00	U
67-66-3	Chloroform		0.250	0.500	1.00	U
74-87-3	Chloromethane		0.250	0.500	1.00	U
106-46-7	1,4-Dichlorobenzene		0.250	0.500	1.00	U
107-06-2	1,2-Dichloroethane		0.250	0.500	1.00	U
75-35-4	1,1-Dichloroethene		0.250	0.500	1.00	U
156-59-2	cis-1,2-Dichloroethene		0.250	0.500	1.00	U
156-60-5	trans-1,2-Dichloroethene		0.250	0.500	1.00	U
78-87-5	1,2-Dichloropropane		0.250	0.500	1.00	U
100-41-4	Ethylbenzene		0.250	0.500	1.00	U
79-34-5	1,1,2,2-Tetrachloroethane		0.250	0.500	1.00	U
127-18-4	Tetrachloroethene		0.250	0.500	1.00	U
79-00-5	1,1,2-Trichloroethane		0.250	0.500	1.00	U
79-01-6	Trichloroethene		0.250	0.500	1.00	U
75-01-4	Vinyl chloride		0.250	0.500	1.00	U

Total Target Analytes Reported 16 Project Analytes: 16

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
Bromofluorobenzene	30.00	28.33	94.4	85 - 114	
Dibromofluoromethane	30.00	33.62	112	80 - 119	
1,2-Dichloroethane-d4	30.00	28.56	95.2	81 - 118	
Toluene-d8	30.00	29.43	98.1	89 - 112	

UM 081515

014

ANALYSIS DATA SHEET

IR82-EB-062615

Laboratory:	Empirical Laboratories, LLC			SDG:	1506290
Client:	ENCO			Project:	Lejeune CTO-WE9A
Matrix:	Water	Laboratory ID:	1506290-09	File ID:	0629009A.D
Sampled:	06/26/15 16:55	Prepared:	06/29/15 08:30	Analyzed:	06/29/15 08:30
Solids:		Preparation:	5030B	Dilution:	1
Batch:	5F29001	Sequence:	5F18025	Calibration:	5103002
Instrument:	MS-VOA4				

CAS NO.	COMPOUND	CONC. (ug/L)	DL	LOD	LOQ	Q
71-43-2	Benzene		0.250	0.500	1.00	U
108-90-7	Chlorobenzene		0.250	0.500	1.00	U
67-66-3	Chloroform		0.250	0.500	1.00	U
74-87-3	Chloromethane		0.250	0.500	1.00	U
106-46-7	1,4-Dichlorobenzene		0.250	0.500	1.00	U
107-06-2	1,2-Dichloroethane		0.250	0.500	1.00	U
75-35-4	1,1-Dichloroethene		0.250	0.500	1.00	U
156-59-2	cis-1,2-Dichloroethene		0.250	0.500	1.00	U
156-60-5	trans-1,2-Dichloroethene		0.250	0.500	1.00	U
78-87-5	1,2-Dichloropropane		0.250	0.500	1.00	U
100-41-4	Ethylbenzene		0.250	0.500	1.00	U
79-34-5	1,1,2,2-Tetrachloroethane		0.250	0.500	1.00	U
127-18-4	Tetrachloroethene		0.250	0.500	1.00	U
79-00-5	1,1,2-Trichloroethane		0.250	0.500	1.00	U
79-01-6	Trichloroethene		0.250	0.500	1.00	U
75-01-4	Vinyl chloride		0.250	0.500	1.00	U

Total Target Analytes Reported 16 Project Analytes: 16

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
Bromofluorobenzene	30.00	29.04	96.8	85 - 114	
Dibromofluoromethane	30.00	33.65	112	80 - 119	
1,2-Dichloroethane-d4	30.00	28.07	93.6	81 - 118	
Toluene-d8	30.00	29.58	98.6	89 - 112	

LM 081575

015

ANALYSIS DATA SHEET

IR82-TB-062615

Laboratory: Empirical Laboratories, LLC SDG: 1506290

Client: ENCO Project: Lejeune CTO-WE9A

Matrix: Water Laboratory ID: 1506290-11 File ID: 0629011A.D

Sampled: 06/26/15 00:00 Prepared: 06/29/15 08:01 Analyzed: 06/29/15 08:01

Solids: Preparation: 5030B Dilution: 1

Batch: 5F29001 Sequence: 5F18025 Calibration: 5103002 Instrument: MS-VOA4

CAS NO.	COMPOUND	CONC. (ug/L)	DL	LOD	LOQ	Q
71-43-2	Benzene		0.250	0.500	1.00	U
108-90-7	Chlorobenzene		0.250	0.500	1.00	U
67-66-3	Chloroform		0.250	0.500	1.00	U
74-87-3	Chloromethane		0.250	0.500	1.00	U
106-46-7	1,4-Dichlorobenzene		0.250	0.500	1.00	U
107-06-2	1,2-Dichloroethane		0.250	0.500	1.00	U
75-35-4	1,1-Dichloroethene		0.250	0.500	1.00	U
156-59-2	cis-1,2-Dichloroethene		0.250	0.500	1.00	U
156-60-5	trans-1,2-Dichloroethene		0.250	0.500	1.00	U
78-87-5	1,2-Dichloropropane		0.250	0.500	1.00	U
100-41-4	Ethylbenzene		0.250	0.500	1.00	U
79-34-5	1,1,2,2-Tetrachloroethane		0.250	0.500	1.00	U
127-18-4	Tetrachloroethene		0.250	0.500	1.00	U
79-00-5	1,1,2-Trichloroethane		0.250	0.500	1.00	U
79-01-6	Trichloroethene		0.250	0.500	1.00	U
75-01-4	Vinyl chloride		0.250	0.500	1.00	U

Total Target Analytes Reported 16 Project Analytes: 16

SYSTEM MONITORING COMPOUND	ADDED (ug/L)	CONC (ug/L)	% REC	QC LIMITS	Q
Bromofluorobenzene	30.00	28.15	93.8	85 - 114	
Dibromofluoromethane	30.00	33.11	110	80 - 119	
1,2-Dichloroethane-d4	30.00	28.77	95.9	81 - 118	
Toluene-d8	30.00	30.20	101	89 - 112	

WL 081515

016

Data Completeness

The data package was received complete and intact. Resubmissions were not required. (SW846 Method 8260B)

Laboratory: Empirical Laboratories

Holding Times

Sampling Date: 6/26/15
Received Date: 6/27/15
Analysis Dates: 6/29/15
Cooler Temp: -2°C

All holding time requirements were met.

Calibrations

Mass assignments were verified by the injection of BFB.

No qualifications were required for the initial or continuing calibrations.

Internal Standards

All criteria were met.

Blank Summary

Blank qualification guidelines:

- No action is taken if a compound is found in the blank but not in the sample.
- Sample weight, volume or dilution factor must be taken into consideration when applying criteria.
- Qualification/Action codes where applied as stated in table below:

Blank Type	Blank Result	Sample Result	Action for Samples
Method, Field	Detects	Not detected	No qualifications
	< LOD*	< LOD*	Report LOD value with a U
		≥ LOD*	Use professional judgment
	> LOD*	< LOD*	Report LOD value with a U
		≥ LOD* and < blank concentration	Report the concentration for the sample with a U, or qualify the data as unusable R
		≥ LOD* and ≥ blank concentration	Use professional judgment
	= LOD*	< LOD*	Report LOD value with a U
		≥ LOD*	Use professional judgment
	Gross contamination	Detects	Qualify results as unusable R

*2x the LOD for methylene chloride, 2-butanone and acetone

No contamination was exhibited in the method blanks. Associated QC blanks: IR82-TB-062615- trip blank (no positive results) and IR82-EB-062615 (no positive results)- equipment blank.

Blank Contamination and Qualification Summaries

Blank ID	Compound	Concentration	Reporting Limit (LOD)

Associated samples and required qualifications are noted in the following table.

Sample ID	Compound	Q Flag	Qual Code
no qualifications			

Surrogates

All criteria were met.

Laboratory Control Sample

All criteria were met.

Matrix Spike/Spike Duplicate Samples

An MS/MSD was submitted for IR09-GW9IUCH-15B and IR82-GW39LCH-15B. Compounds with non-compliant recoveries for both MS and MSD are listed in the table below; qualifications were applied as stated.

Associated Sample	Compound	MS %Rec	MSD %Rec	QC limit	Qualifier	Qual Code
IR82-GW39LCH-15B	trichloroethene	70.8	53.2	79-123	*	

**No qualifications applied due to high amount of compound exhibited in native sample.*

Field Duplicate Sample

A field duplicate was submitted for samples IR82-GW83-15B (no positive results above the LOD, no qualifications) and IR82-GW36UCH-15B-no qualifications required, see attached sheet.

Specific Comments:

All sample results were reported within the calibration range of the instruments.

Detection limits were acceptable. Raw data and calculations were verified.

We have limited the supporting documentation, found with these worksheets, to those forms that indicate qualifications were required.

Validator Signature: L Mascellaro **Date:** 8/15/15

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

SW8260B

IR82-GW39LCH-15B

Laboratory: Empirical Laboratories, LLC

Client: ENCO

Matrix: Water

Batch: 5F29001

% Solids:

SDG: 1506290

Project: Lejeune CTO-WE9A

Source Sample Name: **1506290-02**

ANALYTE	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC.	Q	QC LIMITS REC.
Benzene	500.0	ND	450	90.0		79 - 120
Chlorobenzene	500.0	ND	467	93.3		82 - 118
Chloroform	500.0	ND	459	91.8		79 - 124
Chloromethane	500.0	ND	371	74.1		50 - 139
1,4-Dichlorobenzene	500.0	ND	485	97.0		79 - 118
1,2-Dichloroethane	500.0	ND	497	99.5		73 - 128
1,1-Dichloroethene	500.0	ND	441	88.2		71 - 131
cis-1,2-Dichloroethene	500.0	66.3	527	92.2		78 - 123
trans-1,2-Dichloroethene	500.0	8.03	471	92.6		75 - 124
1,2-Dichloropropane	500.0	ND	452	90.3		78 - 122
Ethylbenzene	500.0	ND	498	99.6		79 - 121
1,1,2,2-Tetrachloroethane	500.0	ND	469	93.9		71 - 121
Tetrachloroethene	500.0	ND	516	103		74 - 129
1,1,2-Trichloroethane	500.0	ND	472	94.4		80 - 119
Trichloroethene	500.0	1830	2190	70.8	*	79 - 123
Vinyl chloride	500.0	ND	480	96.0		58 - 137

No qual due to high amts of compd in native sample

019

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

SW8260B

IR82-GW39LCH-15B

Laboratory: Empirical Laboratories, LLC

Client: ENCO

Matrix: Water

Batch: 5F29001

% Solids:

SDG: 1506290

Project: Lejeune CTO-WE9A

Source Sample Name: **1506290-02**

ANALYTE	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD % REC. #	% RPD	Q	QC LIMITS RPD	QC LIMITS REC.
Benzene	500.0	442	88.3	1.86		20	79 - 120
Chlorobenzene	500.0	489	97.9	4.73		20	82 - 118
Chloroform	500.0	448	89.7	2.39		20	79 - 124
Chloromethane	500.0	380	76.1	2.64		20	50 - 139
1,4-Dichlorobenzene	500.0	470	94.1	3.09		20	79 - 118
1,2-Dichloroethane	500.0	477	95.4	4.16		20	73 - 128
1,1-Dichloroethene	500.0	443	88.6	0.393		20	71 - 131
cis-1,2-Dichloroethene	500.0	525	91.7	0.471		20	78 - 123
trans-1,2-Dichloroethene	500.0	486	95.6	3.13		20	75 - 124
1,2-Dichloropropane	500.0	416	83.2	8.17		20	78 - 122
Ethylbenzene	500.0	518	104	3.99		20	79 - 121
1,1,2,2-Tetrachloroethane	500.0	457	91.4	2.67		20	71 - 121
Tetrachloroethene	500.0	522	104	1.24		20	74 - 129
1,1,2-Trichloroethane	500.0	465	92.9	1.54		20	80 - 119
Trichloroethene	500.0	2100	53.2	4.11	*	20	79 - 123
Vinyl chloride	500.0	499	99.8	3.89		20	58 - 137

020

DataQual **VOA**

FIELD DUPLICATE SAMPLE SUMMARY

Sample ID: IR82-GW36UCH-15B
Duplicate Sample ID: IR82-GW36UCHD-15B

Water: RPD>20%
Soil: RPD>20%

Compound	Sample Conc.	Dup. Sample Conc.	%RPD
chloroform	0.84	0.92	9
1,1-dichloroethene	1.29	1.4	8
cis-1,2-dichloroethene	6.07	6.75	11
tetrachloroethene	0.846	0.959	13
trichloroethene	1.75	1.69	3
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COMMENTS: Qualify all compounds with %RPD above 20% as estimated (J/UJ)

No qual required

* one of the results below the LOD
if both results are below the LOD the results are not compared

1506290

EMPIRICAL LABORATORIES, LLC - CHAIN OF CUSTODY RECORD

SHIP TO: 621 Mainstream Drive, Suite 270 ♦ Nashville, TN 37228 ♦ 877-345-1113 ♦ (fax) 866-417-0548

26633

10

Send Results to:
Name Bianca Kleist
Company CH2M HILL
Address 14120 Ballantyne Corporate Place
City Charlotte
State, Zip NC, 28277
Phone 704-543-3274
Fax
E-mail bianca.kleist@ch2m.com

Send Invoice to:
Name Bianca Kleist
Company CH2M HILL
Address 14120 Ballantyne Corporate
City Charlotte
State, Zip NC, 28277
Phone 704-543-3274
Fax
E-mail bianca.kleist@ch2m.com

Project No./Name: 495027.FI.06.WI

Sampler's (Signature): Lori Chaal Texle

Analysis Requirements: 8260B

Lab Use Only:

VOA Headspace	Y	N	NA
Field Filtered	Y	N	NA
Correct Containers	Y	N	NA
Discrepancies	Y	N	NA
Cust. Seals Intact	Y	N	NA
Containers Intact	Y	N	NA

Airbill #:

CAR #:

Lab Use Only Lab #	Date/Time Sampled	Sample Description	Sample Matrix	8260B	Comments	No. of Bottles	Lab Use Only Containers/Pres.
01	1530/6/26	IR06-MW91-158	AQ	✓	MS/MSD	9	
02	1240/6/26	IR82-MW39-LCH-15B	AQ	✓	MS/MSD	9	MS/MSD
03	1405 6/26	IR82-MW36UCH-15B	AQ	✓		3	
04	1410 6/26	IR82-MW36UCHD-15B	AQ	✓		3	
05	0940 6/26	IR06-MW83D-15B	AQ	✓		3	
06	0935 6/26	IR06-MW83-15B	AQ	✓		3	
07	0855 6/26	IR06-MW84UCH-15B	AQ	✓		3	
08	1105 6/26	IR06-MW85LCH-15B	AQ	✓		3	
09	1655 6/26	IR82-EB-062615	AQ	✓		3	
10	1710 6/26	IR06-MW90LCH-15B	AQ	✓		3	
11	—	Trip blank	AQ	✓		2	

Sample Kit Prep'd by: (Signature)	Date/Time	Received By: (Signature)
[signature]	6/26/15/1730	[signature]
Relinquished by: (Signature) [signature]	Date/Time 6/26/15/1730	Received By: (Signature)
Relinquished by: (Signature)	Date/Time	Received By: (Signature)
Received for Laboratory by: (Signature) [signature]	Date/Time 6/27/15 845	Temperature -20

REMARKS:

Details:
Page ____ of ____
Cooler No. ____ of ____
Date Shipped ____
Shipped By ____
Turnaround ____

Distribution: Original and yellow copies accompany sample shipment to laboratory; Pink retained by samplers.

1506290 Summ Package

V:\Standard Operating Procedures\Current SOP File Directory\Forms\QS10_R21_20140729_Chain of Custody.doc

II. EMPIRICAL LABORATORIES
COOLER RECEIPT FORM

Cooler Received/Opened On: 06/27/15 @ 0845 Work order# 1506290

1. Tracking # 6524 (last 4 digits, FedEx)

   Courier: FedEx

2. Temperature of rep. sample or temp blank when opened: -2.0 °C + correction factor(-0.0) = -2.0 °C

3. If Item #2 temperature is 0°C or less, was the representative sample or temp blank frozen? YES (NO)..NA

4. Were custody seals on outside of cooler? (YES)..NO...NA

   If yes, how many and where: 2 front + Back

5. Were the seals intact, signed, and dated correctly? (YES)..NO...NA

6. Were custody papers inside cooler? (YES)..NO...NA

   I certify that I opened the cooler and answered questions 1-6 (initial/date) TH 6/27/15

7. Were custody seals on containers: YES (NO) and intact YES...NO...(NA)

   Were these signed and dated correctly? YES...NO...(NA)

8. Packing material used? Bubble wrap (Plastic bag) Peanuts Vermiculite Foam Insert Paper Other None

9. Cooling process: (Ice) Ice-pack Ice (direct contact) Dry Ice Other None

10. Did all containers arrive in good condition (unbroken)? (YES)...NO...NA

11. Were all container labels complete (#, date, signed, pres., etc)? (YES)...NO...NA

12. Did all container labels and tags agree with custody papers? (YES)..NO...NA

13. a. Were VOA vials received? (YES)..NO...NA

    b. Was there observable headspace present in any VOA vial (>5mm-6mm)? YES..(NO)..NA

14. Was there a Trip Blank in this cooler (custody seals present/intact)? (YES)..NO...NA...Comments_____
    If multiple coolers, sequence #_____

    I certify that I unloaded the cooler and answered questions 7-14 (initial/date) TH 6/27/15

15. a. On pres'd bottles, did pH test strips suggest preservation reached the correct pH level? YES...NO...(NA)

    b. Did the bottle labels indicate that the correct preservatives were used? YES...NO...(NA)

16. Was residual chlorine present? YES...NO...(NA)

    I certify that I checked for chlorine and pH as per SOP and answered questions 15-16 (initial/date) TH 6/27/15

17. Were custody papers properly filled out (ink, signed, etc)? (YES)...NO...NA

18. Did you sign the custody papers in the appropriate place? (YES)...NO...NA

19. Were correct containers used for the analysis requested? (YES)..NO...NA If not, PM notified? YES...NO...(NA)

20. Was sufficient amount of sample sent in each container? (YES)...NO...NA If not, PM notified? YES...NO...(NA)

21. Were there Non-Conformance issues at login? YES..(NO)...NCR#_____

I certify that I entered this project into LIMS and answered questions 17-21 (initial/date) TH 6/27/15

I certify that I attached a label with the unique LIMS number to each container (initial/date) TH 6/24/15

I certify that I notified the laboratory of any short holding time or RUSH parameters (initial/date) TH 6/27/15

C:\Users\jgross\Desktop\Cooler Receipt Updated 2014.doc

II. EMPIRICAL LABORATORIES
COOLER RECEIPT FORM (Continued)

LIMS Data Entry Second Check

Work order# 1506290

22. Cooler Receipt Form issues reviewed and communicated to PM? YES...NO...NA

23. Client and Project verified to match the COC/CRF in LIMS Project Screen? YES...NO...NA

24. Following items verified to items verified to match the COC/CRF in LIMS Receipt Screen:

a. Received Date/Received By YES...NO...NA

b. TAT (COC specified different?) YES...NO...NA

c. Shipping Container Temperatures (corrected temps) YES...NO ...NA

d. Condition Items (seals, intact, labels, preservation, ROI) YES...NO...NA

25. Following LIMS Sample Information verified against COC for each sample:

a. Name YES...NO...NA

b. QC Source YES...NO...NA

c. Matrix YES...NO...NA

d. Sample Type YES...NO...NA

e. Sampled Date/Time (Correct Time Zone) YES...NO...NA

f. Work Analyses/Versions (if applicable) YES...NO...NA

g. Sample Issues included in comments (limited volume, concentration warnings, etc.)? YES...NO...NA

h. Unpreserved VOA holding time set to 7 days? YES...NO...NA

26. Containers consistent with tests requested? YES...NO...NA

27. Field data entered and matching COC? YES...NO...NA

I certify that I have verified the LIMS data entry and answered questions 23-27 above (initial/date): _____

Additional Details:

Sample Delivery Group Case Narrative

Receipt Information:

The samples were received within the preservation guidelines for the associated methods. The information associated with sample receipt and the Sample Delivery Group (SDG) are included within section 4 of this package, which also provides information on the link between the client sample ID listed on the COC and laboratory's assigned unique sample ID or WorkOrder #. The sample is tracked through the laboratory for all analysis via the assigned WorkOrder #.

All samples that were received were analyzed and none of the samples were placed on hold without analyses. There were no subcontracted analyses for this SDG.

The following issues were discovered with the COC and/or samples upon log-in:

1. As per the client, sample IR06-GW90LCH-15B should be cancelled.
2. As per the client, all samples with "MW" in the client ID should be changed to "GW".
3. As per the client, the sample listed on the COC as IR06-MW91-15B should have the client ID of IR06-GW91UCH-15B and the sample listed as Trip Blank should have the client ID of IR82-TB-062615.

Changes to the Revision:

This is an original submittal of the final report package.

Analytical Information:

All samples were prepped (where applicable) and analyzed within the standard allowed holding times, unless noted within the exceptions listed below. The laboratory analyzed all samples within the program and method guidelines. Sample preparation and dilution information is provided within the final results report and at the beginning of each form set. The following information is provided specific to individual methods:

SW8260B:

Note – Sample 1506290-02 was analyzed at a 10x due to high concentrations of target analytes detected during screening. No lower analysis was performed.

The following matrix spikes exceeded criteria:
5F29001-MS3/MSD3 (1506290-02) with a negative bias for Trichloroethene; note – the associated batch spike is within criteria

No additional anomalies or deviations are noted and the proper data qualifiers have been applied.

025

Data Qualifiers:

As applicable and where required, the following general qualifiers are associated with the sample results. Additional qualifiers will be specified within the reporting sections of the data package or within the body of the Case Narrative.

Analytical Report Terms and Qualifiers

DL: The detection limit (DL) is defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero. The DL is supported by the method detection limit (MDL) which is determined from analysis of a sample containing the analyte in a given matrix.

LOD: The Limit of Detection is an estimate of the minimum amount of a substance that an analytical process can reliably detect. An LOD is analyte- and matrix-specific and may be laboratory-dependent. This definition is further clarified in the DoD QSM 5.0 revisions as the smallest amount or concentration of a substance that must be present in a sample in order to be detected at a high level of confidence (99%). At the LOD, the false negative rate (Type II error) is 1%.

LOQ: The Limit of Quantitation is the minimum level, concentration, or quantity of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence. This term is further clarified within the DoD QSM 5.0 as the lowest concentration that produces a quantitative result within specified limits of precision and bias.

***:** Exceeding quality control criteria are associated with the reported result.

B: The presence of a "B" to the right of an analytical value indicates that this compound was also detected in the method blank and the data should be interpreted with caution. One should consider the possibility that the correct sample result might be less than the reported result and, perhaps, zero.

D: When a sample (or sample extract) is rerun diluted because one of the compound concentrations exceeded the highest concentration range for the standard curve, all of the values obtained in the dilution run will be flagged with a "D".

E: The concentration for any compound found which exceeds the highest concentration level on the standard curve for that compound will be flagged with an "E". Usually the sample will be rerun at a dilution to quantitate the flagged compound. For Metals, the qualifier indicates that the serial dilution was outside of the control limits and the compound should be considered estimated due to the presence of interference.

H1: The result was analyzed outside of the EPA recommended holding time.

H2: The result was extracted outside of the EPA recommended holding time.

H3: The sample for this analyte was received outside of the EPA recommended holding time.

J: The presence of a "J" to the right of an analytical result indicates that the reported result is estimated. The mass spectral data pass the identification criteria showing that the compound is present, but the calculated result is less than the LOQ. One should feel confident that the result is greater than zero and less than the LOQ.

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M: Indicates that the sample matrix interfered with the quantitation of the analyte. In dual column analysis the result is reported from the column with the lower concentration. In inorganics, it indicates that the parameters DL/LOD/LOQ have been raised.

N: The MS/MSD accuracy and/or precision are outside criteria. The predigested spike recovery is not within control limits for the associated parameter.

P: The associated numerical value is an estimated quantity. There is greater than a 40% difference between the two GC columns for the detected concentrations. The higher of the two values is reported unless matrix interference is obvious or for HPLC analysis where the primary column is reported.

Q: The relative percent difference (RPD) and/or percent recovery exceeded limits in the associated Blank Spike and/or Blank Spike Duplicate.

S: The associated internal standard exceeded criteria.

U: The presence of a "U" indicates that the analyte was analyzed for but was not detected or the concentration of the analyte quantitated below the DL.

X: The parameter shows a potential positive bias on a reported concentration due to an ICV or CCV exceeding the upper control limit on the high side.

Y: The parameter shows a potential negative bias on a reported concentration due to an ICV or CCV exceeding the lower control limit on the low side.

Z: The parameter shows lack of confirmation/detection, which may be due to a negative bias in the ICV or CCV which exceeds the lower control limit.

Chromatographic Flags for Manual Integration:

The following letters are used to denote manual integrations on the laboratory's raw data in association with chromatographic integrations:

A: The peak was manually integrated as it was not integrated in the original chromatogram.

B: The peak was manually integrated due to resolution or co-elution issues in the original chromatogram.

C: The peak was manually integrated to correct the baseline from the original chromatogram.

D: The peak was manually integrated to identify the correct peak as the wrong peak was identified in the original chromatogram.

E: The peak was manually integrated to include the entire peak as the original chromatogram only integrated part of the peak.

LIMS Definitions / Naming Conventions:

The following are general naming conventions that are used throughout the laboratory; however, on a method by method basis, there are additional QAQC items that are named in a consistent format.

BLK: LIMS assigns a unique identifier to the Method Blank by naming it as the letters BLK

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appended to the Batch ID. A Method Blank is an analyte-free matrix to which all reagents are added in the same volumes or proportions as used in sample processing. The Method Blank is used to assess for possible contamination during preparation and/or analysis steps. Method Blanks within a Batch or Analytical sequence will be appended with a numerical value beginning with 1 that will increase incrementally.

BS: LIMS assigns a unique identifier to the Blank Spike by naming it as the letters BS appended to the Batch ID. The Blank Spike or Lab Control Sample is a controlled analyte-free matrix, which is spiked with known and verified concentrations of target analytes. Spiking concentrations can be referenced in the method SOP. The BS is used to evaluate the viability of analytes taken through the entire prep (when applicable) and analytical process. Blank Spikes within a Batch or Analytical sequence will be appended with a numerical value beginning with 1 that will increase incrementally. A duplicate Blank Spike will be designated as a BSD.

MS: The LIMS assigns each Client sample with a unique identifier. The Matrix Spike is designated with a MS at the end of the sample's unique identifier. The Matrix Spike sample is used to assess the effect of the sample matrix on the precision and accuracy of the results generated using the selected method. A duplicate Matrix Spike will be designated as a MSD.

IDs: The LIMS assigns each Client sample with a unique identifier. The letter "RE" may potentially be appended to the end of the LIMS Sample ID. And **"RE"** implies that the sample was either re-prepped, re-analyzed straight, or re-analyzed at a dilution. Subsequent re-analysis for the sample will be appended with a numerical value beginning with 1 that will increase incrementally. Eg: RE1, RE2, RE3, etc.

Statement of Data Authenticity:

I certify that, based upon my inquiry of those individuals immediately responsible for obtaining the information and to the best of my knowledge, the data package is in compliance with the terms and conditions of the contract, both technically and for completeness, with the exception of the conditions detailed in this Case Narrative, as verified by my signature below. During absences, the Data Quality Manager, Technical Directors or Project Managers are authorized to sign this Statement of Data Authenticity.

Mr. Rick D. Davis
Laboratory Technical Director / VP Operations

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From: Seng.Camus@ch2m.com
Sent:
To: sgordon@empirlabs.com
Subject:

Sonya,
I also wanted to point out that the Trip Blank sample ID should be IR82-TB-062615.

Thanks,
Seng Camus
CH2M Hill
Chemist
(808)440-0231-Work
(423)443-7618-Cell
***Please note my new hours Monday-Thursday 8-2HST**

From: Sonya Gordon [mailto:sgordon@empirlabs.com]
Sent: Monday, June 29, 2015 1:31 PM
To: Camus, Seng/HNL
Subject: RE: Site 6 & 82 Groundwater Samples - Send out today

Thanks Seng. It looks like our emails probably crossed paths. I'll update the IDs and resend the rush report in the morning.

Sonya Gordon
Project Manager
Empirical Laboratories, LLC
Main: 615.345.1115 ext. 238 I Toll free: 877.345.1113 I Fax: 866.417.0548

Your opinion is valuable to us. Please click here to provide us your feedback.

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From: Seng.Camus@ch2m.com [mailto:Seng.Camus@ch2m.com]
Sent: Monday, June 29, 2015 6:15 PM
To: sgordon@empirlabs.com
Subject: RE: Site 6 & 82 Groundwater Samples - Send out today
Importance: High

Aloha Sonya,
Please see below for the following correct sample IDs. Rachel informed me that she spoke to you about some possible incorrect sample IDs. I didn't have a login/COC so I wasn't able to make a CTF.

IR06-GW90LCH-15B

IR06-GW83-15B
IR06-GW83D-15B
IR06-GW84UCH-15B
IR06-GW85LCH-15B
IR06-GW99LCH-15B
IR06-GW87UCH-15B
IR06-GW91UCH-15B
IR06-GW91UCH-15B-MS
IR06-GW91UCH-15B-SD
IR82-GW36UCH-15B
IR82-GW36UCHD-15B
IR82-GW39LCH-15B
IR82-GW39LCH-15B-MS
IR82-GW39LCH-15B-SD

Lastly, IR06-MW86 (standard TAT) and IR06-MW87UCH (24-TAT) were not shipped yet – these will be shipped today.

Other than IR06-MW86, no other "non-priority" samples were collected, I've asked the FLT to ensure that this IR06-MW86 gets listed as standard TAT instead of the 24 hour TAT.
Please let me know if you have any questions.

Thanks,
Seng Camus
CH2M Hill
Chemist
(808)440-0231
1132 Bishop Street Suite 1100
Honolulu, HI 96813
*****Please note my new hours Monday-Thursday 8-2HST**

From: Seng.Camus@ch2m.com
Sent:
To: sgordon@empirlabs.com
Subject:

Importance: High

Sonya,
The sample IDs are correct. Can you please update the sample time for IR82-EB-062615 from 10:55 to 16:55?

Thanks,
Seng Camus
CH2M Hill
Chemist
(808)440-0231-Work
(423)443-7618-Cell
***Please note my new hours Monday-Thursday 8-2HST**

From: Sonya Gordon [mailto:sgordon@empirlabs.com]
Sent: Tuesday, June 30, 2015 2:15 PM
To: Camus, Seng/HNL
Subject: RE: Site 6 & 82 Groundwater Samples - Send out today

Can you double check me on the corrections? It appears the biggest thing was that they should be GW instead of MW.

Sonya Gordon
Project Manager
Empirical Laboratories, LLC
Main: 615.345.1115 ext. 238 I Toll free: 877.345.1113 I Fax: 866.417.0548

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Sonya Gordon
Project Manager
Empirical Laboratories, LLC
Main: 615.345.1115 ext. 238 I Toll free: 877.345.1113 I Fax: 866.417.0548

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IR06-GW87UCH-15B
IR06-GW91UCH-15B
IR06-GW91UCH-15B-MS
IR06-GW91UCH-15B-SD
IR82-GW36UCH-15B
IR82-GW36UCHD-15B
IR82-GW39LCH-15B

IR82-GW39LCH-15B-MS
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