#### **Table of Contents - Validation Report File**

(May 2017 – Grenada Manufacturing LLC – Data Validation Reports.PDF)

Note: This file shows the sample key and eight (8) data validation reports conducted for sampling undertaken per the Revised Facility Interim Air Monitoring Plan by the Grenada Manufacturing LLC (dated April 17, 2017)

#### 1. Sample Key for May 2017 Sampling Event – Indoor Air and Ambient Air

#### 2. Data Validation Reports

First Set - Indoor and Outdoor Air (May 1 - 2, 2017) – 8 Hour - Radiello Sampling (Analysis Method RAD 145)

First Set – Indoor Air (May 1 – 2, 2017) – 8 Hour – Summa Canister Sampling (Analysis Method TO-15)

Second Set – Indoor and Outdoor Air (May 9, 2017) – 8 Hour – Radiello Sampling (Analysis Method RAD 145)

Third Set – Indoor and Outdoor Air (May 16-17, 2017) – 8 Hour – Radiello Sampling (Analysis Method RAD 145)

7-Day – Indoor and Outdoor Air (May 1 - 8, 2017) – 7 Days – Radiello Sampling (Analysis Method RAD 130)

14-Day Set 1 - Indoor Air and Outdoor Air (May 1 – May 15, 2017) – Radiello Sampling (Analysis Method RAD 130)

14-Day Set 2 – Outdoor Air (May 1 – May 15, 2017) – Radiello Sampling (Analysis Method RAD 130)

30-Day – Indoor Air and Outdoor Air (May 1 – May 30, 2017) – Radiello Sampling (Analysis Method RAD 130)



	Sample	Location /	Worker	Sample	Sample	
Sample ID	Location ID	Column	Shift	Duration‡	Dates	Analysis
Program A - Indoor	Air - Zone B: Pro	oduction Area				
550 JU			1st	8-hrs	5/2/2017	RAD 145*
B-4 (050217) 1ST			1st	8-hrs	5/2/2017	TO-15
118 JX			1st	8-hrs	5/9/2017	RAD 145
431 JX			1st	8-hrs	5/16/2017	RAD 145
557 JU			2nd	8-hrs	5/2/2017	RAD 145*
B-4 (050217) 2ND			2nd	8-hrs	5/2/2017	TO-15
123 JX	B-4	D-14	2nd	8-hrs	5/9/2017	RAD 145
438 JX	D-4	D-14	2nd	8-hrs	5/16/2017	RAD 145
540 JU			3rd	8-hrs	5/1/2017	RAD 145*
B-4 (050117) 3RD			3rd	8-hrs	5/1/2017	TO-15
111 JX			3rd	8-hrs	5/8/2017	RAD 145
104 QK			3rd	8-hrs	5/16/2017	RAD 145
088 QK			All	7-days	5/1/2017 - 5/8/2017	RAD 130
425 JX			All	14-days	5/1/2017 - 5/15/2017	RAD 130
539 JU			1st	8-hrs	5/2/2017	RAD 145*
120 JX	1		1st	8-hrs	5/9/2017	RAD 145
432 JX			1st	8-hrs	5/16/2017	RAD 145
556 JU	1		2nd	8-hrs	5/2/2017	RAD 145*
418 JX			2nd	8-hrs	5/9/2017	RAD 145
098 QK	B-6	B-19	2nd	8-hrs	5/16/2017	RAD 145
539 JU	1		3rd	8-hrs	5/1/2017	RAD 145*
119 JX	1		3rd	8-hrs	5/8/2017	RAD 145
109 QK**	1		3rd	8-hrs	5/16/2017	RAD 145
093 QK	1		All	7-days	5/1/2017 - 5/8/2017	RAD 130
424 JX	1		All	14-days	5/1/2017 - 5/15/2017	RAD 130
551 JU			1st	8-hrs	5/2/2017	RAD 145*
117 JX	1		1st	8-hrs	5/9/2017	RAD 145
433 JX	1		1st	8-hrs	5/16/2017	RAD 145
558 JU	1		2nd	8-hrs	5/2/2017	RAD 145*
419 JX	1		2nd	8-hrs	5/9/2017	RAD 145
099 QK	B-9	E-10	2nd	8-hrs	5/16/2017	RAD 145
542 JU			3rd	8-hrs	5/1/2017	RAD 145*
116 JX	1		3rd	8-hrs	5/8/2017	RAD 145
106 QK			3rd	8-hrs	5/16/2017	RAD 145
091 QK			All	7-days	5/1/2017 - 5/8/2017	RAD 130
426 JX	1		All	14-days	5/1/2017 - 5/15/2017	RAD 130
Program C - Indoor	Air - Zone B: Pro	oduction Area				
548 JU			1st	8-hrs	5/2/2017	RAD 145*
103 JX	1		2nd	8-hrs	5/2/2017	RAD 145*
538 JU	A-5	CMM Room /	3rd	8-hrs	5/1/2017	RAD 145*
096 QK	1	C-12	All	7-days	5/1/2017 - 5/8/2017	RAD 130
R-A-5	1		All	30-days	5/1/2017 - 5/30/2017	RAD 130
552 JU			1st	8-hrs	5/2/2017	RAD 145*
104 JX	1		2nd	8-hrs	5/2/2017	RAD 145*
543 JU	B-3	F-16	3rd	8-hrs	5/1/2017	RAD 145*
092 QK	1		All	7-days	5/1/2017 - 5/8/2017	RAD 130
R-B-3	1		All	30-days	5/1/2017 - 5/30/2017	RAD 130
553 JU			1st	8-hrs	5/2/2017	RAD 145*
105 JX	1		2nd	8-hrs	5/2/2017	RAD 145*
544 JU	B-8	G-18	3rd	8-hrs	5/1/2017	RAD 145*
090 QK	-		All	7-days	5/1/2017 - 5/8/2017	RAD 130
030 QK			ΛII	1-uays	3/1/2017 - 3/0/2017	1740 130



	Sample	Location /	Worker	Sample	Sample	
Sample ID	Location ID	Column	Shift	Duration‡	Dates	Analysis
Ambient Air						
554 JU			1st	8-hrs	5/2/2017	RAD 145*
115 JX			1st	8-hrs	5/9/2017	RAD 145
435 JX			1st	8-hrs	5/16/2017	RAD 145
106 JX			2nd	8-hrs	5/2/2017	RAD 145*
421 JX			2nd	8-hrs	5/9/2017	RAD 145
101 QK		North side of	2nd	8-hrs	5/16/2017	RAD 145
547 JU	AMB-R-N	facility	3rd	8-hrs	5/1/2017	RAD 145*
114 JX			3rd	8-hrs	5/8/2017	RAD 145
108 QK			3rd	8-hrs	5/16/2017	RAD 145
097 QK			All	7-days	5/1/2017 - 5/8/2017	RAD 130
428 JX	-	-	All	14-days	5/1/2017 - 5/15/2017	RAD 130
Amb-R-N	-	-	All	30-days	5/1/2017 - 5/30/2017	RAD 130
555 JU			1st	8-hrs	5/2/2017	RAD 145*
122 JX	-		1st	8-hrs	5/9/2017	RAD 145
434 JX	-		1st	8-hrs	5/16/2017	RAD 145
107 JX			2nd	8-hrs	5/2/2017	RAD 145*
420 JX			2nd	8-hrs	5/9/2017	RAD 145
100 QK		South side of	2nd 2nd	8-hrs	5/16/2017	RAD 145
545 JU	AMB-R-S	facility	3rd	8-hrs	5/1/2017	RAD 145*
		laomity	3rd			
121 JX				8-hrs	5/8/2017	RAD 145
105 QK**			3rd	8-hrs	5/16/2017	RAD 145
095 QK			All	7-days	5/1/2017 - 5/8/2017	RAD 130
427 JX			All	14-days	5/1/2017 - 5/15/2017	RAD 130
Amb-R-S			All	30-days	5/1/2017 - 5/30/2017	RAD 130
108 JX			1st	8-hrs	5/9/2017	RAD 145
437 JX			1st	8-hrs	5/16/2017	RAD 145
423 JX			2nd	8-hrs	5/9/2017	RAD 145
103 QK	AMB-R-E	East side of	2nd	8-hrs	5/16/2017	RAD 145
109 JX		facility	3rd	8-hrs	5/8/2017	RAD 145
111 QK			3rd	8-hrs	5/16/2017	RAD 145
430 JX			All	14-days	5/1/2017 - 5/15/2017	RAD 145
Amb-R-E			All	30-days	5/1/2017 - 5/30/2017	RAD 130
113 JX			1st	8-hrs	5/9/2017	RAD 145
436 JX			1st	8-hrs	5/16/2017	RAD 145
422 JX			2nd	8-hrs	5/9/2017	RAD 145
102 QK	AMB-R-W	West side of	2nd	8-hrs	5/16/2017	RAD 145
112 JX		facility	3rd	8-hrs	5/8/2017	RAD 145
110 QK	_		3rd	8-hrs	5/16/2017	RAD 145
429 JX			All	14-days	5/1/2017 - 5/15/2017	RAD 130
Amb-R-W			All	30-days	5/1/2017 - 5/30/2017	RAD 130
QA/QC						
541 JU	B-4	D-14	3rd	8-hrs	5/1/2017	RAD 145*
546 JU	B-3	F-16	3rd	8-hrs	5/1/2017	RAD 145*
089 QK	B-4	D-14	All	7-days	5/1/2017 - 5/8/2017	RAD 130
094 QK	B-3	F-16	All	7-days	5/1/2017 - 5/8/2017	RAD 130
110 JX	B-4	D-14	3rd	8-hrs	5/8/2017	RAD 145
107 QK	B-9	E-10	3rd	8-hrs	5/16/2017	RAD 145
DUP-5	B-3	F-16	All	30-days	5/1/2017 - 5/30/2017	RAD 130



## Grenada Manufacturing

# **DATA REVIEW**

# Grenada, Mississippi

Volatile Organic Compound (VOC) Analyses

SDG #1712627

Analyses Performed By: ALS Environmental Salt Lake City, Utah

Report #27667R Review Level: Tier III

Project: LA003307.0006.00001

#### **SUMMARY**

This data quality assessment summarizes the review of Sample Delivery Group (SDG) #1712627 for samples collected in association with the Grenada Manufacturing site, located in Grenada, Mississippi. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

			Sample		Analysis			
Sample ID	Lab ID	Matrix	Collection Date	Parent Sample	VOC	svoc	MET	MISC
538 JU	1712627001	Air	5/1/2017		Х			
539 JU	1712627002	Air	5/2/2017		X			
540 JU	1712627003	Air	5/1/2017		Х			
541 JU	1712627004	Air	5/1/2017	540JU	Х			
542 JU	1712627005	Air	5/1/2017		Х			
543 JU	1712627006	Air	5/1/2017		Х			
546 JU	1712627007	Air	5/1/2017	543 JU	Х			
544 JU	1712627008	Air	5/1/2017		Х			
547 JU	1712627009	Air	5/1/2017		Х			
545 JU	1712627010	Air	5/1/2017		Х			
548 JU	1712627011	Air	5/2/2017		Х			
549 JU	1712627012	Air	5/1/2017		Х			
550 JU	1712627013	Air	5/2/2017		Х			
551 JU	1712627014	Air	5/2/2017		Х			
552 JU	1712627015	Air	5/2/2017		Х			
553 JU	1712627016	Air	5/2/2017		Х			
554 JU	1712627017	Air	5/2/2017		Х			
555 JU	1712627018	Air	5/2/2017		Х			
103 JX	1712627019	Air	5/2/2017		Х			
556 JU	1712627020	Air	5/2/2017		Х			
557 JU	1712627021	Air	5/2/2017		Х			
558 JU	1712627022	Air	5/2/2017		Х			
104 JX	1712627023	Air	5/2/2017		Х			
105 JX	1712627024	Air	5/2/2017		Х			

Sample ID	Lab ID Matrix		Sample	5	Analysis			
	Lab ID	Matrix	Collection Date	Parent Sample	VOC	svoc	MET	MISC
106 JX	1712627025	Air	5/2/2017		Х			
107 JX	1712627026	Air	5/2/2017		Х			

#### **ANALYTICAL DATA PACKAGE DOCUMENTATION**

The table below is the evaluation of the data package completeness.

	Rep	orted	Performance Acceptable		Not	
Items Reviewed	No	Yes	No	Yes	Required	
Sample receipt condition		Х		Х		
Requested analyses and sample results		Х		Х		
Master tracking list		Х		X		
4. Methods of analysis		Х		X		
5. Reporting limits		Х		X		
6. Sample collection date		Х		X		
7. Laboratory sample received date		Х		X		
8. Sample preservation verification (as applicable)		Х		X		
Sample preparation/extraction/analysis dates		Х		Х		
10. Fully executed Chain-of-Custody (COC) form		Х		Х		
11. Narrative summary of QA or sample problems provided		Х		Х		
12. Data Package Completeness and Compliance		Х		Х		

Note:

QA - Quality Assurance

#### **ORGANIC ANALYSIS INTRODUCTION**

Samples were collected using Radiello cartidges and analysis was performed using the Solvent Panel Scan method. Data were reviewed in accordance with USEPA National Functional Guidelines of October 1999.

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and had already been subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
  - U The compound was analyzed for but not detected. The associated value is the compound quantitation limit.
  - B The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.
- Quantitation (Q) Qualifiers
  - E The compound was quantitated above the calibration range.
  - D Concentration is based on a diluted sample analysis.
- Validation Qualifiers
  - J The compound was positively identified; however, the associated numerical value is an estimated concentration only.
  - UJ The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.
  - JN The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification. The associated numerical value is an estimated concentration only.
  - UB Compound considered non-detect at the listed value due to associated blank contamination.
  - N The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification.
  - R The sample results are rejected.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

#### **VOLATILE ORGANIC COMPOUND (VOC) ANALYSIS**

#### 1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
Solvent Panel Scan (SOP: IH-AN-Solvent Panel)	Air	60 days from collection to analysis	Cool to <6°C

All samples were analyzed within the specified holding time.

The following sample preparation and analysis non-conformance was noted:

Samples were collected using Radiello 145 media specified for thermal desorption sample
preparation techniques. The laboratory mistakenly prepared and analyzed the samples using the
Radiello 130 solvent panel scan method. Due to the addition of the desorbent solution and the limited
sample exposure duration, the sample results were reported at elevated reporting limits.

#### 2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

#### 3. Mass Spectrometer Tuning

Mass spectrometer performance was acceptable and all analyses were performed within a 24-hour tune clock.

System performance and column resolution were acceptable.

#### 4. Calibration

Satisfactory instrument calibration is established to insure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

#### 4.1 Initial Calibration

The method specifies percent relative standard deviation (%RSD) and relative response factor (RRF) limits for select compounds only. A technical review of the data applies limits to all compounds with no exceptions.

All target compounds associated with the initial calibration standards must exhibit a %RSD less than the control limit (30%) and an RRF value greater than control limit (0.05).

#### 4.2 Continuing Calibration

All target compounds associated with the continuing calibration standard must exhibit a percent difference (%D) less than the control limit (30%) and RRF value greater than control limit (0.05).

All compounds associated with the calibrations were within the specified control limits.

#### 5. Internal Standard Performance

Internal standard performance criteria insure that the GC/MS sensitivity and response are stable during every sample analysis. The criteria require the internal standard compounds associated with the VOC exhibit area counts are  $\pm$  40% of the area counts of the associated continuing calibration standard.

All internal standard responses were within control limits.

# 6. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) Analysis

The LCS/LCSD analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS/LCSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits.

Sample locations associated with LCS/LCSD analysis exhibiting recoveries outside of the control limits presented in the following table.

Sample Locations	Compound	LCS Recovery	LCSD Recovery	
538 JU	1,2-Dichloroethane			
539 JU	Benzene			
540 JU	Toluene			
541 JU	1,1,2-Trichloroethane			
542 JU				
543 JU	Tetrachloroethene			
546 JU				
544 JU				
547 JU				
545 JU		> UL	> UL	
548 JU		702	7 02	
549 JU				
550 JU	cis-1,2-Dichloroethene			
551 JU	Ci3-1,2-Dictriordentene			
552 JU				
553 JU				
554 JU				
555 JU				
103 JX				
556 JU				
557 JU	1,2-Dichloroethane			
558 JU	1,1,2-Trichloroethene	AC	> UL	
104 JX	Tetrachloroethene			
105 JX	. 53.461.1616			
106JX	Benzene	> UL	AC	
107 JX			7.0	
Note:				

Note:

AC Acceptable

The criteria used to evaluate the LCS/LCSD recoveries are presented in the following table. In the case of an LCS/LCSD deviation, the sample results are qualified as documented in the table below.

Control Limit	Sample Result	Qualification
> the upper control limit (UL)	Non-detect	No Action
> the upper control limit (OL)	Detect	J
the lower central limit /LL\ but - 400/	Non-detect	UJ
< the lower control limit (LL) but > 10%	Detect	J
< 10%	Non-detect	R
< 10%	Detect	J

#### 7. Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 25% for air matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for air matrices.

Laboratory duplicate analysis was not performed using a sample from this SDG.

#### 8. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for air matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for air matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Compound	Compound Sample Result (µg/m³)		RPD
540 JU / 541 JU	All compounds	U	U	AC
543 JU / 546 JU	All compounds	U	U	AC

Note:

AC Acceptable

There were no target compounds detected in the parent and field duplicate samples and the results are considered to be in agreement.

#### 9. Compound Identification

Compounds are identified on the GC/MS by using the analytes relative retention time and ion spectra. All identified compounds met the specified criteria.

#### 10. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

#### **DATA VALIDATION CHECKLIST FOR VOCs**

VOCs: Solvent Panel Scan	Rep	orted	Performance Acceptable		Not Required	
	No	Yes	No	Yes	Kequirea	
GAS CHROMATOGRAPHY/MASS SPECTROMETR	Y (GC/M	S)				
Tier II Validation						
Holding times		Х		Х		
Reporting limits (units)		Х		Х		
Blanks		1			1	
A. Method blanks		Х		Х		
B. Equipment blanks					Х	
Laboratory Control Sample (LCS) %R		Х	Х			
Laboratory Control Sample Duplicate (LCSD) %R		Х	Х			
LCS/LCSD Precision (RPD)		Х		Х		
Field/Lab Duplicate (RPD)		Х		Х		
Dilution Factor		Х		Х		
Tier III Validation					1	
System performance and column resolution		Х		Х		
Initial calibration %RSDs		Х		Х		
Continuing calibration RRFs		Х		Х		
Continuing calibration %Ds		Х		Х		
Instrument tune and performance check		Х		Х		
Ion abundance criteria for each instrument used		Х		Х		
Internal standard		Х		Х		
Compound identification and quantitation						
A. Reconstructed ion chromatograms		Х		Х		
B. Quantitation Reports		Х		Х		
C. RT of sample compounds within the established RT windows		Х		x		
D. Transcription/calculation errors present		Х		Х		
E. Reporting limits adjusted to reflect sample dilutions		Х		Х		

%RSD Percent relative difference

%R Percent recovery

RPD Relative percent difference

%D Percent difference

VALIDATION PERFORMED BY: Jennifer Singer

SIGNATURE:

DATE: May 17, 2017

knnife Ainger

PEER REVIEW: Dennis Capria

DATE: May 19, 2017

# CHAIN OF CUSTODY CORRECTED SAMPLE ANALYSIS DATA SHEETS

ANAL	<b>YTIC</b>	AL	RFQ	UEST	<b>FORM</b>
$\Delta$ II $\Delta$ E	- 1 1 1 🔾				

1. REGULAR Status

					atus Requested - ADDITIONAL CH S REQUIRED BY	HARGE	
AL	.5)				DATE OT ALS SALT LAKE PRIOR TO SEN	JDING SAM	IPLES
2. Date 5-2-17		der No	/ ArD	1			
3. Company Name	_	Jei 140. ,	27100	<i>)</i>	ALS Project Manager	and Pe	PE
		٠	<u> </u>	STE GET		TUC IC	<u>,, C</u>
Address /32	2. WASKE	<u>~ 07°0\</u>	2015 -	STE GOV	_5. Sample Collection		W C.
	APOLIS I	<u>~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ </u>	007		Sampling Site		
Person to Contact	_		/ XRAV	1 Jonker		٠,	
Telephone ( $30$ ) $\overline{2}$					Date of Collection 5-1-17	15-2-1	7
Fax Telephone (3/2)	231.651	4			Time Collected	•	
E-mail Address	AN, JONKER	V4, 6 8	AR CUSTS	. Con	Date of Shipment 5-3-1	7	<u> </u>
Billing Address (if differ	ent from above	)			Chain of Custody No.	of 2	
ACCTS PAY	ABUE -AR	CADES			6. How did you first learn about Al		***************************************
MIGHANS	RANCH,	CO					•
	<u> </u>						
		<i></i>					
7. REQUEST FOR ANAL		T				1 1	
Client Sample Number	Matrix*		rea Volume	ANALYSES REQU	JESTED - Use method number if known	Units**	Lab Comments
538JU	SERBOUT TUBE RAD #45	2130	5-2-17 0603	TO-15; PAZ	DELT LIST	$u_3/m^3$	
53954	130	5/43	5-2-17 0609	11		"	
540 JU	*1	2155	5-2-17 0615	**		11	
54154	•••	5-1-17 2155	5-7-17	**		**	
542 54	~ `	5-147 2265	5.2.17	**		~	
5435U	``	5-147 2215	5.2-17	-1		"	
546 Ju		5-1-17 2215	5-2-17	11		~	
54454	*1	5-177	5-2-17	11		<b>\</b> \	
547 JU	~ ` `	5777	5-2-17	<b>\1</b>		~1	{
545 JU	```	5-1-17	5-2-17	41		-1	
548 IU	~1	5.200	35217	11		11	
549 54	11	5.2.7	5-2-17	1		1)	
550 24	1	\$ 2.17	\$25.7	<b>&gt;</b> 1		7	
551 Ju	1	5-2-17	13557	1		7	
	tube, e.g. Char			nger solution; Bulk	sample; Blood; Urine; Tissue; Soil;	Water; Oth	er
** 1. μg/sample 2. mg/r	n <sup>3</sup> 3. ppm 4	. % 5(	ig/m³ 6.	(other) Pl	ease indicate one or more units in the	ne column e	ntitled Units**
Comments 70-15	prosect i	ST ?	BENZER	NE, 1.1-DIE	MIGROSTHENE, 1,2-DICHE	LAND ETHA	ME, (IS-1, 2-DICHUWE
TRANS-1. Z-Dreinles	WETWENE I	WETH VIE	we Chlad	LEDE TEMA	CHLOROENEJE, TRE CHLOROETH	ene lil	2-TRECHINESETWEE
Possible Contamination a			TIPE		The state of the s		- Animal municipality
7. Chain of Custody (Q		⊓azards	100				
		0 1	Inno	140=5	Date/Time /5 © /5-3-7	`	
Relinquished by	201000	Je se	1790	(412)			
Received by	HULL				_ Date/Time	7.72	an
Relinquished by					_ Date/Time		

Received by

Date/Time

#### For lab use only



#### **ANALYTICAL REQUEST FORM**

				1. REGULA	R Status			
T DEG				RUSH Sta	itus Requested - ADDITIONA			
AL	s)			CONTAC	DATE ACT ALS SALT LAKE PRIOR TO SENDING SAMPLES			
2. Date 5-2-17	Purchase Ord	er No.	LA 003	307,50 <u>05</u>	4. Quote No.			
3. Company Name ARCANS				ALS Project Manager	PAUL POP	と		
Address 132 E.	WASHAUTON	1 57, 57	7% 6ec	>	5. Sample Collection Sampling Site Industrial Process Date of Collection  5-	. 4		
INDANA	POLE! IN	1 462	<u> </u>		Sampling Site	evant MAN	JUSACTURAL	
Person to Contact	ROB WAPEN	Jamp /	Saran	JONKER	Industrial Process	STAMPENG		
Telephone (3/1) Z	31-655	<i>'</i>			Date of Collection 5-	1-17 /5-2	-17	
Fax Telephone (3/7)	231-6514				Time Collected			
E-mail Address	RAN, JONE	gw C	PARCAS	Is. Com	Time Collected  Date of Shipment  5	3-17		
Billing Address (if different					Chain of Custody Noc	2012		
APCTI PAY	MIE - AR	"AST!			6. How did you first learn ab	out ALS?		
MIGHTANOS RA	weh. Co	`						
71201(1)								
7. REQUEST FOR ANALY	1	Cl-/A-	aa Valuma	ANALYSES REOL	JESTED - Use method number if k	nown Units**	Lab Comments	
Client Sample Number	Matrix*	Sample/Are					205 551,,,,,,	
552 Ju	CAS MS AD	0633	5-2-17 1357 5-2-17	3-9	PROJECT LIST	ug/m3		
553 Ju	1	5-2-11 5637 5-2-17	5-2-17 1405 5-2-17 1408	11				
559 JU	1	5-2-17 5-2-17	5-2-17	<u>\</u>				
555 Ju	111	5-2-17	5:2:12	11				
1035X 55654	11	5-2-17	3:3:17	1				
	-	5:1-17	3-237	N		1		
557JU 558JU	***	5357	275 5 275 17	1		<u> </u>		
104 7%	~1	5:257	3:28	1		-1		
105 TX	<b>N</b> 1	7485	5-2-15	1		~		
106 2X	31	5,2,7	2277	1		٧ .		
107 7%	~1	5-2-15	5-2-17	N		4		
19731		/ 1//3	1 2221		Andrew Market Control of the Control			
* Specify: Solid sorbent	tube, e.g. Char	coal; Filter	type: Impi	nger solution; Bull	sample; Blood; Urine; Tissue	; Soil; Water; Othe	эг	
** 1. μg/sample 2. mg/m					ease indicate one or more un	its in the column e	ntitled Units**	
Comments 70-15	PROJECT 1	JST ?	SEE P	141 ER (	AST			
Possible Contamination as	nd/or Chemical	Hazards	TCE					
7. Chain of Custody (Or			,					
Relinquished by	Relinquished by Law Pull 1420455 Date/Time 53-17/1500							
Received by	Ath	-41				7 9:42	7	
77	7 / /				Date/Time			
Relinquished by								
Received by					Date/Time			



#### Amended-20170517

Report Date: May 17, 2017

Sarah Jonker Phone: (317) 231-6500 Arcadis

132 E Washington St.

Suite 600

E-mail: Sarah.Jonker@arcadis.com

Workorder: **34-1712627** 

Client Project ID: Grenada Manufacturing 050117

Purchase Order: LA003307.0005 Project Manager: Paul Pope

#### **Analytical Results**

Indianapolis, IN 46204

Sample ID: 538JU Collected: 05/01/2017 Lab ID: 1712627001 Sampling Location: Grenada Manufacturin Received: 05/05/2017 **Method: Solvent Panel Scan** Media: Radiello 130, Badge Analyzed: 05/08/2017 (190204) **Sampling Info: Exposure 513 Minutes Result Analyte** (ug/sample) Result (mg/m³) Result (ppm) RL (ug/sample) 1,2-Dichloroethane <2.0 < 0.051 < 0.013 2.0 Benzene <2.0 < 0.049 < 0.015 2.0 Trichloroethene 2.0 <2.0 < 0.057 < 0.011 Toluene <2.0 < 0.014 2.0 < 0.053 1,1,2-Trichloroethane 2.0 < 2.0 < 0.065 < 0.012 Tetrachloroethene <2.0 < 0.066 <0.0097 2.0 < 2.0 2.0 cis-1,2-Dichloroethene < 0.052 < 0.013

Sample ID: 539 JU				Collected: 05/02/2017
Lab ID: 1712627002	Sa	impling Location: Gre	Received: 05/05/2017	
Method: Solvent Panel Scan	Media: Radiello 130, Badge Sampling Info: Exposure 509 Minutes			Analyzed: 05/08/2017 (190204)
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
1,2-Dichloroethane	<2.0	<0.051	<0.013	2.0
Benzene	<2.0	<0.049	<0.015	2.0
Trichloroethene	<2.0	<0.057	<0.011	2.0
Toluene	<2.0	<0.053	<0.014	2.0
1,1,2-Trichloroethane	<2.0	<0.065	<0.012	2.0
Tetrachloroethene	<2.0	<0.067	<0.0098	2.0
cis-1,2-Dichloroethene	<2.0	< 0.053	<0.013	2.0

ADDRESS 960 West LeVoy Drive, Salt Lake City, Utah, 84123 USA | PHONE +1 801 266 7700 | FAX +1 801 268 9992 ALS GROUP USA, CORP. An ALS Limited Company



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#### Amended-20170517

Workorder: **34-1712627** 

Client Project ID: Grenada Manufacturing 050117

Purchase Order: LA003307.0005 Project Manager: Paul Pope

#### **Analytical Results**

Sample ID: 540 JU Collected: 05/01/2017 Lab ID: 1712627003 Sampling Location: Grenada Manufacturin Received: 05/05/2017 **Method: Solvent Panel Scan** Media: Radiello 130, Badge Analyzed: 05/08/2017 (190204) **Sampling Info: Exposure 500 Minutes Result Analyte** (ug/sample) Result (mg/m³) Result (ppm) RL (ug/sample) 1,2-Dichloroethane <2.0 < 0.052 < 0.013 2.0 < 0.050 < 0.016 Benzene <2.0 2.0 Trichloroethene <0.058 <0.011 2.0 <2.0 Toluene <2.0 < 0.054 < 0.014 2.0 1,1,2-Trichloroethane 2.0 <2.0 < 0.067 < 0.012 Tetrachloroethene < 0.010 <2.0 <0.068 2.0 cis-1,2-Dichloroethene <2.0 < 0.054 < 0.014 2.0

Sample ID: 541 JU				Collected: 05/01/2017
Lab ID: 1712627004	Sa	mpling Location: Gre	Received: 05/05/2017	
Method: Solvent Panel Scan	Samp	Media: Radiello 130, ling Info: Exposure 50	Analyzed: 05/08/2017 (190204)	
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
1,2-Dichloroethane	<2.0	<0.052	<0.013	2.0
Benzene	<2.0	< 0.050	<0.016	2.0
Trichloroethene	<2.0	<0.058	<0.011	2.0
Toluene	<2.0	<0.054	<0.014	2.0
1,1,2-Trichloroethane	<2.0	<0.067	<0.012	2.0
Tetrachloroethene	<2.0	<0.068	<0.010	2.0
cis-1,2-Dichloroethene	<2.0	<0.054	<0.014	2.0

Sample ID: <b>542 JU</b> Lab ID: 1712627005	Sa	mpling Location: Gre	nada Manufacturin	Collected: 05/01/2017 Received: 05/05/2017
Method: Solvent Panel Scan	Media: Radiello 130, Badge Sampling Info: Exposure 505 Minutes			Analyzed: 05/08/2017 (190204)
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
1,2-Dichloroethane	<2.0	<0.051	<0.013	2.0
Benzene	<2.0	<0.050	<0.015	2.0
Trichloroethene	<2.0	< 0.057	<0.011	2.0
Toluene	<2.0	< 0.054	<0.014	2.0
1,1,2-Trichloroethane	<2.0	<0.066	<0.012	2.0
Tetrachloroethene	<2.0	< 0.067	<0.0099	2.0
cis-1,2-Dichloroethene	<2.0	< 0.053	<0.013	2.0

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#### Amended-20170517

Workorder: **34-1712627** 

Client Project ID: Grenada Manufacturing 050117

Purchase Order: LA003307.0005 Project Manager: Paul Pope

#### **Analytical Results**

Sample ID: 543 JU Collected: 05/01/2017 Lab ID: 1712627006 Sampling Location: Grenada Manufacturin Received: 05/05/2017 **Method: Solvent Panel Scan** Media: Radiello 130, Badge Analyzed: 05/08/2017 (190204) Sampling Info: Exposure 498 Minutes **Result Analyte** (ug/sample) Result (mg/m³) Result (ppm) RL (ug/sample) 1,2-Dichloroethane <2.0 < 0.052 < 0.013 2.0 < 0.050 < 0.016 Benzene <2.0 2.0 Trichloroethene <0.058 <0.011 2.0 <2.0 Toluene <2.0 < 0.054 < 0.014 2.0 1,1,2-Trichloroethane 2.0 <2.0 < 0.067 < 0.012 Tetrachloroethene < 0.010 <2.0 <0.068 2.0 cis-1,2-Dichloroethene <2.0 < 0.054 < 0.014 2.0

Sample ID: 546 JU				Collected: 05/01/2017
Lab ID: 1712627007	Sa	mpling Location: Gre	Received: 05/05/2017	
Method: Solvent Panel Scan	Samp	Media: Radiello 130, ling Info: Exposure 49	Analyzed: 05/08/2017 (190204)	
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
1,2-Dichloroethane	<2.0	<0.052	<0.013	2.0
Benzene	<2.0	< 0.050	<0.016	2.0
Trichloroethene	<2.0	<0.058	<0.011	2.0
Toluene	<2.0	<0.054	<0.014	2.0
1,1,2-Trichloroethane	<2.0	<0.067	<0.012	2.0
Tetrachloroethene	<2.0	<0.068	<0.010	2.0
cis-1,2-Dichloroethene	<2.0	<0.054	<0.014	2.0

Sample ID: <b>544 JU</b> Lab ID: 1712627008	Sa	mpling Location: Gre	nada Manufacturin	Collected: 05/01/2017 Received: 05/05/2017
Method: Solvent Panel Scan	Media: Radiello 130, Badge Sampling Info: Exposure 487 Minutes			Analyzed: 05/09/2017 (190204)
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
1,2-Dichloroethane	<2.0	< 0.053	<0.013	2.0
Benzene	<2.0	<0.051	<0.016	2.0
Trichloroethene	<2.0	< 0.060	<0.011	2.0
Toluene	<2.0	< 0.055	<0.015	2.0
1,1,2-Trichloroethane	<2.0	<0.068	<0.013	2.0
Tetrachloroethene	<2.0	<0.070	<0.010	2.0
cis-1,2-Dichloroethene	<2.0	<0.055	<0.014	2.0

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#### Amended-20170517

Workorder: **34-1712627** 

Client Project ID: Grenada Manufacturing 050117

Purchase Order: LA003307.0005 Project Manager: Paul Pope

#### **Analytical Results**

Sample ID: 547 JU Collected: 05/01/2017 Lab ID: 1712627009 Sampling Location: Grenada Manufacturin Received: 05/05/2017 **Method: Solvent Panel Scan** Media: Radiello 130, Badge Analyzed: 05/09/2017 (190204) Sampling Info: Exposure 490 Minutes **Result Analyte** (ug/sample) Result (mg/m³) Result (ppm) RL (ug/sample) 1,2-Dichloroethane <2.0 < 0.053 < 0.013 2.0 < 0.051 < 0.016 Benzene <2.0 2.0 Trichloroethene < 0.059 <0.011 2.0 <2.0 Toluene <2.0 < 0.055 < 0.015 2.0 1,1,2-Trichloroethane 2.0 <2.0 < 0.068 < 0.012 Tetrachloroethene < 0.069 < 0.010 2.0 <2.0 cis-1,2-Dichloroethene <2.0 < 0.055 < 0.014 2.0

Sample ID: 545 JU				Collected: 05/01/2017
Lab ID: 1712627010	Sa	mpling Location: Gre	Received: 05/05/2017	
Method: Solvent Panel Scan	Samp	Media: Radiello 130, ling Info: Exposure 47	Analyzed: 05/09/2017 (190204)	
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
1,2-Dichloroethane	<2.0	<0.055	<0.014	2.0
Benzene	<2.0	< 0.053	<0.017	2.0
Trichloroethene	<2.0	<0.062	<0.011	2.0
Toluene	<2.0	<0.057	<0.015	2.0
1,1,2-Trichloroethane	<2.0	<0.071	<0.013	2.0
Tetrachloroethene	<2.0	<0.072	<0.011	2.0
cis-1,2-Dichloroethene	<2.0	<0.057	<0.014	2.0

Sample ID: <b>548 JU</b> Lab ID: 1712627011	Sa	mpling Location: Gre	nada Manufacturin	Collected: 05/02/2017 Received: 05/05/2017
Method: Solvent Panel Scan	Media: Radiello 130, Badge Sampling Info: Exposure 457 Minutes			Analyzed: 05/09/2017 (190204)
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
1,2-Dichloroethane	<2.0	< 0.057	< 0.014	2.0
Benzene	<2.0	< 0.055	< 0.017	2.0
Trichloroethene	<2.0	< 0.063	<0.012	2.0
Toluene	<2.0	< 0.059	<0.016	2.0
1,1,2-Trichloroethane	<2.0	< 0.073	< 0.013	2.0
Tetrachloroethene	<2.0	< 0.074	<0.011	2.0
cis-1,2-Dichloroethene	<2.0	< 0.059	<0.015	2.0

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#### Amended-20170517

Workorder: **34-1712627** 

Client Project ID: Grenada Manufacturing 050117

Purchase Order: LA003307.0005 Project Manager: Paul Pope

#### **Analytical Results**

Sample ID: 549 JU Collected: 05/01/2017 Lab ID: 1712627012 Sampling Location: Grenada Manufacturin Received: 05/05/2017 **Method: Solvent Panel Scan** Media: Radiello 130, Badge Analyzed: 05/09/2017 (190204) **Sampling Info: Exposure 457 Minutes Result Analyte** (ug/sample) Result (mg/m³) Result (ppm) RL (ug/sample) 1,2-Dichloroethane <2.0 < 0.057 < 0.014 2.0 < 0.017 Benzene <2.0 < 0.055 2.0 Trichloroethene 2.0 <2.0 < 0.063 < 0.012 Toluene <2.0 < 0.059 < 0.016 2.0 1,1,2-Trichloroethane 2.0 <2.0 < 0.073 < 0.013 Tetrachloroethene < 0.074 <0.011 <2.0 2.0 cis-1,2-Dichloroethene <2.0 < 0.059 < 0.015 2.0

Sample ID: 550 JU				Collected: 05/02/2017
Lab ID: 1712627013	Sa	mpling Location: Gre	Received: 05/05/2017	
Method: Solvent Panel Scan	Samp	Media: Radiello 130, ling Info: Exposure 45	Analyzed: 05/09/2017 (190204)	
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
1,2-Dichloroethane	<2.0	<0.057	<0.014	2.0
Benzene	<2.0	< 0.055	<0.017	2.0
Trichloroethene	<2.0	<0.064	<0.012	2.0
Toluene	<2.0	<0.060	<0.016	2.0
1,1,2-Trichloroethane	<2.0	<0.074	<0.013	2.0
Tetrachloroethene	<2.0	<0.075	<0.011	2.0
cis-1,2-Dichloroethene	<2.0	<0.059	<0.015	2.0

Sample ID: <b>551 JU</b> Lab ID: 1712627014	Sa	mpling Location: Gre	nada Manufacturin	Collected: 05/02/2017 Received: 05/05/2017
Method: Solvent Panel Scan	Media: Radiello 130, Badge Sampling Info: Exposure 447 Minutes			Analyzed: 05/09/2017 (190204)
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
1,2-Dichloroethane	<2.0	<0.058	<0.014	2.0
Benzene	<2.0	<0.056	<0.018	2.0
Trichloroethene	<2.0	< 0.065	<0.012	2.0
Toluene	<2.0	<0.060	<0.016	2.0
1,1,2-Trichloroethane	<2.0	< 0.075	< 0.014	2.0
Tetrachloroethene	<2.0	<0.076	<0.011	2.0
cis-1,2-Dichloroethene	<2.0	<0.060	<0.015	2.0



#### Amended-20170517

Workorder: **34-1712627** 

Client Project ID: Grenada Manufacturing 050117

Purchase Order: LA003307.0005 Project Manager: Paul Pope

#### **Analytical Results**

Sample ID: 552 JU Collected: 05/02/2017 Lab ID: 1712627015 Sampling Location: Grenada Manufacturin Received: 05/05/2017 **Method: Solvent Panel Scan** Media: Radiello 130, Badge Analyzed: 05/09/2017 (190204) **Sampling Info: Exposure 444 Minutes Result Analyte** (ug/sample) Result (mg/m³) Result (ppm) RL (ug/sample) 1,2-Dichloroethane <2.0 < 0.059 < 0.014 2.0 < 0.056 <0.018 Benzene <2.0 2.0 Trichloroethene < 0.065 < 0.012 2.0 <2.0 Toluene <2.0 < 0.061 < 0.016 2.0 1,1,2-Trichloroethane < 0.014 2.0 <2.0 < 0.075 Tetrachloroethene < 0.076 <0.011 2.0 <2.0 cis-1,2-Dichloroethene <2.0 < 0.060 < 0.015 2.0

Sample ID: 553 JU				Collected: 05/02/2017
Lab ID: 1712627016	Sa	mpling Location: Gre	Received: 05/05/2017	
Method: Solvent Panel Scan	Samp	Media: Radiello 130, ling Info: Exposure 44	Analyzed: 05/09/2017 (190204)	
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
1,2-Dichloroethane	<2.0	<0.058	<0.014	2.0
Benzene	<2.0	< 0.056	<0.017	2.0
Trichloroethene	<2.0	<0.065	<0.012	2.0
Toluene	<2.0	<0.060	<0.016	2.0
1,1,2-Trichloroethane	<2.0	<0.074	<0.014	2.0
Tetrachloroethene	<2.0	<0.076	<0.011	2.0
cis-1,2-Dichloroethene	<2.0	<0.060	<0.015	2.0

Sample ID: <b>554 JU</b> Lab ID: 1712627017	Sa	mpling Location: Gre	nada Manufacturin	Collected: 05/02/2017 Received: 05/05/2017
Method: Solvent Panel Scan	Media: Radiello 130, Badge Sampling Info: Exposure 447 Minutes			Analyzed: 05/09/2017 (190204)
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
1,2-Dichloroethane	<2.0	<0.058	<0.014	2.0
Benzene	<2.0	<0.056	<0.018	2.0
Trichloroethene	<2.0	< 0.065	<0.012	2.0
Toluene	<2.0	< 0.060	<0.016	2.0
1,1,2-Trichloroethane	<2.0	< 0.075	< 0.014	2.0
Tetrachloroethene	<2.0	< 0.076	<0.011	2.0
cis-1,2-Dichloroethene	<2.0	<0.060	<0.015	2.0

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#### Amended-20170517

Workorder: **34-1712627** 

Client Project ID: Grenada Manufacturing 050117

Purchase Order: LA003307.0005 Project Manager: Paul Pope

#### **Analytical Results**

Sample ID: 555 JU Collected: 05/02/2017 Lab ID: 1712627018 Sampling Location: Grenada Manufacturin Received: 05/05/2017 **Method: Solvent Panel Scan** Media: Radiello 130, Badge Analyzed: 05/09/2017 (190204) **Sampling Info: Exposure 445 Minutes** Result **Analyte** (ug/sample) Result (mg/m³) Result (ppm) RL (ug/sample) 1,2-Dichloroethane <2.0 < 0.058 < 0.014 2.0 < 0.056 <0.018 Benzene <2.0 2.0 Trichloroethene < 0.065 < 0.012 2.0 <2.0 Toluene <2.0 < 0.061 < 0.016 2.0 1,1,2-Trichloroethane < 0.014 2.0 <2.0 < 0.075 Tetrachloroethene <0.011 <2.0 < 0.076 2.0 cis-1,2-Dichloroethene <2.0 < 0.060 < 0.015 2.0

Sample ID: 103 JX				Collected: 05/02/2017
Lab ID: 1712627019	Sa	mpling Location: Gre	nada Manufacturin	Received: 05/05/2017
Method: Solvent Panel Scan	0	Media: Radiello 130,	Analyzed: 05/09/2017 (190204)	
		ling Info: Exposure 48	9 Minutes	
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
1,2-Dichloroethane	<2.0	< 0.053	< 0.013	2.0
Benzene	<2.0	<0.051	<0.016	2.0
Trichloroethene	<2.0	< 0.059	<0.011	2.0
Toluene	<2.0	<0.055	<0.015	2.0
1,1,2-Trichloroethane	<2.0	<0.068	<0.012	2.0
Tetrachloroethene	<2.0	<0.069	<0.010	2.0
cis-1,2-Dichloroethene	<2.0	<0.055	<0.014	2.0

Sample ID: <b>556 JU</b> Lab ID: 1712627020	Collected: 0 Sampling Location: Grenada Manufacturin Received: 0				
Method: Solvent Panel Scan	Samp	Media: Radiello 130, ling Info: Exposure 48	Analyzed: 05/09/2017 (190204)		
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)	
1,2-Dichloroethane	<2.0	<0.053	<0.013	2.0	
Benzene	<2.0	<0.051	<0.016	2.0	
Trichloroethene	<2.0	<0.059	<0.011	2.0	
Toluene	<2.0	<0.055	<0.015	2.0	
1,1,2-Trichloroethane	<2.0	<0.068	<0.012	2.0	
Tetrachloroethene	<2.0	<0.069	<0.010	2.0	
cis-1,2-Dichloroethene	<2.0	<0.055	<0.014	2.0	



#### Amended-20170517

Workorder: **34-1712627** 

Client Project ID: Grenada Manufacturing 050117

Purchase Order: LA003307.0005 Project Manager: Paul Pope

#### **Analytical Results**

Sample ID: 557 JU Collected: 05/02/2017 Lab ID: 1712627021 Sampling Location: Grenada Manufacturin Received: 05/05/2017 **Method: Solvent Panel Scan** Media: Radiello 130, Badge Analyzed: 05/09/2017 (190204) Sampling Info: Exposure 490 Minutes **Result Analyte** (ug/sample) Result (mg/m³) Result (ppm) RL (ug/sample) 1,2-Dichloroethane <2.0 < 0.053 < 0.013 2.0 < 0.051 < 0.016 Benzene <2.0 2.0 Trichloroethene 2.0 <2.0 < 0.059 <0.011 Toluene <2.0 < 0.055 < 0.015 2.0 1,1,2-Trichloroethane 2.0 <2.0 < 0.068 < 0.012 Tetrachloroethene < 0.010 <2.0 < 0.069 2.0 cis-1,2-Dichloroethene <2.0 < 0.055 < 0.014 2.0

Sample ID: 558 JU				Collected: 05/02/2017		
Lab ID: 1712627022	Sampling Location: Grenada Manufacturin Received: 05/05/2017					
Method: Solvent Panel Scan	Samp	Media: Radiello 130, ling Info: Exposure 49	Analyzed: 05/09/2017 (190204)			
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)		
1,2-Dichloroethane	<2.0	<0.053	<0.013	2.0		
Benzene	<2.0	<0.051	<0.016	2.0		
Trichloroethene	<2.0	<0.059	<0.011	2.0		
Toluene	<2.0	<0.055	<0.015	2.0		
1,1,2-Trichloroethane	<2.0	<0.068	<0.012	2.0		
Tetrachloroethene	<2.0	<0.069	<0.010	2.0		
cis-1,2-Dichloroethene	<2.0	<0.055	<0.014	2.0		

Sample ID: 104 JX				Collected: 05/02/2017
Lab ID: 1712627023	Sa	mpling Location: Gre	nada Manufacturin	Received: 05/05/2017
Method: Solvent Panel Scan	Samp	Media: Radiello 130, ling Info: Exposure 48	Analyzed: 05/09/2017 (190204)	
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
1,2-Dichloroethane	<2.0	<0.053	<0.013	2.0
Benzene	<2.0	<0.051	<0.016	2.0
Trichloroethene	<2.0	<0.059	<0.011	2.0
Toluene	<2.0	<0.055	<0.015	2.0
1,1,2-Trichloroethane	<2.0	<0.068	<0.012	2.0
Tetrachloroethene	<2.0	<0.069	<0.010	2.0
cis-1,2-Dichloroethene	<2.0	<0.055	<0.014	2.0

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#### Amended-20170517

Workorder: **34-1712627** 

Client Project ID: Grenada Manufacturing 050117

Purchase Order: LA003307.0005 Project Manager: Paul Pope

#### **Analytical Results**

Sample ID: 105 JX Collected: 05/02/2017 Lab ID: 1712627024 Sampling Location: Grenada Manufacturin Received: 05/05/2017 **Method: Solvent Panel Scan** Media: Radiello 130, Badge Analyzed: 05/09/2017 (190204) **Sampling Info: Exposure 486 Minutes Result Analyte** (ug/sample) Result (mg/m³) Result (ppm) RL (ug/sample) 1,2-Dichloroethane <2.0 < 0.053 < 0.013 2.0 < 0.051 < 0.016 Benzene <2.0 2.0 Trichloroethene 2.0 <2.0 < 0.060 <0.011 Toluene <2.0 < 0.056 < 0.015 2.0 1,1,2-Trichloroethane 2.0 <2.0 < 0.069 < 0.013 Tetrachloroethene < 0.070 < 0.010 <2.0 2.0 cis-1,2-Dichloroethene <2.0 < 0.055 < 0.014 2.0

Sample ID: 106 JX				Collected: 05/02/2017		
Lab ID: 1712627025	Sampling Location: Grenada Manufacturin Received: 05/05/2017					
Method: Solvent Panel Scan	Samp	Media: Radiello 130, ling Info: Exposure 48	Analyzed: 05/09/2017 (190204)			
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)		
1,2-Dichloroethane	<2.0	< 0.053	<0.013	2.0		
Benzene	<2.0	<0.051	<0.016	2.0		
Trichloroethene	<2.0	<0.060	<0.011	2.0		
Toluene	<2.0	<0.056	<0.015	2.0		
1,1,2-Trichloroethane	<2.0	<0.069	<0.013	2.0		
Tetrachloroethene	<2.0	<0.070	<0.010	2.0		
cis-1,2-Dichloroethene	<2.0	<0.055	<0.014	2.0		

Sample ID: <b>107 JX</b> Lab ID: 1712627026	Sa	mpling Location: Gre	nada Manufacturin	Collected: 05/02/2017 Received: 05/05/2017
Method: Solvent Panel Scan		Media: Radiello 130,	Analyzed: 05/09/2017 (190204)	
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
1,2-Dichloroethane	<2.0	< 0.053	<0.013	2.0
Benzene	<2.0	<0.051	<0.016	2.0
Trichloroethene	<2.0	<0.060	<0.011	2.0
Toluene	<2.0	< 0.056	<0.015	2.0
1,1,2-Trichloroethane	<2.0	< 0.069	<0.013	2.0
Tetrachloroethene	<2.0	<0.070	<0.010	2.0
cis-1,2-Dichloroethene	<2.0	< 0.055	<0.014	2.0

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## Grenada Manufacturing

# **DATA REVIEW**

# Grenada, Mississippi

Volatile Organic Compound (VOC) Analyses

SDG #1705173

Analyses Performed By: ALS Environmental Cincinnati, Ohio

Report #27666R Review Level: Tier III

Project: LA003307.0006.00001

#### **SUMMARY**

This data quality assessment summarizes the review of Sample Delivery Group (SDG) #1705173 for samples collected in association with the Grenada Manufacturing site, located in Grenada, Mississippi. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

			Sample			Analy	sis	
Sample ID	Lab ID	Matrix	Collection Date	Parent Sample	VOC	svoc	MET	MISC
B-4 (050117) 3 <sup>RD</sup>	1705173-01	Air	5/1/2017		Х			
B-4 (050217) 1 <sup>ST</sup>	1705173-02	Air	5/2/2017		Х			
B-4 (050217) 2 <sup>ND</sup>	1705173-03	Air	5/2/2017		Х			

#### **ANALYTICAL DATA PACKAGE DOCUMENTATION**

The table below is the evaluation of the data package completeness.

	Rep	Reported		rmance ptable	Not
Items Reviewed	No	Yes	No	Yes	Required
Sample receipt condition		Х		Х	
Requested analyses and sample results		Х		Х	
Master tracking list		Х		Х	
4. Methods of analysis		Х		Х	
5. Reporting limits		Х		Х	
6. Sample collection date		Х		Х	
7. Laboratory sample received date		Х		Х	
8. Sample preservation verification (as applicable)		Х		Х	
9. Sample preparation/extraction/analysis dates		Х		Х	
10. Fully executed Chain-of-Custody (COC) form		Х		Х	
11. Narrative summary of QA or sample problems provided		Х		Х	
12. Data Package Completeness and Compliance		Х		Х	

Note:

QA - Quality Assurance

#### **ORGANIC ANALYSIS INTRODUCTION**

Analyses were performed according to United States Environmental Protection Agency (USEPA) Method TO-15. Data were reviewed in accordance with USEPA National Functional Guidelines of October 1999 and USEPA Region II SOP HW-31- Validating Air Samples Volatile Organic Analysis of Ambient Air In Canister by Method TO-15 of October 2006.

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and had already been subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
  - U The compound was analyzed for but not detected. The associated value is the compound quantitation limit.
  - B The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.
- Quantitation (Q) Qualifiers
  - E The compound was quantitated above the calibration range.
  - D Concentration is based on a diluted sample analysis.
- Validation Qualifiers
  - J The compound was positively identified; however, the associated numerical value is an estimated concentration only.
  - UJ The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.
  - JN The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification. The associated numerical value is an estimated concentration only.
  - UB Compound considered non-detect at the listed value due to associated blank contamination.
  - N The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification.
  - R The sample results are rejected.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

#### **VOLATILE ORGANIC COMPOUND (VOC) ANALYSIS**

#### 1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation	Return Canister Pressure	
EPA TO-15	Air	30 days from collection to analysis	Ambient temperature	< -1" Hg	

All samples were analyzed within the specified holding time.

#### 2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

#### 3. Mass Spectrometer Tuning

Mass spectrometer performance was acceptable and all analyses were performed within a 24-hour tune clock.

System performance and column resolution were acceptable.

#### 4. Calibration

Satisfactory instrument calibration is established to insure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

#### 4.1 Initial Calibration

The method specifies percent relative standard deviation (%RSD) and relative response factor (RRF) limits for select compounds only. A technical review of the data applies limits to all compounds with no exceptions.

All target compounds associated with the initial calibration standards must exhibit a %RSD less than the control limit (30%) and an RRF value greater than control limit (0.05).

#### 4.2 Continuing Calibration

All target compounds associated with the continuing calibration standard must exhibit a percent difference (%D) less than the control limit (30%) and RRF value greater than control limit (0.05).

All compounds associated with the calibrations were within the specified control limits.

#### 5. Internal Standard Performance

Internal standard performance criteria insure that the GC/MS sensitivity and response are stable during every sample analysis. The criteria require the internal standard compounds associated with the VOC exhibit area counts are  $\pm$  40% of the area counts of the associated continuing calibration standard.

All internal standard responses were within control limits.

#### 6. Surrogates/System Monitoring Compounds

All samples to be analyzed for organic compounds are spiked with surrogate compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. VOC analysis requires that all surrogates associated with the analysis exhibit recoveries within the laboratory-established acceptance limits.

All surrogate recoveries were within control limits.

#### 7. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS analysis must exhibit a percent recovery within the laboratory-established acceptance limits.

All compounds associated with the LCS analysis exhibited recoveries within the control limits.

#### 8. Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 25% for air matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for air matrices.

Laboratory duplicate analysis was not performed using a sample from this SDG.

#### 9. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for air matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for air matrices.

A field duplicate sample was not collected in association with this SDG.

#### 10. Compound Identification

Compounds are identified on the GC/MS by using the analytes relative retention time and ion spectra.

All identified compounds met the specified criteria.

#### 11. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

#### **DATA VALIDATION CHECKLIST FOR VOCs**

VOCs: EPA TO-15	Re	ported	Performance Acceptable		Not
	No	Yes	No	Yes	Required
GAS CHROMATOGRAPHY/MASS SPECTROMET	RY (GC/N	/IS)			
Tier II Validation					
Canister return pressure (<-1"Hg)		X		X	
Holding times		Х		Х	
Reporting limits (units)		Х		Х	
Blanks					1
A. Method blanks		Х		X	
B. Equipment blanks					Х
Laboratory Control Sample (LCS) %R		Х		Х	
Laboratory Control Sample Duplicate (LCSD) %R					Х
LCS/LCSD Precision (RPD)					Х
Field/Lab Duplicate (RPD)					Х
Surrogate Spike Recoveries		Х		Х	
Dilution Factor		Х		Х	
Tier III Validation					'
System performance and column resolution		X		X	
Initial calibration %RSDs		Х		Х	
Continuing calibration RRFs		Х		Х	
Continuing calibration %Ds		Х		Х	
Instrument tune and performance check		Х		Х	
Ion abundance criteria for each instrument used		Х		Х	
Internal standard		Х		Х	
Compound identification and quantitation					
A. Reconstructed ion chromatograms		X		X	
B. Quantitation Reports		Х		X	
C. RT of sample compounds within the established RT windows		Х		Х	
D. Transcription/calculation errors present		X		Х	
E. Reporting limits adjusted to reflect sample dilutions		Х		Х	

VOCs: EPA TO-15	Reported		Performance Acceptable		Not
	No	Yes	No	Yes	Required
GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)					

%RSD Percent relative difference

%R Percent recovery

RPD Relative percent difference

%D Percent difference

VALIDATION PERFORMED BY:	Jennifer Singer
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SIGNATURE:

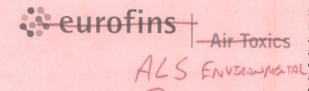
DATE: May 23, 2017

Sennifer O. Singer

PEER REVIEW: Dennis Capria

DATE: May 30, 2017

# CHAIN OF CUSTODY CORRECTED SAMPLE ANALYSIS DATA SHEETS



Sample Transportation Notice

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1	
Page	of

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Company ARCASES Email Control Email			P.O. #	LA 003307	2.0005	Normal					
Company	Email O AR	CADIS, COM		Dustant	t# LA00330	SMAT	1.		Date:		
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Phone _	132 E. WASHING TON City INDIANADITS  S17-231-6500 Fax 317-23	1-6514		Project	t Name	BA MANUFALTURAL	SI	pecify		N <sub>2</sub> He	9
			D	ate	Time			Canis	ter Pres	sure/Vac	uum
Lab I.D	Field Sample I.D. (Location)	Can #	1000		of Collection	Analyses Reques	ted	Initial	Final	Receipt	Final (psi)
	B-4 (050117) 3RD	109084	05-1-	17	7200-0550	TO-15: PROJECT	LEST	-30	-1		(psi)
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Lab	Shipper Name Air Bill #	To	emp (°	C)	Condition	Custody Se	als Inta	act?	Work (	Order #	
Use Only						Yes No	No	ne			
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#### **ALS Environmental**

**Client:** Arcadis

 Project:
 LA0033007.0005
 Work Order:
 1705173

 Sample ID:
 B-4 (050117) 3RD
 Lab ID:
 1705173-01

Collection Date: 5/1/2017 Matrix: AIR

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
TO-15 BY GC/MS			ETO-1	5		Analyst: MRJ
1,1,2-Trichloroethane	ND		0.50	ppbv	1	5/8/2017 06:19 PM
1,1-Dichloroethene	ND		0.50	ppbv	1	5/8/2017 06:19 PM
1,2-Dichloroethane	ND		0.50	ppbv	1	5/8/2017 06:19 PM
Benzene	ND		0.50	ppbv	1	5/8/2017 06:19 PM
cis-1,2-Dichloroethene	ND		0.50	ppbv	1	5/8/2017 06:19 PM
Methylene chloride	17		0.50	ppbv	1	5/8/2017 06:19 PM
Tetrachloroethene	ND		0.50	ppbv	1	5/8/2017 06:19 PM
Toluene	8.3		0.50	ppbv	1	5/8/2017 06:19 PM
trans-1,2-Dichloroethene	ND		0.50	ppbv	1	5/8/2017 06:19 PM
Trichloroethene	2.6		0.20	ppbv	1	5/8/2017 06:19 PM
Vinyl chloride	ND		0.50	ppbv	1	5/8/2017 06:19 PM
Surr: Bromofluorobenzene	95.3		60-140	%REC	1	5/8/2017 06:19 PM
TO-15 BY GC/MS			ETO-1	5		Analyst: MRJ
1,1,2-Trichloroethane	ND		2.73	µg/m3	1	5/8/2017 06:19 PM
1,1-Dichloroethene	ND		1.98	µg/m3	1	5/8/2017 06:19 PM
1,2-Dichloroethane	ND		2.02	µg/m3	1	5/8/2017 06:19 PM
Benzene	ND		1.60	µg/m3	1	5/8/2017 06:19 PM
cis-1,2-Dichloroethene	ND		1.98	µg/m3	1	5/8/2017 06:19 PM
Methylene chloride	59.1		1.74	μg/m3	1	5/8/2017 06:19 PM
Tetrachloroethene	ND		3.39	µg/m3	1	5/8/2017 06:19 PM
Toluene	31.2		1.88	μg/m3	1	5/8/2017 06:19 PM
trans-1,2-Dichloroethene	ND		1.98	µg/m3	1	5/8/2017 06:19 PM
Trichloroethene	13.8		1.07	μg/m3	1	5/8/2017 06:19 PM
Vinyl chloride	ND		1.28	µg/m3	1	5/8/2017 06:19 PM
Surr: Bromofluorobenzene	95.3		60-140	%REC	1	5/8/2017 06:19 PM

**Date:** 17-May-17

Note:

#### **ALS Environmental**

**Client:** Arcadis

 Project:
 LA0033007.0005
 Work Order:
 1705173

 Sample ID:
 B-4 (050217) 1ST
 Lab ID:
 1705173-02

Collection Date: 5/2/2017 Matrix: AIR

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
TO-15 BY GC/MS			ETO-1	5		Analyst: MRJ
1,1,2-Trichloroethane	ND		0.50	ppbv	1	5/9/2017 11:58 AM
1,1-Dichloroethene	ND		0.50	ppbv	1	5/9/2017 11:58 AM
1,2-Dichloroethane	ND		0.50	ppbv	1	5/9/2017 11:58 AM
Benzene	ND		0.50	ppbv	1	5/9/2017 11:58 AM
cis-1,2-Dichloroethene	1.2		0.50	ppbv	1	5/9/2017 11:58 AM
Methylene chloride	ND		0.50	ppbv	1	5/9/2017 11:58 AM
Tetrachloroethene	ND		0.50	ppbv	1	5/9/2017 11:58 AM
Toluene	8.0		0.50	ppbv	1	5/9/2017 11:58 AM
trans-1,2-Dichloroethene	8.9		0.50	ppbv	1	5/9/2017 11:58 AM
Trichloroethene	9.6		0.20	ppbv	1	5/9/2017 11:58 AM
Vinyl chloride	ND		0.50	ppbv	1	5/9/2017 11:58 AM
Surr: Bromofluorobenzene	94.2		60-140	%REC	1	5/9/2017 11:58 AM
TO-15 BY GC/MS			ETO-1	5		Analyst: MRJ
1,1,2-Trichloroethane	ND		2.73	µg/m3	1	5/9/2017 11:58 AM
1,1-Dichloroethene	ND		1.98	μg/m3	1	5/9/2017 11:58 AM
1,2-Dichloroethane	ND		2.02	µg/m3	1	5/9/2017 11:58 AM
Benzene	ND		1.60	μg/m3	1	5/9/2017 11:58 AM
cis-1,2-Dichloroethene	4.72		1.98	μg/m3	1	5/9/2017 11:58 AM
Methylene chloride	ND		1.74	µg/m3	1	5/9/2017 11:58 AM
Tetrachloroethene	ND		3.39	μg/m3	1	5/9/2017 11:58 AM
Toluene	30.3		1.88	μg/m3	1	5/9/2017 11:58 AM
trans-1,2-Dichloroethene	35.2		1.98	μg/m3	1	5/9/2017 11:58 AM
Trichloroethene	51.4		1.07	μg/m3	1	5/9/2017 11:58 AM
Vinyl chloride	ND		1.28	μg/m3	1	5/9/2017 11:58 AM
Surr: Bromofluorobenzene	94.2		60-140	%REC	1	5/9/2017 11:58 AM

**Date:** 17-May-17

Note:

#### **ALS Environmental**

**Client:** Arcadis

 Project:
 LA0033007.0005
 Work Order:
 1705173

 Sample ID:
 B-4 (050217) 2ND
 Lab ID:
 1705173-03

Collection Date: 5/2/2017 Matrix: AIR

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
TO-15 BY GC/MS			ETO-1	5		Analyst: MRJ
1,1,2-Trichloroethane	ND		0.50	ppbv	1	5/8/2017 07:48 PM
1,1-Dichloroethene	ND		0.50	ppbv	1	5/8/2017 07:48 PM
1,2-Dichloroethane	ND		0.50	ppbv	1	5/8/2017 07:48 PM
Benzene	ND		0.50	ppbv	1	5/8/2017 07:48 PM
cis-1,2-Dichloroethene	1.0		0.50	ppbv	1	5/8/2017 07:48 PM
Methylene chloride	ND		0.50	ppbv	1	5/8/2017 07:48 PM
Tetrachloroethene	ND		0.50	ppbv	1	5/8/2017 07:48 PM
Toluene	0.62		0.50	ppbv	1	5/8/2017 07:48 PM
trans-1,2-Dichloroethene	ND		0.50	ppbv	1	5/8/2017 07:48 PM
Trichloroethene	6.3		0.20	ppbv	1	5/8/2017 07:48 PM
Vinyl chloride	ND		0.50	ppbv	1	5/8/2017 07:48 PM
Surr: Bromofluorobenzene	95.3		60-140	%REC	1	5/8/2017 07:48 PM
TO-15 BY GC/MS			ETO-1	5		Analyst: MRJ
1,1,2-Trichloroethane	ND		2.73	µg/m3	1	5/8/2017 07:48 PM
1,1-Dichloroethene	ND		1.98	µg/m3	1	5/8/2017 07:48 PM
1,2-Dichloroethane	ND		2.02	µg/m3	1	5/8/2017 07:48 PM
Benzene	ND		1.60	µg/m3	1	5/8/2017 07:48 PM
cis-1,2-Dichloroethene	4.00		1.98	μg/m3	1	5/8/2017 07:48 PM
Methylene chloride	ND		1.74	µg/m3	1	5/8/2017 07:48 PM
Tetrachloroethene	ND		3.39	µg/m3	1	5/8/2017 07:48 PM
Toluene	2.34		1.88	μg/m3	1	5/8/2017 07:48 PM
trans-1,2-Dichloroethene	ND		1.98	µg/m3	1	5/8/2017 07:48 PM
Trichloroethene	33.6		1.07	μg/m3	1	5/8/2017 07:48 PM
Vinyl chloride	ND		1.28	µg/m3	1	5/8/2017 07:48 PM
Surr: Bromofluorobenzene	95.3		60-140	%REC	1	5/8/2017 07:48 PM

**Date:** 17-May-17



### Grenada Manufacturing

## **DATA REVIEW**

## Grenada, Mississippi

Volatile Organic Compound (VOC) Analyses

SDG #1713171

Analyses Performed By: ALS Environmental Salt Lake City, Utah

Report #27687R Review Level: Tier III

Project: LA003307.0006.00001

#### **SUMMARY**

This data quality assessment summarizes the review of Sample Delivery Group (SDG) #1713171 for samples collected in association with the Grenada Manufacturing site, located in Grenada, Mississippi. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

			Sample			Analy	rsis	
Sample ID	Lab ID	Matrix	Collection Date	Parent Sample	VOC	svoc	MET	MISC
118 JX	1713171001	Air	5/9/2017		Х			
120 JX	1713171002	Air	5/9/2017		Х			
117 JX	1713171003	Air	5/9/2017		Х			
122 JX	1713171004	Air	5/9/2017		Х			
115 JX	1713171005	Air	5/9/2017		Х			
113 JX	1713171006	Air	5/9/2017		Х			
108 JX	1713171007	Air	5/9/2017		Х			
111 JX	1713171008	Air	5/9/2017		Х			
110 JX	1713171009	Air	5/9/2017	111 JX	Х			
119 JX	1713171010	Air	5/9/2017		Х			
116 JX	1713171011	Air	5/9/2017		Х			
121 JX	1713171012	Air	5/9/2017		Х			
114 JX	1713171013	Air	5/9/2017		Х			
112 JX	1713171014	Air	5/9/2017		Х			
109 JX	1713171015	Air	5/9/2017		Х			
123 JX	1713171016	Air	5/9/2017		Х			
418 JX	1713171017	Air	5/9/2017		Х			
419 JX	1713171018	Air	5/9/2017		Х			
420 JX	1713171019	Air	5/9/2017		Х			
421 JX	1713171020	Air	5/9/2017		Х			
422 JX	1713171021	Air	5/9/2017		Х			
423 JX	1713171022	Air	5/9/2017		Х			

#### **ANALYTICAL DATA PACKAGE DOCUMENTATION**

The table below is the evaluation of the data package completeness.

	Rep	Reported		mance ptable	Not
Items Reviewed	No	Yes	No	Yes	Required
Sample receipt condition		Х		Х	
Requested analyses and sample results		Х		X	
Master tracking list		Х		Х	
4. Methods of analysis		Х		Х	
5. Reporting limits		Х		Х	
6. Sample collection date		Х		Х	
7. Laboratory sample received date		Х		Х	
Sample preservation verification (as applicable)		Х		Х	
Sample preparation/extraction/analysis dates		Х		Х	
10. Fully executed Chain-of-Custody (COC) form		Х		Х	
11. Narrative summary of QA or sample problems provided		Х		Х	
12. Data Package Completeness and Compliance		Х		Х	

Note:

QA - Quality Assurance

#### **ORGANIC ANALYSIS INTRODUCTION**

Samples were collected using sorbent tubes and analysis was performed using EPA Method TO-17. Data were reviewed in accordance with USEPA National Functional Guidelines of October 1999.

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and had already been subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
  - U The compound was analyzed for but not detected. The associated value is the compound quantitation limit.
  - B The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.
- Quantitation (Q) Qualifiers
  - E The compound was quantitated above the calibration range.
  - D Concentration is based on a diluted sample analysis.
- Validation Qualifiers
  - J The compound was positively identified; however, the associated numerical value is an estimated concentration only.
  - UJ The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.
  - JN The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification. The associated numerical value is an estimated concentration only.
  - UB Compound considered non-detect at the listed value due to associated blank contamination.
  - N The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification.
  - R The sample results are rejected.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

#### **VOLATILE ORGANIC COMPOUND (VOC) ANALYSIS**

#### 1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
EPA Method TO-17	Air	30 days from collection to analysis	Cool to <6°C

All samples were analyzed within the specified holding time.

#### 2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

#### 3. Mass Spectrometer Tuning

Mass spectrometer performance was acceptable and all analyses were performed within a 24-hour tune clock.

System performance and column resolution were acceptable.

#### 4. Calibration

Satisfactory instrument calibration is established to insure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

#### 4.1 Initial Calibration

The method specifies percent relative standard deviation (%RSD) and relative response factor (RRF) limits for select compounds only. A technical review of the data applies limits to all compounds with no exceptions.

All target compounds associated with the initial calibration standards must exhibit a %RSD less than the control limit (30%) and an RRF value greater than control limit (0.05).

#### 4.2 Continuing Calibration

All target compounds associated with the continuing calibration standard must exhibit a percent difference (%D) less than the control limit (30%) and RRF value greater than control limit (0.05).

All compounds associated with the calibrations were within the specified control limits.

#### 5. Internal Standard Performance

Internal standard performance criteria insure that the GC/MS sensitivity and response are stable during every sample analysis. The criteria require the internal standard compounds associated with the VOC exhibit area counts are ± 40% of the area counts of the associated continuing calibration standard.

All internal standard responses were within control limits.

## 6. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) Analysis

The LCS/LCSD analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS/LCSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits.

All compounds associated with the LCS/LCSD analysis exhibited recoveries within the control limits.

#### 7. Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 25% for air matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for air matrices.

Laboratory duplicate analysis was not performed using a sample from this SDG.

#### 8. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for air matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for air matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Compound	Sample Result (µg/m³)¹	Duplicate Result (μg/m³)¹	RPD
	Benzene	3.8	3.5	8.2%
444 10/ / 440 10/	Trichloroethene	210 EJ	190 EJ	10.0%
111 JX / 110 JX	Toluene	34	37	8.5%
	cis-1,2-Dichloroethene	61	61	0.0%

Sample ID/Duplicate ID Compound	Sample Result (µg/m³) <sup>1</sup>	Duplicate Result (µg/m³)¹	RPD
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#### Note:

The calculated RPDs between the parent sample and field duplicate were acceptable.

#### 9. Compound Identification

Compounds are identified on the GC/MS by using the analytes relative retention time and ion spectra.

All identified compounds met the specified criteria.

Sample results associated with compound that exhibited a concentration greater than the linear range of the instrument calibration are summarized in the following table.

Sample ID	Compound	Original Analysis (µg/m³)	Diluted Analysis (μg/m³)	Reported Analysis (µg/m³)
118 JX	Trichloroethene	230 E		230 EJ
120 JX	Trichloroethene	180 E		180 EJ
111 JX	Trichloroethene	210 E		210 EJ
110 JX	Trichloroethene	190 E		190 EJ
120 JX	Trichloroethene	280 E		280 EJ
418 JX	Trichloroethene	240 E		240 EJ

Sample results associated with compounds exhibiting concentrations greater than the linear range are qualified as documented in the table below when reported as the final reported sample result.

Reported Sample Results	Qualification
Diluted sample result within calibration range	D
Diluted sample result less than the calibration range	DJ
Diluted sample result greater than the calibration range	EDJ
Original sample result greater than the calibration range	EJ

#### 10. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

<sup>&</sup>lt;sup>1</sup> cis-1,2-Dichloroethene results are reported in units of ng/sample. Uptake rates are not available to determine results in units of µg/m³.

#### **DATA VALIDATION CHECKLIST FOR VOCs**

VOCs: EPA Method TO-17	Rep	orted	Performance Acceptable		Not
	No	Yes	No	Yes	Required
GAS CHROMATOGRAPHY/MASS SPECTROMETR	Y (GC/M	S)			
Tier II Validation					
Holding times		Х		Х	
Reporting limits (units)		Х		Х	
Blanks					
A. Method blanks		Х		Х	
B. Equipment blanks					Х
Laboratory Control Sample (LCS) %R		Х		Х	
Laboratory Control Sample Duplicate (LCSD) %R		Х		Х	
LCS/LCSD Precision (RPD)		Х		Х	
Field/Lab Duplicate (RPD)		Х		Х	
Dilution Factor		Х		Х	
Tier III Validation		1			
System performance and column resolution		Х		Х	
Initial calibration %RSDs		Х		Х	
Continuing calibration RRFs		Х		Х	
Continuing calibration %Ds		Х		Х	
Instrument tune and performance check		Х		Х	
Ion abundance criteria for each instrument used		Х		Х	
Internal standard		Х		Х	
Compound identification and quantitation		1			
A. Reconstructed ion chromatograms		Х		Х	
B. Quantitation Reports		Х		Х	
C. RT of sample compounds within the established RT windows		Х		x	
D. Transcription/calculation errors present		Х		Х	
E. Reporting limits adjusted to reflect sample dilutions		Х		Х	

%RSD Percent relative difference

%R Percent recovery

RPD Relative percent difference

%D Percent difference

VALIDATION PERFORMED BY: Jennifer Singer

SIGNATURE:

DATE: May 23, 2017

knnifer O. Linger

PEER REVIEW: Dennis Capria

DATE: May 30, 2017

# CHAIN OF CUSTODY CORRECTED SAMPLE ANALYSIS DATA SHEETS

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Specify: Solid sorbent tube, e.g. Charcoal; Filter type; Impinger solution; Bulk sample; Blood; Urine; Tissue; Soil; Water; Other

Comments	
Possible Contamination and/or Chemical Hazards 7. Chain of Custody (Optional)	
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#### For lab use only



### **ANALYTICAL REQUEST FORM**

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#### Amended-20170522

Workorder: 34-1713171

Client: Arcadis, Inc.

Project Manager: Paul E. Pope

#### **Analytical Results**

Sample ID: 118JX Sampling Site: Grendada Manufacturi Collected: 05/09/2017

Lab ID: 1713171001 Media: Radiello, Code 145 Received: 05/11/2017

Matrix: Air Sampling Parameter: Air Volume 470 Minutes

		9				
Analysis Method - Radiello, Volatile	Organics					
Preparation: Not Applicable			Analysis: Radiello,	Volatile Organics Air	Instrum	ent ID: 5975-X
			Batch: IVOA/35	96 (HBN: 190874)	Percent	Solid: NA
			<b>Analyzed:</b> 05/16/20	17 15:15	Report	Basis: Wet
	Result	Result		RL		
Analyte	(ng/sample)	(ug/m³)	Result (ppb)	(ng/sample)	Dilution	Qual
Benzene	56	4.3	1.3	25	1	
Trichloroethene	2900	230	43	25	1	ΕJ
Toluene	520	37	9.8	25	1	
Tetrachloroethene	ND	<2.1	<0.31	25	1	
cis-1,2-Dichloroethene	69	NA	NA	NA	1	
1,2-Dichloroethane	ND	NA	NA	NA	1	
1,1,2-Trichloroethane	ND	NA	NA	NA	1	

Sample ID: 120 JX Sampling Site: Grendada Manufacturi Collected: 05/09/2017

Lab ID: 1713171002 Media: Radiello, Code 145 Received: 05/11/2017

Matrix: Air	Sampling Parameter: Air Volume 458 Minutes								
Analysis Method - Radiello, Volatile Organics									
Preparation: Not Applicable			Analysis: Radiello	, Volatile Organics Air	Instrum	ent ID: 5975-X			
			Batch: IVOA/3596 (HBN: 190874) Percent Solid: NA						
			<b>Analyzed:</b> 05/16/20	)17 15:54	Report Basis: Wet				
	Result	Result		RL					
Analyte	(ng/sample)	(ug/m³)	Result (ppb)	(ng/sample)	Dilution	Qual			
Benzene	49	3.9	1.2	25	1				
Trichloroethene	2200	180	33	25	1	ΕJ			
Toluene	290	21	5.7	25	1				
Tetrachloroethene	ND	<2.1	<0.32	25	1				
cis-1,2-Dichloroethene	210	NA	NA	NA	1				

Sample ID: 117JX Sampling Site: Grendada Manufacturi Collected: 05/09/2017
Lab ID: 1713171003 Media: Radiello, Code 145 Received: 05/11/2017

NA

NA

NA

NA

1.2

NA

NA

1

Matrix: Air Sampling Parameter: Air Volume 456 Minutes

ND

ND

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Analysis Method - Radiello, Vola	atile Organics						
Preparation: Not Applicable			Analysis: Radiello	, Volatile Organics Air	Instrum	ent ID: 5975-2	X
			Batch: IVOA/35	96 (HBN: 190874)	Percent	Solid: NA	
			<b>Analyzed:</b> 05/16/20	17 16:35	Report	Basis: Wet	
	Result	Result		RL			
Analyte	(ng/sample)	(ug/m³)	Result (ppb)	(ng/sample)	Dilution	Qual	

3.9

#### **Results Continued on Next Page**

Benzene

1,2-Dichloroethane

1,1,2-Trichloroethane



#### Amended-20170522

Workorder: 34-1713171

Client: Arcadis, Inc.

Project Manager: Paul E. Pope

#### **Analytical Results**

Sample ID: 117JX Sampling Site: Grendada Manufacturi Collected: 05/09/2017

Lab ID: 1713171003 Media: Radiello, Code 145 Received: 05/11/2017

Matrix: Air Sampling Parameter: Air Volume 456 Minutes

Matrix. All	Sampling Parameter. All Volume 456 Milnutes								
Analysis Method - Radiello, Vol	atile Organics								
Preparation: Not Applicable			Analysis: Radiello	, Volatile Organics Air	Instrum	ent ID: 5975-X			
				96 (HBN: 190874)	Percent	Solid: NA			
			<b>Analyzed:</b> 05/16/20	)17 16:35	Report Basis: Wet				
	Result	Result		RL					
Analyte	(ng/sample)	(ug/m³)	Result (ppb)	(ng/sample)	Dilution	Qual			
Trichloroethene	1100	86	16	25	1				
Toluene	190	14	3.6	25	1				
Tetrachloroethene	ND	<2.2	<0.32	25	1				
cis-1,2-Dichloroethene	46	NA	NA	NA	1				
1,2-Dichloroethane	ND	NA	NA	NA	1				
1,1,2-Trichloroethane	ND	NA	NA	NA	1				

Sample ID: 122JX Sampling Site: Grendada Manufacturi Collected: 05/09/2017

Lab ID: 1713171004 Media: Radiello, Code 145 Received: 05/11/2017

Matrix: Air Sampling Parameter: Air Volume 455 Minutes

Matrix: Air	Sampling Parameter: Air Volume 455 Minutes							
Analysis Method - Radiello, Vola	atile Organics							
Preparation: Not Applicable			Batch: IVOA/3596 (HBN: 190874) Perce			ument ID: 5975-X ent Solid: NA ort Basis: Wet		
Analyte	Result (ng/sample)	Result (ug/m³)	Result (ppb)	RL (ng/sample)	Dilution	Qual		
Benzene	36	2.8	0.88	25	1			
Trichloroethene	ND	<2.0	<0.38	25	1			
Toluene	110	8.1	2.2	25	1			
Tetrachloroethene	ND	<2.2	<0.32	25	1			
cis-1,2-Dichloroethene	ND	NA	NA	NA	1			
1,2-Dichloroethane	ND	NA	NA	NA	1			
1,1,2-Trichloroethane	ND	NA	NA	NA	1			

Sample ID: 115JX Sampling Site: Grendada Manufacturi Collected: 05/09/2017
Lab ID: 1713171005 Media: Radiello, Code 145 Received: 05/11/2017

Matrix: Air Sampling Parameter: Air Volume 450 Minutes

		1 3	-						
Analysis Method - Radiello, Volatile Organics									
Preparation: Not Applicable			Analysis: Radiello,	Volatile Organics Air	Instrum	ent ID: 5975-X			
			Batch: IVOA/35	96 (HBN: 190874)	Percent	Solid: NA			
			<b>Analyzed:</b> 05/16/20	17 17:53	Report	Basis: Wet			
	Result	Result		RL					
Analyte	(ng/sample)	(ug/m³)	Result (ppb)	(ng/sample)	Dilution	Qual			
Benzene	36	2.9	0.90	25	1				
Trichloroethene	ND	<2.1	<0.38	25	1	_			

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#### Amended-20170522

Workorder: 34-1713171

Client: Arcadis, Inc.

Project Manager: Paul E. Pope

#### **Analytical Results**

Sample ID: 115JX Sampling Site: Grendada Manufacturi Collected: 05/09/2017

Lab ID: 1713171005 Media: Radiello, Code 145 Received: 05/11/2017

Matrix: Air	Sampling Parameter: Air Volume 450 Minutes								
Analysis Method - Radiello, Volatile Organics									
Preparation: Not Applicable				, Volatile Organics Air	Instrum	ent ID: 5975-X			
			Batch: IVOA/35	96 (HBN: 190874)	Percent	Solid: NA			
			<b>Analyzed:</b> 05/16/20	17 17:53	Report	Basis: Wet			
	Result	Result		RL					
Analyte	(ng/sample)	(ug/m³)	Result (ppb)	(ng/sample)	Dilution	Qual			
Toluene	100	7.4	2.0	25	1				
Tetrachloroethene	ND	<2.2	<0.32	25	1				
cis-1,2-Dichloroethene	ND	NA	NA	NA	1				
1,2-Dichloroethane	ND	NA	NA	NA	1				
1,1,2-Trichloroethane	ND	NA	NA	NA	1				

Sample ID: 113JX Sampling Site: Grendada Manufacturi Collected: 05/09/2017 Received: 05/11/2017 Lab ID: 1713171006 Media: Radiello, Code 145

Matrix: Air Sampling Parameter: Air Volume 456 Minutes

ND

Analysis Method - Radiello, Volatile Organics								
Preparation: Not Applicable			Analysis: Radiello	, Volatile Organics Air	Instrum	Instrument ID: 5975-X		
			Batch: IVOA/35	596 (HBN: 190874)	Percent	t Solid: NA		
			<b>Analyzed:</b> 05/16/20	017 18:32	Report	Basis: Wet		
	Result	Result		RL				
Analyte	(ng/sample)	(ug/m³)	Result (ppb)	(ng/sample)	Dilution	Qual		
Benzene	35	2.8	0.87	25	1			
Trichloroethene	ND	<2.0	<0.38	25	1			
Toluene	120	8.7	2.3	25	1			
Tetrachloroethene	ND	<2.2	<0.32	25	1			
cis-1,2-Dichloroethene	ND	NA	NA	NA	1			
1,2-Dichloroethane	ND	NA	NA	NA	1			

Sample ID: 108JX Sampling Site: Grendada Manufacturi Collected: 05/09/2017 Received: 05/11/2017 Lab ID: 1713171007 Media: Radiello, Code 145

NA

NA

NA

1

Matrix: Air	Sampling Pa	Parameter: Air Volume 443 Minutes						
Analysis Method - Radiello, Volatile Organics								
Preparation: Not Applicable		Analysis: Radiello, Volatile Organics Air Instrument ID: 5975			ent ID: 5975-X			
		Batch: IVOA/3596 (HBN: 190874) Percent Solid			Solid: NA			
		Analyzed: 05/16/20	17 19:11	Report Basis: Wet				
Result	Result		RL					
Analyte (ng/sample)	(ug/m³)	Result (ppb)	(ng/sample)	Dilution	Qual			
Benzene 32	2.6	0.82	25	1				
Trichloroethene ND	<2.1	<0.39	25	1				
Toluene 330	25	6.6	25	1				

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1,1,2-Trichloroethane

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#### Amended-20170522

Workorder: 34-1713171

Client: Arcadis, Inc.

Project Manager: Paul E. Pope

#### **Analytical Results**

Sample ID: 108JX Sampling Site: Grendada Manufacturi Collected: 05/09/2017

Lab ID: 1713171007 Media: Radiello, Code 145 Received: 05/11/2017

Matrix: Air	Sampling Parameter: Air Volume 443 Minutes								
Analysis Method - Radiello, Vola	tile Organics								
Preparation: Not Applicable			Analysis: Radiello	, Volatile Organics Air	Instrument ID: 5975-X				
			Batch: IVOA/35	96 (HBN: 190874)	Percent Solid: NA				
			<b>Analyzed:</b> 05/16/20	)17 19:11	Report Basis: Wet				
	Result	Result		RL					
Analyte	(ng/sample)	(ug/m³)	Result (ppb)	(ng/sample)	Dilution	Qual			
Tetrachloroethene	ND	<2.2	<0.33	25	1				
cis-1,2-Dichloroethene	ND	NA	NA	NA	1				
1,2-Dichloroethane	ND	NA	NA	NA	1				
1,1,2-Trichloroethane	ND	NA	NA	NA	1				

Sample ID: 111JX Sampling Site: Grendada Manufacturi Collected: 05/09/2017 Received: 05/11/2017 Lab ID: 1713171008 Media: Radiello, Code 145 Matrix: Air Sampling Parameter: Air Volume 443 Minutes

Analysis Method - Radiello, Volatile Organics								
Preparation: Not Applicable			Analysis: Radiello, Volatile Organics Air		Instrum	nent ID: 5975-X		
			Batch: IVOA/35	596 (HBN: 190874)	Percen	t Solid: NA		
			Analyzed: 05/16/20	017 19:50	Report	Basis: Wet		
	Result	Result		RL				
Analyte	(ng/sample)	(ug/m³)	Result (ppb)	(ng/sample)	Dilution	Qual		
Benzene	46	3.8	1.2	25	1			
Trichloroethene	2500	210	39	25	1	ΕJ		
Toluene	450	34	9.0	25	1			
Tetrachloroethene	ND	<2.2	<0.33	25	1			
cis-1,2-Dichloroethene	61	NA	NA	NA	1			
1,2-Dichloroethane	ND	NA	NA	NA	1			
1,1,2-Trichloroethane	ND	NA	NA	NA	1			

Sample ID: 110JX Sampling Site: Grendada Manufacturi Collected: 05/09/2017 Received: 05/11/2017 Lab ID: 1713171009 Media: Radiello, Code 145 Sampling Parameter: Air Volume 443 Minutes Matrix: Air

Analysis Method - Radiello, V	olatile Organics					
Preparation: Not Applicable			Analysis: Radiello, Volatile Organics Air Instrument ID:			ent ID: 5975-X
			Batch: IVOA/35	96 (HBN: 190874)	Percent	Solid: NA
			<b>Analyzed:</b> 05/16/20	17 20:29	Report Basis: Wet	
	Result	Result	t RL			
Analyte	(ng/sample)	(ug/m³)	Result (ppb)	(ng/sample)	Dilution	Qual
Benzene	43	3.5	1.1	25	1	
Trichloroethene	2300	190	35	25	1	ΕJ
Toluene	500	37	9.9	25	1	
Tetrachloroethene	ND	<2.2	< 0.33	25	1	

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#### Amended-20170522

Workorder: 34-1713171

Client: Arcadis, Inc.

Project Manager: Paul E. Pope

#### **Analytical Results**

Sample ID: 110JX Sampling Site: Grendada Manufacturi Collected: 05/09/2017

Lab ID: 1713171009 Media: Radiello, Code 145 Received: 05/11/2017

Matrix: Air Sampling Parameter: Air Volume 443 Minutes

Matrix. All	Sampling Farameter. All Volume 443 Minutes									
Analysis Method - Radiello, V	olatile Organics									
Preparation: Not Applicable			Analysis: Radiello, Volatile Organics Air Instrument II							
			Batch: IVOA/3596 (HBN: 190874) Percent Solid: NA							
			Analyzed: 05/16/20	17 20:29	Report Basis: Wet					
	Result	Result		RL						
Analyte	(ng/sample)	(ug/m³)	Result (ppb)	(ng/sample)	Dilution	Qual				
cis-1,2-Dichloroethene	61	NA	NA	NA	1					
1,2-Dichloroethane	ND	NA	NA	NA	1					
1.1.2-Trichloroethane	ND	NA	NA	NA	1					

Sample ID: 119JX Sampling Site: Grendada Manufacturi Collected: 05/09/2017

Received: 05/11/2017 Lab ID: 1713171010 Media: Radiello, Code 145

Matrix: Air	Sampling Parameter: Air Volume 520 Minutes								
Analysis Method - Radiello, Vol	atile Organics								
Preparation: Not Applicable			Analysis: Radiello, Volatile Organics Air Instru			ent ID: 5975-X			
			Batch: IVOA/35	596 (HBN: 190874)	Percent	Solid: NA			
			<b>Analyzed:</b> 05/16/20	017 21:08	Report Basis: Wet				
	Result	Result		RL					
Analyte	(ng/sample)	(ug/m³)	Result (ppb)	(ng/sample)	Dilution	Qual			
Benzene	42	2.9	0.92	25	1				
Trichloroethene	1900	130	25	25	1				
Toluene	190	12	3.2	25	1				
Tetrachloroethene	ND	<1.9	<0.28	25	1				
cis-1,2-Dichloroethene	200	NA	NA	NA	1				
1,2-Dichloroethane	ND	NA	NA	NA	1				
1,1,2-Trichloroethane	ND	NA	NA	NA	1				

Sample ID: 116JX Sampling Site: Grendada Manufacturi Collected: 05/09/2017 Lab ID: 1713171011 Received: 05/11/2017 Media: Radiello, Code 145

Matrix: Air Sampling Parameter: Air Volume 517 Minutes

Matrix: Air	Sampling Parameter: Air Volume 517 Minutes						
Analysis Method - Radiello, Volatil	e Organics						
Preparation: Not Applicable			Analysis: Radiello, Volatile Organics Air		Instrument ID: 5975-X		
	Batch: IVOA/3596 (HBN: 190874)			96 (HBN: 190874)	Percent Solid: NA		
			<b>Analyzed:</b> 05/16/20	17 21:48	Report Basis: Wet		
	Result	Result		RL			
Analyte	(ng/sample)	(ug/m³)	Result (ppb)	(ng/sample)	Dilution	Qual	
Benzene	50	3.5	1.1	25	1		
Trichloroethene	1100	76	14	25	1		
Toluene	200	13	3.4	25	1		
Tetrachloroethene	ND	<1.9	<0.28	25	1		
cis-1,2-Dichloroethene	44	NA	NA	NA	1		

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#### Amended-20170522

Workorder: 34-1713171

Client: Arcadis, Inc.

Project Manager: Paul E. Pope

#### **Analytical Results**

Sample ID: 116JX Sampling Site: Grendada Manufacturi Collected: 05/09/2017 Received: 05/11/2017

Lab ID: 1713171011 Media: Radiello, Code 145

Matrix: Air	Sampling Parameter: Air Volume 517 Minutes							
Analysis Method - Radiello, Volatile Organics								
Preparation: Not Applicable			Analysis: Radiello, Volatile Organics Air Instrument ID: 5975					
			Batch: IVOA/35	96 (HBN: 190874)	Percent Solid: NA			
			<b>Analyzed: 05/16/20</b>	17 21:48	Report Basis: Wet			
	Result	Result		RL				
Analyte	(ng/sample)	(ug/m³)	Result (ppb)	(ng/sample)	Dilution	Qual		
1,2-Dichloroethane	ND	NA	NA	NA	1			
1,1,2-Trichloroethane	ND	NA	NA	NA	1			

Sample ID: 121JX Sampling Site: Grendada Manufacturi Collected: 05/09/2017 Lab ID: 1713171012 Media: Radiello, Code 145 Received: 05/11/2017

Matrix: Air Sampling Parameter: Air Volume 482 Minutes

Wicking, 7 th	Camping Faramotor. 7th Volume 102 Minutes							
Analysis Method - Radiello, Volati	ile Organics							
Preparation: Not Applicable		Analysis: Radiello,	Volatile Organics Air	Instrument ID: 5975-X				
			Batch: IVOA/35	96 (HBN: 190874)	Percent	Solid: NA		
			<b>Analyzed:</b> 05/16/20	17 22:27	Report	Basis: Wet		
	Result	Result		RL				
Analyte	(ng/sample)	(ug/m³)	Result (ppb)	(ng/sample)	Dilution	Qual		
Benzene	43	3.2	1.0	25	1			
Trichloroethene	ND	<1.9	<0.36	25	1			
Toluene	130	9.0	2.4	25	1			
Tetrachloroethene	ND	<2.0	<0.30	25	1			
cis-1,2-Dichloroethene	ND	NA	NA	NA	1			
1,2-Dichloroethane	ND	NA	NA	NA	1			
1,1,2-Trichloroethane	ND	NA	NA	NA	1			

Sample ID: 114JX Sampling Site: Grendada Manufacturi Collected: 05/09/2017 Media: Radiello, Code 145 Received: 05/11/2017 Lab ID: 1713171013

Matrix: Air	Sampling Parameter: Air Volume 487 Minutes							
Analysis Method - Radiello, Vola	atile Organics							
Preparation: Not Applicable	ration: Not Applicable		Analysis: Radiello, Volatile Organics Air Batch: IVOA/3596 (HBN: 190874)		Instrument ID: 5975-X Percent Solid: NA			
			Analyzed: 05/16/20	,	Report Basis: Wet			
	Result	Result		RL				
Analyte	(ng/sample)	(ug/m³)	Result (ppb)	(ng/sample)	Dilution	Qual		
Benzene	36	2.7	0.83	25	1			
Trichloroethene	ND	<1.9	<0.35	25	1			
Toluene	100	6.8	1.8	25	1			
Tetrachloroethene	ND	<2.0	<0.30	25	1			
cis-1,2-Dichloroethene	ND	NA	NA	NA	1			
1,2-Dichloroethane	ND	NA	NA	NA	1			

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#### Amended-20170522

Workorder: 34-1713171

Client: Arcadis, Inc.

Project Manager: Paul E. Pope

#### **Analytical Results**

Sampling Site: Grendada Manufacturi Sample ID: 114JX Collected: 05/09/2017 Lab ID: 1713171013 Media: Radiello, Code 145 Received: 05/11/2017

Matrix: Air Sampling Parameter: Air Volume 487 Minutes

**Analysis Method - Radiello, Volatile Organics** Analysis: Radiello, Volatile Organics Air Preparation: Not Applicable Instrument ID: 5975-X Batch: IVOA/3596 (HBN: 190874) **Percent Solid: NA** Analyzed: 05/16/2017 23:06 **Report Basis: Wet** Result Result **RL Analyte** (ng/sample) Result (ppb) (ng/sample) **Dilution** Qual  $(ug/m^3)$ 1,1,2-Trichloroethane ND NA NA

Sampling Site: Grendada Manufacturi Sample ID: 112JX Collected: 05/09/2017 Received: 05/11/2017 Lab ID: 1713171014 Media: Radiello, Code 145

Matrix: Air	Sampling Parameter: Air Volume 492 Minutes								
Analysis Method - Radiello, Vol	atile Organics								
Preparation: Not Applicable			Analysis: Radiello,	Volatile Organics Air	Instrument ID: 5975-X				
			Batch: IVOA/35	96 (HBN: 190874)	Percent	Solid: NA			
			Analyzed: 05/16/20	17 23:45	Report Basis: Wet				
	Result	Result		RL					
Analyte	(ng/sample)	(ug/m³)	Result (ppb)	(ng/sample)	Dilution	Qual			
Benzene	44	3.2	1.0	25	1				
Trichloroethene	ND	<1.9	<0.35	25	1				
Toluene	130	8.8	2.3	25	1				
Tetrachloroethene	ND	<2.0	<0.29	25	1				
cis-1,2-Dichloroethene	ND	NA	NA	NA	1				
1,2-Dichloroethane	ND	NA	NA	NA	1				
1,1,2-Trichloroethane	ND	NA	NA	NA	1				

Sample ID: 109JX Sampling Site: Grendada Manufacturi Collected: 05/09/2017 Received: 05/11/2017 Lab ID: 1713171015 Media: Radiello, Code 145

Matrix: Air Sampling Parameter: Air Volume 490 Minutes

IVIAUTX. AII	Sampling Parameter. All Volume 490 Milnutes							
Analysis Method - Radiello, Vola	atile Organics							
Preparation: Not Applicable			Analysis: Radiello, Volatile Organics Air		Instrument ID: 5975-X			
			Batch: IVOA/3596 (HBN: 190874)		Percent Solid: NA			
			Analyzed: 05/17/2017 00:24		Report Basis: Wet			
	Result	Result		RL				
Analyte	(ng/sample)	(ug/m³)	Result (ppb)	(ng/sample)	Dilution	Qual		
Benzene	31	2.2	0.70	25	1			
Trichloroethene	ND	<1.9	<0.35	25	1			
Toluene	310	21	5.6	25	1			
Tetrachloroethene	ND	<2.0	<0.30	25	1			
cis-1,2-Dichloroethene	ND	NA	NA	NA	1			
1,2-Dichloroethane	ND	NA	NA	NA	1			
1,1,2-Trichloroethane	ND	NA	NA	NA	1	•		

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#### Amended-20170522

Workorder: 34-1713171

Client: Arcadis, Inc.

Project Manager: Paul E. Pope

#### **Analytical Results**

Sample ID: 123JX Sampling Site: Grendada Manufacturi Collected: 05/09/2017

Lab ID: 1713171016 Media: Radiello, Code 145 Received: 05/11/2017

Matrix: Air Sampling Parameter: Air Volume 465 Minutes

Matrix. All	Sampling Farameter. All Volume 403 Wilnutes							
Analysis Method - Radiello, Volatile Organics								
Preparation: Not Applicable			Analysis: Radiello,	Volatile Organics Air	Instrument ID: 5975-X			
				96 (HBN: 190874)	Percent Solid: NA			
			<b>Analyzed:</b> 05/17/20	17 01:03	Report Basis: Wet			
	Result	Result		RL				
Analyte	(ng/sample)	(ug/m³)	Result (ppb)	(ng/sample)	Dilution	Qual		
Benzene	59	4.5	1.4	25	1			
Trichloroethene	3500	280	51	25	1	ΕJ		
Toluene	820	59	16	25	1			
Tetrachloroethene	ND	<2.1	<0.31	25	1			
cis-1,2-Dichloroethene	72	NA	NA	NA	1			
1,2-Dichloroethane	ND	NA	NA	NA	1			
1,1,2-Trichloroethane	ND	NA	NA	NA	1			

Sample ID: 418JX Sampling Site: Grendada Manufacturi Collected: 05/09/2017 Received: 05/11/2017 Lab ID: 1713171017 Media: Radiello, Code 145

Matrix: Air	Sampling Parameter: Air Volume 466 Minutes						
Analysis Method - Radiello, Vo	latile Organics						
Preparation: Not Applicable			Analysis: Radiello, Volatile Organics Air Instrument ID:			ent ID: 5975-X	
			Batch: IVOA/35	598 (HBN: 190948)	Percent Solid: NA		
			<b>Analyzed:</b> 05/17/20	)17 13:20	Report Basis: Wet		
	Result	Result	RL				
Analyte	(ng/sample)	(ug/m³)	Result (ppb)	(ng/sample)	Dilution	Qual	
Benzene	55	4.2	1.3	25	1		
Trichloroethene	3000	240	44	25	1	ΕJ	
Toluene	370	26	7.0	25	1		
Tetrachloroethene	ND	<2.1	<0.31	25	1		
cis-1,2-Dichloroethene	240	NA	NA	NA	1		
1,2-Dichloroethane	ND	NA	NA	NA	1		
1,1,2-Trichloroethane	ND	NA	NA	NA	1	_	

Sampling Site: Grendada Manufacturi Sample ID: 419JX Collected: 05/09/2017 Received: 05/11/2017 Lab ID: 1713171018 Media: Radiello, Code 145

Matrix: Air Sampling Parameter: Air Volume 464 Minutes

54

Analysis Method - Radiello, Volatile Organics						
Preparation: Not Applicable		Analysis: Radiello	, Volatile Organics Air	Instrum	ent ID: 5975->	Χ
		Batch: IVOA/35	Percent Solid: NA			
		Analyzed: 05/17/20	)17 13:59	Report Basis: Wet		
Result	Result		RL			
Analyte (ng/sample)	(ua/m³)	Result (ppb)	(ng/sample)	Dilution	Qual	

4.2

1.3

1

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Benzene



#### Amended-20170522

Workorder: 34-1713171

Client: Arcadis, Inc.

Project Manager: Paul E. Pope

#### **Analytical Results**

Sample ID: 419JX Sampling Site: Grendada Manufacturi Collected: 05/09/2017

Media: Radiello, Code 145 Received: 05/11/2017 Lab ID: 1713171018

Matrix: Air	Sampling Parameter: Air Volume 464 Minutes							
Analysis Method - Radiello, Vola	tile Organics							
Preparation: Not Applicable			,			ument ID: 5975-X ent Solid: NA		
			Analyzed: 05/17/20	,	Report Basis: Wet			
Analyte	Result (ng/sample)	Result (ug/m³)	Result (ppb)	RL (ng/sample)	Dilution	Qual		
Trichloroethene	1100	91	17	25	1			
Toluene	200	15	3.9	25	1			
Tetrachloroethene	ND	<2.1	<0.31	25	1			
cis-1,2-Dichloroethene	39	NA	NA	NA	1			
1,2-Dichloroethane	ND	NA	NA	NA	1			
1,1,2-Trichloroethane	ND	NA	NA	NA	1			

Sample ID: 420JX Sampling Site: Grendada Manufacturi Collected: 05/09/2017

Received: 05/11/2017 Lab ID: 1713171019 Media: Radiello, Code 145

Matriv: Air Sampling Parameter: Air Volume 470 Minutes

Matrix: Air	Sampling Parameter: Air Volume 470 Minutes						
Analysis Method - Radiello, Vo	latile Organics						
Preparation: Not Applicable			Analysis: Radiello, Volatile Organics Air Instrument ID:				
			Batch: IVOA/3598 (HBN: 190948)		Percent Solid: NA		
			<b>Analyzed:</b> 05/17/20	)17 14:38	Report	Basis: Wet	
	Result	Result		RL			
Analyte	(ng/sample)	(ug/m³)	Result (ppb)	(ng/sample)	Dilution	Qual	
Benzene	35	2.7	0.85	25	1		
Trichloroethene	ND	<2.0	<0.37	25	1		
Toluene	70	4.9	1.3	25	1		
Tetrachloroethene	ND	<2.1	<0.31	25	1		
cis-1,2-Dichloroethene	ND	NA	NA	NA	1		
1,2-Dichloroethane	ND	NA	NA	NA	1		
1,1,2-Trichloroethane	ND	NA	NA	NA	1		

Sample ID: 421JX Sampling Site: Grendada Manufacturi Collected: 05/09/2017 Lab ID: 1713171020 Media: Radiello, Code 145 Received: 05/11/2017

Matrix: Air Sampling Parameter: Air Volume 466 Minutes

Analysis Method - Radiello, Volatile Organics									
Preparation: Not Applicable		Analysis: Radiello, Volatile Organics Air		Instrument ID: 5975-X					
			Batch: IVOA/3598 (HBN: 190948		Percent Solid: NA				
			Analyzed: 05/17/2017 15:17		Report Basis: Wet				
	Result	Result		RL					
Analyte	(ng/sample)	(ug/m³)	Result (ppb)	(ng/sample)	Dilution	Qual			
Benzene	38	2.9	0.91	25	1				
Trichloroethene	36	2.9	0.53	25	1				

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#### Amended-20170522

Workorder: 34-1713171

Client: Arcadis, Inc.

Project Manager: Paul E. Pope

#### **Analytical Results**

Sampling Site: Grendada Manufacturi Collected: 05/09/2017 Sample ID: 421JX

Media: Radiello, Code 145 Received: 05/11/2017 Lab ID: 1713171020

Matrix: Air	Sampling Parameter: Air Volume 466 Minutes								
Analysis Method - Radiello, Volatile Organics									
Preparation: Not Applicable			Analysis: Radiello, Volatile Organics Air		Instrument ID: 5975-X				
			Batch: IVOA/3598 (HBN: 190948) Perce			Solid: NA			
			Analyzed: 05/17/20	)17 15:17	Report Basis: Wet				
	Result	Result		RL					
Analyte	(ng/sample)	(ug/m³)	Result (ppb)	(ng/sample)	Dilution	Qual			
Toluene	65	4.7	1.2	25	1				
Tetrachloroethene	ND	<2.1	<0.31	25	1				
cis-1,2-Dichloroethene	ND	NA	NA	NA	1				
1,2-Dichloroethane	ND	NA	NA	NA	1				
1,1,2-Trichloroethane	ND	NA	NA	NA	1				

Sample ID: 422 JX Sampling Site: Grendada Manufacturi Collected: 05/09/2017 Received: 05/11/2017 Media: Radiello, Code 145 Lab ID: 1713171021

Matrix: Air Sampling Parameter: Air Volume 460 Minutes

Analysis Method - Radiello, Volatile Organics								
Preparation: Not Applicable			Analysis: Radiello, Volatile Organics Air		Instrument ID: 5975-X			
			Batch: IVOA/3598 (HBN: 190948)		Percent	Solid: NA		
			Analyzed: 05/17/20	)17 15:56	Report	Basis: Wet		
	Result	Result		RL				
Analyte	(ng/sample)	(ug/m³)	Result (ppb)	(ng/sample)	Dilution	Qual		
Benzene	38	3.0	0.93	25	1			
Trichloroethene	ND	<2.0	<0.37	25	1			
Toluene	130	9.1	2.4	25	1			
Tetrachloroethene	ND	<2.1	<0.32	25	1			
cis-1,2-Dichloroethene	ND	NA	NA	NA	1			
1,2-Dichloroethane	ND	NA	NA	NA	1			
1,1,2-Trichloroethane	ND	NA	NA	NA	1	_		

Sampling Site: Grendada Manufacturi Sample ID: 423JX Collected: 05/09/2017 Lab ID: 1713171022 Media: Radiello, Code 145 Received: 05/11/2017

Sampling Parameter: Air Volume 459 Minutes Matrix: Air

240

Analysis N	<u> llethod - Rad</u>	liello, Vol	latile Org	anics
Preparatio	n: Not Applica	ıble		

Preparation: Not Applicable			Analysis: Radiello	Volatile Organics Air	Instrument ID: 5975-X	
			Batch: IVOA/3598 (HBN: 190948)		Percent	Solid: NA
			<b>Analyzed:</b> 05/17/20	17 16:36	Report	Basis: Wet
	Result	Result		RL		
Analyte	(ng/sample)	(ug/m³)	Result (ppb)	(ng/sample)	Dilution	Qual
Benzene	29	2.3	0.71	25	1	
Trichloroethene	ND	<2.0	<0.37	25	1	

4.7

**Results Continued on Next Page** 

Toluene

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#### Amended-20170522

Workorder: 34-1713171

Client: Arcadis, Inc.

Project Manager: Paul E. Pope

#### **Analytical Results**

Sample ID: 423JX Sampling Site: Grendada Manufacturi Collected: 05/09/2017

Lab ID: 1713171022 Media: Radiello, Code 145 Received: 05/11/2017

Matrix: Air Sampling Parameter: Air Volume 459 Minutes

Matrix. All	Sampling Farameter. All Volume 439 Williams								
Analysis Method - Radiello, Vola	atile Organics								
Preparation: Not Applicable	ion: Not Applicable Analysis: Radiello, Volatile Organics Air		Instrument ID: 5975						
			Batch: IVOA/3598 (HBN: 190948) Analyzed: 05/17/2017 16:36		Percent Solid: NA Report Basis: Wet				
	Result	Result		RL					
Analyte	(ng/sample)	(ug/m³)	Result (ppb)	(ng/sample)	Dilution	Qual			
Tetrachloroethene	ND	<2.1	<0.32	25	1				
cis-1,2-Dichloroethene	ND	NA	NA	NA	1				
1,2-Dichloroethane	ND	NA	NA	NA	1				
1,1,2-Trichloroethane	ND	NA	NA	NA	1				

#### Comments

**Workorder: 1713171** 

EPA TO-17 Mod.: All results are semi-quantitative.

**Quality Control:** Radiello, Volatile Organics - (HBN: 190874)

QC limits are advisory for this method and data presented as client information only.

**Quality Control: Radiello, Volatile Organics - (HBN: 190948)** 

QC limits are advisory for this method and data presented as client information only.

#### Report Authorization (/S/ is an electronic signature that complies with 21 CFR Part 11)

Method	Analyst	Peer Review
Padialla Valatila Organias	/S/ Lisa M. Reid	/S/ Jorden Baum
Radiello, Volatile Organics	05/18/2017 14:29	05/18/2017 15:15

#### **Laboratory Contact Information**

ALS Environmental Phone: (801) 266-7700
960 W Levoy Drive Email: alslt.lab@ALSGlobal.com

Salt Lake City, Utah 84123 Web: www.alsslc.com

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## Grenada Manufacturing

## **DATA REVIEW**

## Grenada, Mississippi

Volatile Organic Compound (VOC) Analyses

SDG #1714518

Analyses Performed By: ALS Environmental Salt Lake City, Utah

Report #27758R Review Level: Tier III

Project: LA003307.0006.00001

#### **SUMMARY**

This data quality assessment summarizes the review of Sample Delivery Group (SDG) #1714518 for samples collected in association with the Grenada Manufacturing site, located in Grenada, Mississippi. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

			Sample		Analysis			
Sample ID	Lab ID	Matrix	Collection Date	Parent Sample	voc	svoc	MET	MISC
104 QK	1714518001	Air	5/17/2017		Х			
105 QK	1714518002	Air	5/17/2017		Х			
106 QK	1714518003	Air	5/17/2017		Х			
107 QK	1714518004	Air	5/17/2017	106 QK	Х			
108 QK	1714518005	Air	5/17/2017		Х			
109 QK	1714518006	Air	5/17/2017		Х			
110 QK	1714518007	Air	5/17/2017		Х			
111 QK	1714518008	Air	5/17/2017		Х			
431 JX	1714518009	Air	5/16/2017		Х			
432 JX	1714518010	Air	5/16/2017		Х			
433 JX	1714518011	Air	5/16/2017		Х			
434 JX	1714518012	Air	5/16/2017		Х			
435 JX	1714518013	Air	5/16/2017		Х			
436 JX	1714518014	Air	5/16/2017		Х			
437 JX	1714518015	Air	5/16/2017		Х			
438 JX	1714518016	Air	5/16/2017		Х			
098 QK	1714518017	Air	5/16/2017		Х			
099 QK	1714518018	Air	5/16/2017		Х			
100 QK	1714518019	Air	5/16/2017		Х			
101 QK	1714518020	Air	5/16/2017		Х			
102 QK	1714518021	Air	5/16/2017		Х			
103 QK	1714518022	Air	5/16/2017		Х			

#### **ANALYTICAL DATA PACKAGE DOCUMENTATION**

The table below is the evaluation of the data package completeness.

	Reported		Performance Acceptable		Not
Items Reviewed		Yes	No	Yes	Required
Sample receipt condition		Х		X	
Requested analyses and sample results		Х		Х	
Master tracking list		Х		X	
4. Methods of analysis		Х		Х	
5. Reporting limits		Х		Х	
6. Sample collection date		Х		Х	
7. Laboratory sample received date		Х		Х	
8. Sample preservation verification (as applicable)		Х		Х	
Sample preparation/extraction/analysis dates		Х		Х	
10. Fully executed Chain-of-Custody (COC) form		Х		Х	
11. Narrative summary of QA or sample problems provided		Х		Х	
12. Data Package Completeness and Compliance		Х		Х	

Note:

QA - Quality Assurance

#### **ORGANIC ANALYSIS INTRODUCTION**

Samples were collected using sorbent tubes and analysis was performed using EPA Method TO-17. Data were reviewed in accordance with USEPA National Functional Guidelines of October 1999.

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and had already been subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
  - U The compound was analyzed for but not detected. The associated value is the compound quantitation limit.
  - B The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.
- Quantitation (Q) Qualifiers
  - E The compound was quantitated above the calibration range.
  - D Concentration is based on a diluted sample analysis.
- Validation Qualifiers
  - J The compound was positively identified; however, the associated numerical value is an estimated concentration only.
  - UJ The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.
  - JN The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification. The associated numerical value is an estimated concentration only.
  - UB Compound considered non-detect at the listed value due to associated blank contamination.
  - N The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification.
  - R The sample results are rejected.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

#### **VOLATILE ORGANIC COMPOUND (VOC) ANALYSIS**

#### 1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
EPA Method TO-17	Air	30 days from collection to analysis	Cool to <6°C

All samples were analyzed within the specified holding time.

#### 2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

#### 3. Mass Spectrometer Tuning

Mass spectrometer performance was acceptable and all analyses were performed within a 24-hour tune clock.

System performance and column resolution were acceptable.

#### 4. Calibration

Satisfactory instrument calibration is established to insure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

#### 4.1 Initial Calibration

The method specifies percent relative standard deviation (%RSD) and relative response factor (RRF) limits for select compounds only. A technical review of the data applies limits to all compounds with no exceptions.

All target compounds associated with the initial calibration standards must exhibit a %RSD less than the control limit (30%) and an RRF value greater than control limit (0.05).

#### 4.2 Continuing Calibration

All target compounds associated with the continuing calibration standard must exhibit a percent difference (%D) less than the control limit (30%) and RRF value greater than control limit (0.05).

All compounds associated with the calibrations were within the specified control limits.

#### 5. Internal Standard Performance

Internal standard performance criteria insure that the GC/MS sensitivity and response are stable during every sample analysis. The criteria require the internal standard compounds associated with the VOC exhibit area counts are  $\pm$  40% of the area counts of the associated continuing calibration standard.

All internal standard responses were within control limits.

## 6. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) Analysis

The LCS/LCSD analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS/LCSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits.

All compounds associated with the LCS/LCSD analysis exhibited recoveries within the control limits.

#### 7. Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 25% for air matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for air matrices.

Laboratory duplicate analysis was not performed using a sample from this SDG.

#### 8. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for air matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for air matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Compound	Sample Result (µg/m³)¹	Duplicate Result (μg/m³)¹	RPD
	Benzene	1.8 U	2.0	AC
106 QK / 107 QK	Trichloroethene	26	65	85.7%
	Toluene	29	1.7 U	NC
	cis-1,2-Dichloroethene	U	56	NC

Sample ID/Duplicate ID Comp	Sample Result (µg/m³)¹	Duplicate Result (μg/m³)¹	RPD
-----------------------------	---------------------------	------------------------------	-----

Note:

AC = Acceptable

NC = Not compliant

The compounds trichloroethene, toluene, and cis-1,2-dichloroethene associated with sample locations 106 QK and 107 QK exhibited non-compliant field duplicate sample results. The associated sample results were qualified as estimated.

#### 9. Compound Identification

Compounds are identified on the GC/MS by using the analytes relative retention time and ion spectra. All identified compounds met the specified criteria.

#### 10. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

 $<sup>^{1}</sup>$  cis-1,2-Dichloroethene results are reported in units of ng/sample. Uptake rates are not available to determine results in units of  $\mu$ g/m $^{3}$ . A RL was not provided.

#### **DATA VALIDATION CHECKLIST FOR VOCs**

VOCs: EPA Method TO-17		Reported		rmance ptable	Not
		Yes	No	Yes	Required
GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)					
Tier II Validation					
Holding times		Х		Х	
Reporting limits (units)		Х		Х	
Blanks					
A. Method blanks		Х		Х	
B. Equipment blanks					X
Laboratory Control Sample (LCS) %R		Х		Х	
Laboratory Control Sample Duplicate (LCSD) %R		Х		Х	
LCS/LCSD Precision (RPD)		Х		Х	
Field/Lab Duplicate (RPD)		Х	Х		
Dilution Factor		Х		Х	
Tier III Validation					
System performance and column resolution		Х		Х	
Initial calibration %RSDs		Х		Х	
Continuing calibration RRFs		Х		Х	
Continuing calibration %Ds		Х		Х	
Instrument tune and performance check		Х		Х	
Ion abundance criteria for each instrument used		Х		Х	
Internal standard		Х		Х	
Compound identification and quantitation					
A. Reconstructed ion chromatograms		Х		Х	
B. Quantitation Reports		Х		Х	
C. RT of sample compounds within the established RT windows		Х		x	
D. Transcription/calculation errors present		Х		Х	
E. Reporting limits adjusted to reflect sample dilutions		Х		Х	

%RSD Percent relative difference

%R Percent recovery

RPD Relative percent difference

%D Percent difference

VALIDATION PERFORMED BY: Jennifer Singer

SIGNATURE:

DATE: June 6, 2017

Sennifer O. Singer

PEER REVIEW: Dennis Capria

DATE: June 7, 2017

# CHAIN OF CUSTODY CORRECTED SAMPLE ANALYSIS DATA SHEETS



# **ANALYTICAL REQUEST FORM**

				1. REGULAR Status		,			
AL				RUSH Status Requested - ADDITIONAL CH RESULTS REQUIRED BY DATE	ARGE				
(AL				CONTACT ALS SALT LAKE PRIOR TO SEN	DING SAMI	PLES			
				7,005 4. Quote No.	4. Quote No				
3. Company Name	ARCAD	Is		ALS Project Manager R	AM POP	E			
Address 1315	WASHIN	GTON 5	1: 57	5. Sample Collection					
INDIANA	polista	1 4620	4	Sampling Site <u>GRENADA</u>	MANUE	ACTURTNO			
Person to Contact	,				mpING				
Telephone (3/3+)				7-5/1	7/17				
Fax Telephone (3/7) 231 - 6514									
					119/17				
E-mail Address Racer Billing Address (if differen	h inclear	)	<b>O O</b> • <b>O O O O O O O O O O</b>	Chain of Custody No.					
				<b>6.</b> How did you first learn about AL					
					01				
<u> </u>	INDS IGNII	104, CS							
		<u>.</u>	······································						
. REQUEST FOR ANALY	YSES	1			<del></del>				
Client Sample Number	Matrix*	Sample/Are		ANALYSES REQUESTED - Use method number if known	Units**	Lab Comments			
104 QK	SURVIENT TWEE (ALADIYS)	2150	5-17	RADI45	Mylm	· · · · · · · · · · · · · · · · · · ·			
105 ak	//	5-16 USS	5-17	RAD 145	11				
106 QK 1	~	2159	517	RAD 145	~				
1079K 1	//	2159	26.16	EAD 145	"				
lugar	11	5-16	20024	RADIYO	11				
109 ax 1	-//	2210	5117	RAD 145	N				
110 aK:	//	Signo	514	radiy5	11				
111 QK.	SORBENT	5-16-25	5717	RAD 145	(1)				
4245X	TUBE I MADIES	2(40	2100	PAD 130	Nr-				
425JX 1	V.	5-1 2155	5-15 U05	RAD 130	-10				
426 JX.	· in	105	2112	AD 130	W				
4270X E	<u>ب</u>	cras		PAD 130	N				
428 JX =		2250	5-12/20	RADIZO	<b>N</b>				
430 TY 1	· v	5-1 2820	5-15 2135 5-15 2135	2 Pat (3.0	N.				
Specify: Solid sorbent tu * 1. µg/sample     2. mg/m		-		ger solution; Bulk sample; Blood; Urine; Tissue; Soil; W (other) Please indicate one or more units in the					
				RAP Inc. 145	COMMITTEN	uned Offics			
- <del></del>	rote 4	14 Jx -	43001	are RAD 130	-				
ossible Contamination and Chain of Custody (Option		Hazards							
elinquished by	ett Mali	Kerne-	1 ARCA	DIS Date/Time 5-19-17 @ /	16:05				
eceived by	wen	Jass	lle	Date/Time OS 74-17		00			
telinquished by	-	·	ŧ	Date/Time					
eceived by				Date/Time					

# For lab use only



# **ANALYTICAL REQUEST FORM**

			1. REGULAR Status		
			RUSH Status Requested - ADDITIONAL CH RESULTS REQUIRED BY		 DI ES
	<i></i>	· .			
• •			<u>07.0005</u> 4. Quote No.		
3. Company Name AR			ALS Project Manager	eul fof	<u> </u>
			5. Sample Collection		
* *		N 46204	·		· •
Person to Contact RO	3 uppenc	camp Isaea H			
Telephone (313	131-660	0	Date of Collection	170 - 5/	17/17
Fax Telephone (317)	231-65	14	Time Collected		
E-mail Address	+ . MARENCE	ms@aredis Lon	Time Collected  Date of Shipment  51	19117	
Billing Address (if differen	nt from above)	<b>b</b>	Chain of Custody No.		
ACCTS PA	VABLE	-ARCADIS	6. How did you first learn about Al	_S?	
		rncm, co			
	······································				
7. REQUEST FOR ANALY			ANN VOTO DECUESTED. He a mathed a makes if from the	Units**	Lab Cammonto
Client Sample Number	Matrix*	Sample/Area Volume	ANALYSES REQUESTED - Use method number if known		Lab Comments
MARIAN 431JK	Sorbent Tabe (padiyê	0620 - 1400	RAD 145	Melmi	
R 432JX"	ч	5/16 0628 - 140B	u .	- 21	
4335% "	cl	0.625 - 1912		- (1	
434JX"	"	5116 0642 - 1415	L9 ;	41	
435JX '	41	DEUR 5/16 1420	•	ļ	
436JK'	L	9655 TIL	11	11	
437JX"	l)	0720 5/16	14	1,	
438JK !	и	1400 5/16 2150	Lf	ι,	
098 ak '	и	1408 316 2155	И		
oga ak '	11	1412 16 2159	L4	li ()	
LOO QK '	11	1415 5116 2204	И	u	
101 QK 1	l1	1420 5/16 2210	u	LI	
lorak,	f ş	1426 1120	(1	Li	
103QK:	(1/	1428 2225	ц	<u> </u>	
			nger solution; Bulk sample; Blood; Urine; Tissue; Soil;		
			(other) Please indicate one or more units in the	ie columni er	ninea omis
Comments <u>XXX</u> RA	D145 A	qivalys Is	***		
				-	
Possible Contamination and	l/or Chemical l	Hazards			
7. Chain of Custody (Opti					
Relinquished by	rett N	latheme 1	ARCADIS Date/Time 5/19/17/	16:00	
Received by	unter,	fa8600		<del>}-</del> [	0,'\( \infty\)
Relinquished by		<i></i>	Date/Time		
Received by			Date/Time		



# Amended-20170608

Workorder: 34-1714518

Client: Arcadis, Inc.

Project Manager: Paul E. Pope

# **Analytical Results**

Sample ID: 104 QK Sampling Site: Grenada Manufacturin Collected: 05/17/2017

Lab ID: 1714518001 Media: Radiello, Code 145 Received: 05/24/2017

Matrix: Air Sampling Parameter: Air Volume 502 Minutes

	• • • • • • • • • • • • • • • • • • •		.a 002a.		
Analysis Method - Radiello, Volatile Organics					
Preparation: Not Applicable		Analysis: Radiello,	, Volatile Organics Air	Instrum	ent ID: 5975-X
			10 (HBN: 191669)	Percent	Solid: NA
		Analyzed: 05/26/20	)17 12:30	Report	Basis: Wet
Result	Result		RL		
Analyte (ng/sample)	(ug/m³)	Result (ppb)	(ng/sample)	Dilution	Qual
Benzene 29	2.1	0.65	25	1	
Trichloroethene 1000	75	14	25	1	
Toluene 570	38	10	25	1	
Tetrachloroethene ND	<2.0	<0.29	25	1	
cis-1,2-Dichloroethene 57	NA	NA	NA	1	
1,2-Dichloroethane ND	NA	NA	NA	1	
1,1,2-Trichloroethane ND	NA	NA	NA	1	

Sampling Site: Grenada Manufacturin Collected: 05/17/2017 Sample ID: 105 QK Received: 05/24/2017 Lab ID: 1714518002 Media: Radiello, Code 145

Matrix: Air	Sampling Parameter: Air Volume 497 Minutes								
Analysis Method - Radiello, Vol	atile Organics								
Preparation: Not Applicable				Volatile Organics Air	Instrum	ent ID: 5975-X			
				10 (HBN: 191669)	Percent Solid: NA				
			<b>Analyzed:</b> 05/26/20	17 13:09	Report Basis: Wet				
	Result	Result		RL					
Analyte	(ng/sample)	(ug/m³)	Result (ppb)	(ng/sample)	Dilution	Qual			
Benzene	29	2.1	0.65	25	1				
Trichloroethene	ND	<1.9	<0.35	25	1				
Toluene	270	18	4.8	25	1				
Tetrachloroethene	ND	<2.0	<0.29	25	1				
cis-1,2-Dichloroethene	ND	NA	NA	NA	1				
1,2-Dichloroethane	ND	NA	NA	NA	1				
1,1,2-Trichloroethane	ND	NA	NA	NA	1				

Sample ID: 106 QK Sampling Site: Grenada Manufacturin Collected: 05/17/2017 Received: 05/24/2017 Lab ID: 1714518003 Media: Radiello, Code 145

Matrix: Air Sampling Parameter: Air Volume 496 Minutes

ND

Analysis Method - Radiello, Volatile	Organics						
Preparation: Not Applicable			Analysis: Radiello,	Volatile Organics Air	Instrum	ent ID: 5975-X	
			Batch: IVOA/36	10 (HBN: 191669)	Percent	Solid: NA	
			Analyzed: 05/26/20	17 13:48	Report	Basis: Wet	
	Result	Result		RL			
Analyte	(ng/sample)	(ug/m³)	Result (ppb)	(ng/sample)	Dilution	Qual	

<1.8

< 0.57

1

# **Results Continued on Next Page**

Benzene

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# Amended-20170608

Workorder: 34-1714518

Client: Arcadis, Inc.

Project Manager: Paul E. Pope

# **Analytical Results**

Sample ID: 106 QK Sampling Site: Grenada Manufacturin Collected: 05/17/2017 Received: 05/24/2017

Lab ID: 1714518003 Media: Radiello, Code 145

Matrix: Air Sampling Parameter: Air Volume 496 Minutes

Matrix: Air	Sampling Parameter: Air Volume 496 Minutes							
Analysis Method - Radiello, Vola	tile Organics							
Preparation: Not Applicable			Analysis: Radiell	o, Volatile Organics Air	Instrum	ent ID: 5975-X		
			Batch: IVOA/3	3610 (HBN: 191669)	Percent	Solid: NA		
			<b>Analyzed:</b> 05/26/2	2017 13:48	Report	Basis: Wet		
	Result	Result		RL				
Analyte	(ng/sample)	(ug/m³)	Result (ppb)	(ng/sample)	Dilution	Qual		
Trichloroethene	350 <sup>J</sup>	26	J 4.9	J 25	1			
Toluene	440 J	29	J 7.8	J 25	1			
Tetrachloroethene	ND	<2.0	<0.29	25	1			
cis-1,2-Dichloroethene	ND <mark>UJ</mark>	NA	NA	NA	1			
1,2-Dichloroethane	ND	NA	NA	NA	1			
1,1,2-Trichloroethane	ND	NA	NA	NA	1			

Sample ID: 107 QK Sampling Site: Grenada Manufacturin Collected: 05/17/2017

Received: 05/24/2017 Lab ID: 1714518004 Media: Radiello, Code 145

Matriv: Air Compling Deremeters Air Volume 406 Minutes

Matrix: Air	Sampling Parameter: Air Volume 496 Minutes							
Analysis Method - Radiello, Vola	tile Organics							
Preparation: Not Applicable				o, Volatile Organics A 610 (HBN: 191669)		nent ID: 5975-X t Solid: NA		
			Analyzed: 05/26/2	,		t Basis: Wet		
Analyte	Result (ng/sample)	Result (ug/m³)	Result (ppb)	RL (ng/sample)	Dilution	Qual		
Benzene	27	2.0	0.62	25	1			
Trichloroethene	870	J 65	J 12	J 25	1			
Toluene	ND <sup>l</sup>	JJ <1.7	UJ <0.45	UJ 25	1			
Tetrachloroethene	ND	<2.0	<0.29	25	1			
cis-1,2-Dichloroethene	56 J	NA	NA	NA	1			
1,2-Dichloroethane	ND	NA	NA	NA	1			
1,1,2-Trichloroethane	ND	NA	NA	NA	1			

Sample ID: 108 QK Sampling Site: Grenada Manufacturin Collected: 05/17/2017 Lab ID: 1714518005 Media: Radiello, Code 145 Received: 05/24/2017

Matriv: Air Sampling Parameter: Air Volume 500 Minutes

Matrix: Air	Sampling Parameter: Air Volume 500 Minutes									
Analysis Method - Radiello, Vo	Analysis Method - Radiello, Volatile Organics									
Preparation: Not Applicable			Analysis: Radiello,	Volatile Organics Air	Instrum	ent ID: 5975-X				
			Batch: IVOA/36	10 (HBN: 191669)	Percent	Solid: NA				
			<b>Analyzed:</b> 05/26/20	17 15:07	Report	Basis: Wet				
	Result	Result		RL						
Analyte	(ng/sample)	(ug/m³)	Result (ppb)	(ng/sample)	Dilution	Qual				
Benzene	26	1.9	0.60	25	1					
Trichloroethene	ND	<1.8	< 0.34	25	1					

# **Results Continued on Next Page**



# Amended-20170608

Workorder: 34-1714518

Client: Arcadis, Inc.

Project Manager: Paul E. Pope

# **Analytical Results**

Sample ID: 108 QK Sampling Site: Grenada Manufacturin Collected: 05/17/2017

Lab ID: 1714518005 Media: Radiello, Code 145 Received: 05/24/2017

Matrix: Air	Sampling Parameter: Air Volume 500 Minutes								
Analysis Method - Radiello, Vola	atile Organics								
Preparation: Not Applicable			Analysis: Radiello,	Volatile Organics Air	Instrum	ent ID: 5975-X			
			Batch: IVOA/36	10 (HBN: 191669)	Percent	Solid: NA			
			<b>Analyzed:</b> 05/26/20	17 15:07	Report Basis: Wet				
	Result	Result		RL					
Analyte	(ng/sample)	(ug/m³)	Result (ppb)	(ng/sample)	Dilution	Qual			
Toluene	320	21	5.6	25	1				
Tetrachloroethene	ND	<2.0	<0.29	25	1				
cis-1,2-Dichloroethene	ND	NA	NA	NA	1				
1,2-Dichloroethane	ND	NA	NA	NA	1				
1,1,2-Trichloroethane	ND	NA	NA	NA	1				

Sample ID: 109 QK Sampling Site: Grenada Manufacturin Collected: 05/17/2017 Received: 05/24/2017 Lab ID: 1714518006 Media: Radiello, Code 145

Matrix: Air Sampling Parameter: Air Volume 498 Minutes

Analysis Method - Radiello, Vola	atile Organics					
Preparation: Not Applicable			Analysis: Radiello,	Volatile Organics Air	Instrument ID: 5975-X	
			Batch: IVOA/36	10 (HBN: 191669)	Percent	Solid: NA
			<b>Analyzed:</b> 05/26/20	17 15:46	Report	Basis: Wet
	Result	Result		RL		
Analyte	(ng/sample)	(ug/m³)	Result (ppb)	(ng/sample)	Dilution	Qual
Benzene	26	1.9	0.58	25	1	
Trichloroethene	1200	90	17	25	1	
Toluene	290	19	5.2	25	1	
Tetrachloroethene	ND	<2.0	<0.29	25	1	
cis-1,2-Dichloroethene	150	NA	NA	NA	1	
1,2-Dichloroethane	ND	NA	NA	NA	1	
1.1.2-Trichloroethane	ND	NΑ	NΑ	NA	1	

Sample ID: 110 QK Sampling Site: Grenada Manufacturin Collected: 05/17/2017 Received: 05/24/2017 Lab ID: 1714518007 Media: Radiello, Code 145

Matrix: Air		Sampling Pa	Parameter: Air Volume 491 Minutes					
Analysis Method - Radiello, Vo	olatile Organics							
Preparation: Not Applicable			Analysis: Radiello,	Volatile Organics Air	Instrum	ent ID: 5975-X		
			Batch: IVOA/36	10 (HBN: 191669)	Percent	Solid: NA		
			<b>Analyzed:</b> 05/26/20	17 16:25	Report Basis: Wet			
	Result	Result		RL				
Analyte	(ng/sample)	(ug/m³)	Result (ppb)	(ng/sample)	Dilution	Qual		
Benzene	ND	<1.8	<0.57	25	1			
Trichloroethene	ND	<1.9	<0.35	25	1			
Toluene	220	15	3.9	25	1			

# **Results Continued on Next Page**

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# Amended-20170608

Workorder: 34-1714518

Client: Arcadis, Inc.

Project Manager: Paul E. Pope

NA

NA

1

1

# **Analytical Results**

Sampling Site: Grenada Manufacturin Collected: 05/17/2017 Sample ID: 110 QK

Media: Radiello, Code 145 Received: 05/24/2017 Lab ID: 1714518007

otor: Air Valuma 401 Min

Matrix: Air	Sampling Parameter: Air Volume 491 Minutes								
Analysis Method - Radiello, Vol	atile Organics								
Preparation: Not Applicable			Analysis: Radiello	, Volatile Organics Air	Instrum	ent ID: 5975-X			
			Batch: IVOA/36	310 (HBN: 191669)	Percent	Solid: NA			
			Analyzed: 05/26/20	)17 16:25	Report Basis: Wet				
	Result	Result		RL					
Analyte	(ng/sample)	(ug/m³)	Result (ppb)	(ng/sample)	Dilution	Qual			
Tetrachloroethene	ND	<2.0	<0.30	25	1				
cis-1,2-Dichloroethene	ND	NA	NA	NA	1				
1,2-Dichloroethane	ND	NA	NA	NA	1				
1,1,2-Trichloroethane	ND	NA	NA	NA	1				

Sample ID: 111 QK Sampling Site: Grenada Manufacturin Collected: 05/17/2017 Received: 05/24/2017 Lab ID: 1714518008 Media: Radiello, Code 145

Matrix: Air	Sampling Parameter: Air Volume 491 Minutes								
Analysis Method - Radiello, \	/olatile Organics								
Preparation: Not Applicable			Analysis: Radie	llo, Volatile Organics A	ir Instrun	nent ID: 5975-X			
			Batch: IVOA	/3610 (HBN: 191669)	Percen	t Solid: NA			
			Analyzed: 05/26	/2017 17:04	Report	t Basis: Wet			
	Result	Result		RL					
Analyte	(ng/sample)	(ug/m³)	Result (ppb)	(ng/sample)	Dilution	Qual			
Benzene	ND	<1.8	<0.57	7 25	1				
Trichloroethene	ND	<1.9	<0.35	5 25	1				
Toluene	530	36	9.6	<b>5</b> 25	1				
Tetrachloroethene	ND	<2.0	<0.30	) 25	1				
cis-1,2-Dichloroethene	ND	NA	N/	NA NA	1				

Sample ID: 431 JX Sampling Site: Grenada Manufacturin Collected: 05/16/2017 Received: 05/24/2017 Lab ID: 1714518009 Media: Radiello, Code 145

NA

NA

NA

NA

Matrix: Air Sampling Parameter: Air Volume 460 Minutes

ND

ND

Matrix: Air	Sampling Parameter: Air Volume 460 Minutes								
Analysis Method - Radiello, V	Volatile Organics								
Preparation: Not Applicable			Analysis: Radiello	, Volatile Organics Air	Instrument ID: 5975-X				
			Batch: IVOA/36	Percent	t Solid: NA				
			Analyzed: 05/26/20	)17 17:43	Report Basis: Wet				
	Result	Result		RL					
Analyte	(ng/sample)	(ug/m³)	Result (ppb)	(ng/sample)	Dilution	Qual			
Benzene	ND	<2.0	<0.61	25	1				
Trichloroethene	1500	120	23	25	1				
Toluene	91	6.6	1.7	25	1				
Tetrachloroethene	ND	<2.1	<0.32	25	1				

# **Results Continued on Next Page**

1,2-Dichloroethane

1,1,2-Trichloroethane

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# Amended-20170608

Workorder: 34-1714518

Client: Arcadis, Inc.

Project Manager: Paul E. Pope

# **Analytical Results**

Sample ID: 431 JX Sampling Site: Grenada Manufacturin Collected: 05/16/2017

Lab ID: 1714518009 Media: Radiello, Code 145 Received: 05/24/2017

Matrix: Air Sampling Parameter: Air Volume 460 Minutes

Matrix: Air	Sampling Parameter: Air Volume 460 Minutes								
Analysis Method - Radiello, V	olatile Organics								
Preparation: Not Applicable			Analysis: Radiello	, Volatile Organics Air	Instrument ID: 5975-X				
			Batch: IVOA/3610 (HBN: 191669) Percent Solid: N/						
			Analyzed: 05/26/20	)17 17:43	Report	Basis: Wet			
	Result	Result		RL					
Analyte	(ng/sample)	(ug/m³)	Result (ppb)	(ng/sample)	Dilution	Qual			
cis-1,2-Dichloroethene	72	NA	NA	NA	1				
1,2-Dichloroethane	ND	NA	NA	NA	1				
1,1,2-Trichloroethane	ND	NA	NA	NA	1				

Sample ID: 432 JX Sampling Site: Grenada Manufacturin Collected: 05/16/2017

Lab ID: 1714518010 Media: Radiello, Code 145 Received: 05/24/2017

Matrix: Air Sampling Parameter: Air Volume 460 Minutes

IVIAUIX. AII	Sampling Farameter. All Volume 400 Minutes							
Analysis Method - Radiello, Vo	latile Organics							
Preparation: Not Applicable			Analysis: Radiello,	, Volatile Organics Air	Instrum	Instrument ID: 5975-X		
			Batch: IVOA/36	10 (HBN: 191669)	Percent	Solid: NA		
			<b>Analyzed:</b> 05/26/20	17 18:22	Report	Basis: Wet		
	Result	Result		RL				
Analyte	(ng/sample)	(ug/m³)	Result (ppb)	(ng/sample)	Dilution	Qual		
Benzene	ND	<2.0	<0.61	25	1			
Trichloroethene	830	67	12	25	1			
Toluene	56	4.1	1.1	25	1			
Tetrachloroethene	ND	<2.1	<0.32	25	1			
cis-1,2-Dichloroethene	120	NA	NA	NA	1			
1,2-Dichloroethane	ND	NA	NA	NA	1			
1,1,2-Trichloroethane	ND	NA	NA	NA	1			

Sample ID: 433 JX Sampling Site: Grenada Manufacturin Collected: 05/16/2017
Lab ID: 1714518011 Media: Radiello, Code 145 Received: 05/24/2017

Matrix: Air Sampling Parameter: Air Volume 457 Minutes

Analysis Method - Radiello, Volatile Organics								
Preparation: Not Applicable			Analysis: Radiello,	Volatile Organics Air	Instrument ID: 5975-X			
			Batch: IVOA/36	10 (HBN: 191669)	Percent Solid: NA			
			Analyzed: 05/26/20	17 19:01	Report Basis: Wet			
	Result	Result		RL				
Analyte	(ng/sample)	(ug/m³)	Result (ppb)	(ng/sample)	Dilution	Qual		
Benzene	ND	<2.0	<0.62	25	1			
Trichloroethene	180	14	2.7	25	1			
Toluene	52	3.8	1.0	25	1			
Tetrachloroethene	ND	<2.2	<0.32	25	1			
cis-1,2-Dichloroethene	ND	NA	NA	NA	1			

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# Amended-20170608

Workorder: 34-1714518

Client: Arcadis, Inc.

Project Manager: Paul E. Pope

# **Analytical Results**

Sample ID: 433 JX Sampling Site: Grenada Manufacturin Collected: 05/16/2017

Lab ID: 1714518011 Media: Radiello, Code 145 Received: 05/24/2017

Matrix: Air	Sampling Parameter: Air Volume 457 Minutes								
Analysis Method - Radiello, Volatile Organi	ics								
Preparation: Not Applicable			Analysis: Radiello,	Volatile Organics Air	Instrum	ent ID: 5975-X			
			Batch: IVOA/36	10 (HBN: 191669)	Percent Solid: NA				
			Analyzed: 05/26/20	17 19:01	Report	Basis: Wet			
	Result	Result		RL					
Analyte (ng/	sample)	(ug/m³)	Result (ppb)	(ng/sample)	Dilution	Qual			
1,2-Dichloroethane	ND	NA	NA	NA	1				
1.1.2-Trichloroethane	ND	NA	NA	NA	1				

Sample ID: 434 JX Sampling Site: Grenada Manufacturin Collected: 05/16/2017 Lab ID: 1714518012 Media: Radiello, Code 145 Received: 05/24/2017

Matrix: Air Sampling Parameter: Air Volume 453 Minutes

Matrix. All	Sampling Farameter. All Volume 400 Minutes								
Analysis Method - Radiello, Volati	le Organics								
Preparation: Not Applicable			Analysis: Radiello,	, Volatile Organics Air	Instrument ID: 5975-X				
			Batch: IVOA/36	10 (HBN: 191669)	Percent	Solid: NA			
			Analyzed: 05/26/20	)17 19:40	Report	Basis: Wet			
	Result	Result		RL					
Analyte	(ng/sample)	(ug/m³)	Result (ppb)	(ng/sample)	Dilution	Qual			
Benzene	ND	<2.0	<0.62	25	1				
Trichloroethene	ND	<2.0	<0.38	25	1				
Toluene	140	10	2.8	25	1				
Tetrachloroethene	ND	<2.2	<0.32	25	1				
cis-1,2-Dichloroethene	ND	NA	NA	NA	1				
1,2-Dichloroethane	ND	NA	NA	NA	1				
1,1,2-Trichloroethane	ND	NA	NA	NA	1				

Sample ID: 435 JX Sampling Site: Grenada Manufacturin Collected: 05/16/2017 Lab ID: 1714518013 Media: Radiello, Code 145 Received: 05/24/2017

Matrix: Air	Sampling Parameter: Air Volume 452 Minutes							
Analysis Method - Radiello, Vola	tile Organics							
Preparation: Not Applicable			•	Volatile Organics Air 10 (HBN: 191669) 17 20:19	Percent	ent ID: 5975-X Solid: NA Basis: Wet		
Analyte	Result (ng/sample)	Result (ug/m³)	Result (ppb)	RL (ng/sample)	Dilution	Qual		
Benzene	ND	<2.0	<0.62	25	1			
Trichloroethene	ND	<2.0	<0.38	25	1			
Toluene	97	7.1	1.9	25	1			
Tetrachloroethene	ND	<2.2	<0.32	25	1			
cis-1,2-Dichloroethene	ND	NA	NA	NA	1			
1,2-Dichloroethane	ND	NA	NA	NA	1			

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# Amended-20170608

Workorder: 34-1714518

Client: Arcadis, Inc.

Project Manager: Paul E. Pope

# **Analytical Results**

Sample ID: 435 JX Sampling Site: Grenada Manufacturin Collected: 05/16/2017 Lab ID: 1714518013 Media: Radiello, Code 145 Received: 05/24/2017

Matrix: Air Sampling Parameter: Air Volume 452 Minutes

**Analysis Method - Radiello, Volatile Organics** Analysis: Radiello, Volatile Organics Air Preparation: Not Applicable Instrument ID: 5975-X Batch: IVOA/3610 (HBN: 191669) **Percent Solid: NA** Analyzed: 05/26/2017 20:19 **Report Basis: Wet** Result Result **RL Analyte** (ng/sample)  $(ug/m^3)$ Result (ppb) (ng/sample) **Dilution** Qual 1,1,2-Trichloroethane ND NA NA

Sample ID: 436 JX Sampling Site: Grenada Manufacturin Collected: 05/16/2017 Received: 05/24/2017 Lab ID: 1714518014 Media: Radiello, Code 145

Matriv: Air Compling Decembers Air Values 450 Min to

Matrix: Air	Sampling Parameter: Air Volume 452 Minutes						
Analysis Method - Radiello, Vo	latile Organics						
Preparation: Not Applicable			Batch: IVOA/3611 (HBN: 191710) Perce			ent ID: 5975-X t Solid: NA Basis: Wet	
Analyte	Result (ng/sample)	Result (ug/m³)	Result (ppb)	RL (ng/sample)	Dilution	Qual	
Benzene	ND	<2.0	<0.62	25	1		
Trichloroethene	ND	<2.0	<0.38	25	1		
Toluene	190	14	3.7	25	1		
Tetrachloroethene	ND	<2.2	<0.32	25	1		
cis-1,2-Dichloroethene	ND	NA	NA	NA	1		
1,2-Dichloroethane	ND	NA	NA	NA	1		
1,1,2-Trichloroethane	ND	NA	NA	NA	1		

Sample ID: 437 JX Sampling Site: Grenada Manufacturin Collected: 05/16/2017 Received: 05/24/2017 Lab ID: 1714518015 Media: Radiello, Code 145

Matrix: Air Sampling Parameter: Air Volume 428 Minutes

Matrix: Air	Sampling Parameter: Air Volume 428 Minutes							
Analysis Method - Radiello, Vol	atile Organics							
Preparation: Not Applicable			Analysis: Radiello, Volatile Organics Air		Instrument ID: 5975-X			
			Batch: IVOA/36	11 (HBN: 191710)	Percent	Solid: NA		
			<b>Analyzed:</b> 05/30/20	17 14:10	Report Basis: Wet			
	Result	Result		RL				
Analyte	(ng/sample)	(ug/m³)	Result (ppb)	(ng/sample)	Dilution	Qual		
Benzene	ND	<2.1	<0.66	25	1			
Trichloroethene	ND	<2.2	<0.40	25	1			
Toluene	170	13	3.5	25	1			
Tetrachloroethene	ND	<2.3	<0.34	25	1			
cis-1,2-Dichloroethene	ND	NA	NA	NA	1			
1,2-Dichloroethane	ND	NA	NA	NA	1			
1,1,2-Trichloroethane	ND	NA	NA	NA	1			

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# Amended-20170608

Workorder: 34-1714518

Client: Arcadis, Inc.

Project Manager: Paul E. Pope

# **Analytical Results**

Sample ID: 438 JX Sampling Site: Grenada Manufacturin Collected: 05/16/2017

Lab ID: 1714518016 Media: Radiello, Code 145 Received: 05/24/2017

Matrix: Air Sampling Parameter: Air Volume 470 Minutes

		1 0				
Analysis Method - Radiello, V	olatile Organics					
Preparation: Not Applicable	Preparation: Not Applicable			, Volatile Organics Air	Instrument ID: 5975-X	
			Batch: IVOA/36	11 (HBN: 191710)	Percent	Solid: NA
			<b>Analyzed:</b> 05/30/20	)17 14:49	Report	Basis: Wet
	Result	Result		RL		
Analyte	(ng/sample)	(ug/m³)	Result (ppb)	(ng/sample)	Dilution	Qual
Benzene	ND	<1.9	<0.60	25	1	
Trichloroethene	1400	110	21	25	1	
Toluene	100	7.2	1.9	25	1	
Tetrachloroethene	ND	<2.1	<0.31	25	1	
cis-1,2-Dichloroethene	70	NA	NA	NA	1	
1,2-Dichloroethane	ND	NA	NA	NA	1	
1,1,2-Trichloroethane	ND	NA	NA	NA	1	

Sample ID: **098 QK**Lab ID: 1714518017

Sampling Site: Grenada Manufacturin

Media: Radiello, Code 145

Received: 05/24/2017

Matrix: Air Sampling Parameter: Air Volume 467 Minutes

Matrix. All	Sampling Farameter. All Volume 407 Milliottes								
Analysis Method - Radiello, Vol	atile Organics								
Preparation: Not Applicable				, Volatile Organics Air 11 (HBN: 191710)	Instrument ID: 5975-X Percent Solid: NA				
			Analyzed: 05/30/20	)17 15:27	Report Basis: Wet				
Analyte	Result (ng/sample)	Result (ug/m³)	Result (ppb)	RL (ng/sample)	Dilution	Qual			
Benzene	ND	<1.9	<0.60	25	1				
Trichloroethene	760	60	11	25	1				
Toluene	48	3.4	0.91	25	1				
Tetrachloroethene	ND	<2.1	<0.31	25	1				
cis-1,2-Dichloroethene	130	NA	NA	NA	1				
1,2-Dichloroethane	ND	NA	NA	NA	1				
1,1,2-Trichloroethane	ND	NA	NA	NA	1				

Sample ID: 099 QK Sampling Site: Grenada Manufacturin Collected: 05/16/2017

Lab ID: 1714518018 Sampling Site: Grenada Manufacturin Received: 05/24/2017

Matrix: Air Sampling Parameter: Air Volume 467 Minutes

ND

Analysis Method - Radiello, Volatile	Organics						
Preparation: Not Applicable	Analysis: Radiello,	Volatile Organics Air	Instrument ID: 5975-X				
		Batch: IVOA/3611 (HBN: 191710)		Percent Solid: NA			
			Analyzed: 05/30/20	17 16:06	Report	Basis: Wet	
	Result	Result		RL			
Analyte	(ng/sample)	(ug/m³)	Result (ppb)	(ng/sample)	Dilution	Qual	

<1.9

< 0.60

1

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Benzene

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# Amended-20170608

Workorder: 34-1714518

Client: Arcadis, Inc.

Project Manager: Paul E. Pope

# **Analytical Results**

Sample ID: 099 QK Sampling Site: Grenada Manufacturin Collected: 05/16/2017 Lab ID: 1714518018 Received: 05/24/2017

Media: Radiello, Code 145

Matrix: Air	Sampling Parameter: Air Volume 467 Minutes									
Analysis Method - Radiello, Volatile Organics										
Preparation: Not Applicable				Volatile Organics Air	Instrument ID: 5975-X					
			Batch: IVOA/36	Batch: IVOA/3611 (HBN: 191710)		Solid: NA				
			Analyzed: 05/30/20	17 16:06	Report Basis: Wet					
	Result	Result		RL						
Analyte	(ng/sample)	(ug/m³)	Result (ppb)	(ng/sample)	Dilution	Qual				
Trichloroethene	160	13	2.4	25	1					
Toluene	38	2.7	0.72	25	1					
Tetrachloroethene	ND	<2.1	<0.31	25	1					
cis-1,2-Dichloroethene	ND	NA	NA	NA	1					
1,2-Dichloroethane	ND	NA	NA	NA	1					
1,1,2-Trichloroethane	ND	NA	NA	NA	1					

Sample ID: 100 QK Sampling Site: Grenada Manufacturin Collected: 05/16/2017

Received: 05/24/2017 Lab ID: 1714518019 Media: Radiello, Code 145

Matrix: Air Sampling Parameter: Air Volume 469 Minutes

1 1101111111111111111111111111111111111	Camping Faranteen 7 in Volume 100 Nimates						
Analysis Method - Radiello, Volatile Organics							
Preparation: Not Applicable		Analysis: Radiello,	, Volatile Organics Air	Instrument ID: 5975-X			
		Batch: IVOA/36	11 (HBN: 191710)	Percent	Solid: NA		
		Analyzed: 05/30/20	)17 16:46	Report	Basis: Wet		
Result	Result		RL				
Analyte (ng/sample)	(ug/m³)	Result (ppb)	(ng/sample)	Dilution	Qual		
Benzene ND	<1.9	<0.60	25	1			
Trichloroethene ND	<2.0	<0.37	25	1			
Toluene 57	4.0	1.1	25	1			
Tetrachloroethene ND	<2.1	<0.31	25	1			
cis-1,2-Dichloroethene ND	NA	NA	NA	1			
1,2-Dichloroethane ND	NA	NA	NA	1			
1,1,2-Trichloroethane ND	NA	NA	NA	1			

Sample ID: 101 QK Sampling Site: Grenada Manufacturin Collected: 05/16/2017 Lab ID: 1714518020 Media: Radiello, Code 145 Received: 05/24/2017

Sampling Parameter: Air Volume 469 Minutes Matrix: Air

ND

		• ampining i				
Analysis Method - Radiello, Volati	ile Organics					
Preparation: Not Applicable			Analysis: Radiello	Volatile Organics Air	Instrum	ent ID: 5975-X
		Batch: IVOA/3611 (HBN: 191710)		Percent Solid: NA		
			Analyzed: 05/30/20	17 17:25	Report	Basis: Wet
	Result	Result		RL		
Analyte	(ng/sample)	(ug/m³)	Result (ppb)	(ng/sample)	Dilution	Qual
Benzene	ND	<1.9	<0.60	25	1	

# **Results Continued on Next Page**

Trichloroethene

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<2.0

< 0.37



# Amended-20170608

Workorder: 34-1714518

Client: Arcadis, Inc.

Project Manager: Paul E. Pope

# **Analytical Results**

Sampling Site: Grenada Manufacturin Collected: 05/16/2017 Sample ID: 101 QK

Media: Radiello, Code 145 Received: 05/24/2017 Lab ID: 1714518020

Matrix: Air	Sampling Parameter: Air Volume 469 Minutes									
Analysis Method - Radiello, Volatile Organics										
Preparation: Not Applicable				, Volatile Organics Air	Instrument ID: 5975					
			Batch: IVOA/36	311 (HBN: 191710)	Percent	Solid: NA				
			Analyzed: 05/30/20	)17 17:25	Report	Basis: Wet				
Result		Result		RL						
Analyte	(ng/sample)	(ug/m³)	Result (ppb)	(ng/sample)	Dilution	Qual				
Toluene	53	3.8	1.0	25	1					
Tetrachloroethene	ND	<2.1	<0.31	25	1					
cis-1,2-Dichloroethene	ND	NA	NA	NA	1					
1,2-Dichloroethane	ND	NA	NA	NA	1					
1,1,2-Trichloroethane	ND	NA	NA	NA	1					

Sample ID: 102 QK Sampling Site: Grenada Manufacturin Collected: 05/16/2017 Received: 05/24/2017 Lab ID: 1714518021 Media: Radiello, Code 145

Matrix: Air Sampling Parameter: Air Volume 469 Minutes

		1	-				
Analysis Method - Radiello, Vo	latile Organics						
Preparation: Not Applicable			Analysis: Radiello,	, Volatile Organics Air	Instrument ID: 5975-X		
			Batch: IVOA/36	311 (HBN: 191710)	Percent	Solid: NA	
			Analyzed: 05/30/20	)17 18:04	Report	Basis: Wet	
	Result	Result	RL				
Analyte	(ng/sample)	(ug/m³)	Result (ppb)	(ng/sample)	Dilution	Qual	
Benzene	ND	<1.9	<0.60	25	1		
Trichloroethene	ND	<2.0	<0.37	25	1		
Toluene	57	4.1	1.1	25	1		
Tetrachloroethene	ND	<2.1	<0.31	25	1		
cis-1,2-Dichloroethene	ND	NA	NA	NA	1		
1,2-Dichloroethane	ND	NA	NA	NA	1		
1,1,2-Trichloroethane	ND	NA	NA	NA	1		
1,1,2-Trichioroethane	ND	INA	NA NA	NA .	1		

Sampling Site: Grenada Manufacturin Collected: 05/16/2017 Sample ID: 103 QK Received: 05/24/2017 Lab ID: 1714518022 Media: Radiello, Code 145

Matrix: Air Sampling Parameter: Air Volume 469 Minutes

Analysis Met	thod - Radiello,	Volatile Organics	
Preparation:	Not Applicable		Т

Analysis: Radiello, Volatile Organics Air Instrument ID: 5975-X Batch: IVOA/3611 (HBN: 191710) Percent Solid: NA

		1	<b>Analyzed:</b> 05/30/20	117 18:43	Report	Basis: Wet
	Result	Result		RL		
Analyte	(ng/sample)	(ug/m³)	Result (ppb)	(ng/sample)	Dilution	Qual
Benzene	ND	<1.9	<0.60	25	1	
Trichloroethene	ND	<2.0	<0.37	25	1	
Toluene	71	5.0	1.3	25	1	

# **Results Continued on Next Page**

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# Amended-20170608

Workorder: 34-1714518

Client: Arcadis, Inc.

Project Manager: Paul E. Pope

# **Analytical Results**

Sample ID: 103 QK Sampling Site: Grenada Manufacturin Collected: 05/16/2017

Lab ID: 1714518022 Media: Radiello, Code 145 Received: 05/24/2017

Matrix: Air Sampling Parameter: Air Volume 469 Minutes

Matrix. All		Camping 1	arameter. All VO	idilic 405 Militates		
Analysis Method - Radiello, Volatile O	rganics					
Preparation: Not Applicable			Analysis: Radiello	, Volatile Organics Air	Instrum	ent ID: 5975-X
			Batch: IVOA/36	611 (HBN: 191710)	Percent Solid: NA	
			Analyzed: 05/30/20	017 18:43	Report	Basis: Wet
	Result	Result		RL		
Analyte	(ng/sample)	(ug/m³)	Result (ppb)	(ng/sample)	Dilution	Qual
Tetrachloroethene	ND	<2.1	<0.31	25	1	
cis-1,2-Dichloroethene	ND	NA	NA	NA	1	
1,2-Dichloroethane	ND	NA	NA	NA	1	
1,1,2-Trichloroethane	ND	NA	NA	NA	1	

# Comments

**Workorder: 1714518** 

EPA TO-17 Mod.: All results are semi-quantitative.

Report amended to correct sampling dates per client request. No data was changed.

Quality Control: Radiello, Volatile Organics - (HBN: 191669)

QC limits are advisory for this mehod and data presented as client informaion only.

Quality Control: Radiello, Volatile Organics - (HBN: 191710)

QC limits are advisory for this method and data presented as client information only.

# Report Authorization (/S/ is an electronic signature that complies with 21 CFR Part 11)

Method	Analyst	Peer Review
Radiello, Volatile Organics	/S/ Lisa M. Reid	/S/ Jorden Baum
Radiello, Volatile Organics	05/31/2017 16:16	06/01/2017 10:47

# **Laboratory Contact Information**

ALS Environmental Phone: (801) 266-7700

960 W Levoy Drive Email: alslt.lab@ALSGlobal.com

Salt Lake City, Utah 84123 Web: www.alsslc.com

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# Grenada Manufacturing

# **DATA REVIEW**

# Grenada, Mississippi

Volatile Organic Compound (VOC) Analyses

SDG #1713168

Analyses Performed By: ALS Environmental Salt Lake City, Utah

Report #27688R Review Level: Tier III

Project: LA003307.0006.00001

# **SUMMARY**

This data quality assessment summarizes the review of Sample Delivery Group (SDG) #1713168 for samples collected in association with the Grenada Manufacturing site, located in Grenada, Mississippi. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

0			Sample	B		Analysis		
Sample ID	Lab ID	Matrix	Collection Date	Parent Sample	voc	svoc	MET	MISC
096 QK	1713168001	Air	5/1/2017		X			
093 QK	1713168002	Air	5/1/2017		Х			
088 QK	1713168003	Air	5/1/2017		Х			
089 QK	1713168004	Air	5/1/2017	088 QK	Х			
091 QK	1713168005	Air	5/1/2017		Х			
092 QK	1713168006	Air	5/1/2017		Х			
094 QK	1713168007	Air	5/1/2017	092 QK	Х			
090 QK	1713168008	Air	5/1/2017		Х			
095 QK	1713168009	Air	5/1/2017		Х			
097 QK	1713168010	Air	5/1/2017		Х			

# **ANALYTICAL DATA PACKAGE DOCUMENTATION**

The table below is the evaluation of the data package completeness.

	Reported		Performance Acceptable		Not	
Items Reviewed	No	Yes	No	Yes	Required	
Sample receipt condition		Х		Х		
Requested analyses and sample results		Х		Х		
Master tracking list		Х		Х		
4. Methods of analysis		Х		Х		
5. Reporting limits		Х		Х		
6. Sample collection date		Х		Х		
7. Laboratory sample received date		Х		Х		
8. Sample preservation verification (as applicable)		Х		Х		
Sample preparation/extraction/analysis dates		Х		Х		
10. Fully executed Chain-of-Custody (COC) form		Х		Х		
11. Narrative summary of QA or sample problems provided		Х		Х		
12. Data Package Completeness and Compliance		Х		Х		

Note:

QA - Quality Assurance

# **ORGANIC ANALYSIS INTRODUCTION**

Samples were collected using Radiello cartidges and analysis was performed using the Solvent Panel Scan method. Data were reviewed in accordance with USEPA National Functional Guidelines of October 1999.

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and had already been subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
  - U The compound was analyzed for but not detected. The associated value is the compound quantitation limit.
  - B The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.
- Quantitation (Q) Qualifiers
  - E The compound was quantitated above the calibration range.
  - D Concentration is based on a diluted sample analysis.
- Validation Qualifiers
  - J The compound was positively identified; however, the associated numerical value is an estimated concentration only.
  - UJ The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.
  - JN The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification. The associated numerical value is an estimated concentration only.
  - UB Compound considered non-detect at the listed value due to associated blank contamination.
  - N The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification.
  - R The sample results are rejected.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

# **VOLATILE ORGANIC COMPOUND (VOC) ANALYSIS**

# 1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
Solvent Panel Scan (SOP: IH-AN-Solvent Panel)	Air	60 days from collection to analysis	Cool to <6°C

All samples were analyzed within the specified holding time.

# 2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

# 3. Mass Spectrometer Tuning

Mass spectrometer performance was acceptable and all analyses were performed within a 24-hour tune clock.

System performance and column resolution were acceptable.

# 4. Calibration

Satisfactory instrument calibration is established to insure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

# 4.1 Initial Calibration

The method specifies percent relative standard deviation (%RSD) and relative response factor (RRF) limits for select compounds only. A technical review of the data applies limits to all compounds with no exceptions.

All target compounds associated with the initial calibration standards must exhibit a %RSD less than the control limit (30%) and an RRF value greater than control limit (0.05).

# 4.2 Continuing Calibration

All target compounds associated with the continuing calibration standard must exhibit a percent difference (%D) less than the control limit (30%) and RRF value greater than control limit (0.05).

All compounds associated with the calibrations were within the specified control limits.

# 5. Internal Standard Performance

Internal standard performance criteria insure that the GC/MS sensitivity and response are stable during every sample analysis. The criteria require the internal standard compounds associated with the VOC exhibit area counts are  $\pm 40\%$  of the area counts of the associated continuing calibration standard.

All internal standard responses were within control limits.

# 6. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) Analysis

The LCS/LCSD analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS/LCSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits.

Sample locations associated with LCS/LCSD analysis exhibiting recoveries outside of the control limits presented in the following table.

Sample Locations	Compound	LCS Recovery	LCSD Recovery
096 QK	Taluana		
093 QK	Toluene		
088 QK			
089 QK	1,1,2-Trichloroethane	> UL	> UL
091 QK			
092 QK	Tetrachloroethene		
094 QK			
090 QK			
095 QK	cis-1,2-Dichloroethene		AC
097 QK			

Note:

AC Acceptable

The criteria used to evaluate the LCS/LCSD recoveries are presented in the following table. In the case of an LCS/LCSD deviation, the sample results are qualified as documented in the table below.

Control Limit	Sample Result	Qualification
> the upper central limit (LIL)	Non-detect	No Action
> the upper control limit (UL)	Detect	J

Control Limit	Sample Result	Qualification
the leaver central limit (LL) but > 100/	Non-detect	UJ
< the lower control limit (LL) but > 10%	Detect	J
< 10%	Non-detect	R
<b>\ 1070</b>	Detect	J

Sample locations associated with LCS/LCSD recoveries exhibiting an RPD greater than of the control limit presented in the following table.

Sample Locations	Compound
096 QK	
093 QK	
088 QK	
089 QK	
091 QK	Toluene
092 QK	roluene
094 QK	
090 QK	
095 QK	
097 QK	

The criteria used to evaluate the RPD between the LCS/LCSD recoveries are presented in the following table. In the case of an RPD deviation, the sample results are qualified as documented in the table below.

Control Limit	Sample Result	Qualification
> UL	Non-detect	UJ
	Detect	J

# 7. Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 25% for air matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for air matrices.

Laboratory duplicate analysis was not performed using a sample from this SDG.

# 8. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for air matrices is applied to the RPD between the parent

sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for air matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Compound	Sample Result (mg/m³)	Duplicate Result (mg/m³)	RPD	
	Trichloroethene	0.046	0.045	2.2%	
088 QK / 089 QK	Toluene	0.0051	0.0049	AC	
	cis-1,2-Dichloroethene	0.0055	0.0053	AC	
002 OK / 004 OK	Trichloroethene	0.029	0.022	27.5%	
092 QK / 094 QK	Toluene	0.0039	0.0037	AC	

Note:

AC Acceptable

The calculated RPDs between the parent sample and field duplicate were acceptable.

# 9. Compound Identification

Compounds are identified on the GC/MS by using the analytes relative retention time and ion spectra. All identified compounds met the specified criteria.

# 10. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

# **DATA VALIDATION CHECKLIST FOR VOCs**

VOCs: Solvent Panel Scan	Rep	orted		rmance ptable	Not			
	No	Yes	No	Yes	Required			
GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)								
Tier II Validation								
Holding times		Х		Х				
Reporting limits (units)		Х		Х				
Blanks								
A. Method blanks		Х		Х				
B. Equipment blanks					Х			
Laboratory Control Sample (LCS) %R		Х	Х					
Laboratory Control Sample Duplicate (LCSD) %R		Х	Х					
LCS/LCSD Precision (RPD)		Х	Х					
Field/Lab Duplicate (RPD)		Х		Х				
Dilution Factor		Х		Х				
Tier III Validation					ı			
System performance and column resolution		Х		Х				
Initial calibration %RSDs		Х		Х				
Continuing calibration RRFs		Х		Х				
Continuing calibration %Ds		Х		Х				
Instrument tune and performance check		Х		Х				
Ion abundance criteria for each instrument used		Х		Х				
Internal standard		Х		Х				
Compound identification and quantitation				1	I			
A. Reconstructed ion chromatograms		Х		Х				
B. Quantitation Reports		Х		Х				
C. RT of sample compounds within the established RT windows		Х		х				
D. Transcription/calculation errors present		Х		Х				
E. Reporting limits adjusted to reflect sample dilutions  %RSD Percent relative difference		х		Х				

%RSD Percent relative difference

%R Percent recovery

RPD Relative percent difference

%D Percent difference

VALIDATION PERFORMED BY: Jennifer Singer

SIGNATURE:

DATE: May 22, 2017

knnifer O. Linger

PEER REVIEW: Dennis Capria

DATE: May 23, 2017

# CHAIN OF CUSTODY CORRECTED SAMPLE ANALYSIS DATA SHEETS



# **ANALYTICAL REQUEST FORM**

₩ 17.	13168		I	1. REGULA	R Status		Monde
AL				RESULT	atus Requested - ADDITIONAL C S REQUIRED BY	<u> </u>	
					T ALS SALT LAKE PRIOR TO SE		IPLES
					4. Quote No		
					ALS Project Manager	PHUL	6PE
Address <u>132 E</u>							
INDIANAPO	DU15/I	N 46	704		Sampling Site <u>らんとい</u> A	DA MA	NUPACTURING
Person to Contact <u></u>						TAMP IN	<u> </u>
Telephone (517)	231-6	500			Date of Collection 58	4	
Fax Telephone (317)	231-6	514			Time Collected		
E-mail Address Savah	uppen Camp	' ( av	cadis.	Con	Date of Shipment	5/10/17	,
Billing Address (if differe	ent from above	)		•	Chain of Custody No.		
ACC 75	- PAYAB	L15-	ARCADIO	~	6. How did you first learn about A		
	101111111111111111111111111111111111111	1-4100	11/50				
7. REQUEST FOR ANALY		I		ANALYOFO DEOL	EOTED 11	T	
Client Sample Number	Matrix*		rea Volume	ANALYSES REQU	ESTED - Use method number if known		Lab Comments
10-016 QIC /	RAD 130	1-130 5-1-17	5-8-17	RA.	10 130	MM	
093 QK 1	- //	2140	2152		eagle i		
088QK 1	//	5-1-13	noo		·	//	
OBARK 1	//		15-8-17			"	
OTIAK	~/	5713					
Ograk.	11	5-117	5-8-17		·	//	
094 QK "	//	5-117	5-8-17			//	
babak,		2130	mac	-1132	,		
095QK1	//	2410	2248			11	
097 QK.	//	2150	2258			<i>J1</i>	
•	be, e.g. Charce 3. ppm 4.		• •	-	sample; Blood; Urine; Tissue; Soil; ase indicate one or more units in th		
***************************************		·····					
Possible Contamination and 7. Chain of Custody (Option		łazards					
Relinguished by	tt Mis	HUIN	no / A	PCADTE	Date/Time 5/10/17 /	1410	
Received by	van des	flee	7/11	301 V 1.	Date/Time DS 1/ 17	- 10%	72
Relinquished by	$\cup$				Date/Time		
Received by					Date/Time		



Report Date: May 18, 2017

Phone: (317) 231-6500

E-mail: Sarah.Jonker@arcadis.com

Workorder: **34-1713168** 

Client Project ID: Grenada Manufacturing

Purchase Order: LA003307.0005 Project Manager: Paul Pope

# **Analytical Results**

Sarah Jonker

132 E Washington St.

Indianapolis, IN 46204

Arcadis

Suite 600

Sample ID: 096 QK Collected: 05/01/2017 Lab ID: 1713168001 Sampling Location: Grenada Manufacturin Received: 05/11/2017 **Method: Solvent Panel Scan** Media: Radiello 130, Badge **Analyzed:** 05/15/2017 (190665) Sampling Info: Exposure 10098 Minutes **Result Analyte** Result (mg/m³) RL (ug/sample) (ug/sample) Result (ppm) 1,2-Dichloroethane <2.0 < 0.0026 < 0.00064 2.0 Benzene <2.0 < 0.0025 < 0.00077 2.0 Trichloroethene 2.0 14 0.020 0.0037 Toluene 2.0 3.3 J 0.0044 J 0.0012 J 1,1,2-Trichloroethane < 2.0 < 0.0033 < 0.00060 2.0 Tetrachloroethene < 2.0 < 0.0034 < 0.00049 2.0 cis-1,2-Dichloroethene 2.5 J 0.0034 J 0.00085 J 2.0

Sample ID: 093 QK				Collected: 05/01/2017
Lab ID: 1713168002	Sar	mpling Location: Gren	ada Manufacturin	Received: 05/11/2017
Method: Solvent Panel Scan	Media: Radiello 130, Badge Sampling Info: Exposure 10092 Minutes			Analyzed: 05/15/2017 (190665)
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
1,2-Dichloroethane	<2.0	<0.0026	<0.00064	2.0
Benzene	<2.0	<0.0025	<0.00078	2.0
Trichloroethene	28	0.040	0.0074	2.0
Toluene	2.4 J	0.0033 J	0.00087 J	2.0
1,1,2-Trichloroethane	<2.0	< 0.0033	<0.00061	2.0
Tetrachloroethene	<2.0	<0.0034	<0.00050	2.0
cis-1,2-Dichloroethene	14 J	0.019 J	0.0048 J	2.0

ADDRESS 960 West LeVoy Drive, Salt Lake City, Utah, 84123 USA | PHONE +1 801 266 7700 | FAX +1 801 268 9992 ALS GROUP USA, CORP. An ALS Limited Company

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Workorder: **34-1713168** 

Client Project ID: Grenada Manufacturing

Purchase Order: LA003307.0005 Project Manager: Paul Pope

# **Analytical Results**

Sample ID: 088 QK Collected: 05/01/2017 Lab ID: 1713168003 Sampling Location: Grenada Manufacturin Received: 05/11/2017 **Method: Solvent Panel Scan** Media: Radiello 130, Badge Analyzed: 05/15/2017 (190665) **Sampling Info: Exposure 10085 Minutes Result Analyte** (ug/sample) Result (mg/m³) Result (ppm) RL (ug/sample) 1,2-Dichloroethane <2.0 < 0.0026 < 0.00064 2.0 <0.00078 Benzene <2.0 < 0.0025 2.0 Trichloroethene 32 0.046 0.0085 2.0 Toluene 3.8 J 0.0051 J 0.0014 J 2.0 1,1,2-Trichloroethane 2.0 <2.0 < 0.0033 < 0.00061 <2.0 Tetrachloroethene <0.0034 < 0.00050 2.0 cis-1,2-Dichloroethene 4.1 J 0.0055 J 0.0014 J 2.0

Sample ID: 089 QK				Collected: 05/01/2017
Sample ID. 009 QK				Collected. 05/01/2017
Lab ID: 1713168004	Sar	npling Location: Gren	ada Manufacturin	Received: 05/11/2017
Method: Solvent Panel Scan	Sampli	Media: Radiello 130, E	Analyzed: 05/15/2017 (190665)	
	Result			
Analyte	(ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
1,2-Dichloroethane	<2.0	<0.0026	<0.00064	2.0
Benzene	<2.0	<0.0025	<0.00078	2.0
Trichloroethene	31	0.045	0.0084	2.0
Toluene	3.7 J	0.0049 J	0.0013 J	2.0
1,1,2-Trichloroethane	<2.0	<0.0033	<0.00061	2.0
Tetrachloroethene	<2.0	<0.0034	<0.00050	2.0
cis-1,2-Dichloroethene	4.0 J	0.0053 J	0.0013 J	2.0

Sample ID: 091 QK				Collected: 05/01/2017
Lab ID: 1713168005	Sar	npling Location: Gren	ada Manufacturin	Received: 05/11/2017
Method: Solvent Panel Scan	Sampli	Media: Radiello 130, E	Analyzed: 05/15/2017 (190665)	
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
1,2-Dichloroethane	<2.0	<0.0026	<0.00064	2.0
Benzene	<2.0	<0.0025	<0.00078	2.0
Trichloroethene	52	0.075	0.014	8.0
Toluene	3.9 J	0.0052 <sup>J</sup>	0.0014 J	2.0
1,1,2-Trichloroethane	<2.0	< 0.0033	<0.00061	2.0
Tetrachloroethene	<2.0	<0.0034	<0.00050	2.0
cis-1,2-Dichloroethene	8.5 J	0.011 <sup>J</sup>	0.0028 J	2.0

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Workorder: **34-1713168** 

Client Project ID: Grenada Manufacturing

Purchase Order: LA003307.0005 Project Manager: Paul Pope

# **Analytical Results**

Sample ID: 092 QK Collected: 05/01/2017 Lab ID: 1713168006 Sampling Location: Grenada Manufacturin Received: 05/11/2017 **Method: Solvent Panel Scan** Media: Radiello 130, Badge Analyzed: 05/15/2017 (190665) **Sampling Info: Exposure 10085 Minutes Result Analyte** (ug/sample) Result (mg/m³) Result (ppm) RL (ug/sample) 1,2-Dichloroethane <2.0 < 0.0026 < 0.00064 2.0 <0.00078 Benzene <2.0 < 0.0025 2.0 Trichloroethene 20 0.029 0.0054 2.0 Toluene 2.9 J 0.0039 J 0.0010 J 2.0 1,1,2-Trichloroethane 2.0 <2.0 < 0.0033 < 0.00061 Tetrachloroethene < 0.0034 < 0.00050 <2.0 2.0 cis-1,2-Dichloroethene <2.0 < 0.0027 < 0.00067 2.0

				0 11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
Sample ID: <b>094 QK</b>				Collected: 05/01/2017
Lab ID: 1713168007	Sar	Received: 05/11/2017		
Method: Solvent Panel Scan	Sampli	Media: Radiello 130, E	Analyzed: 05/15/2017 (190665)	
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
1,2-Dichloroethane	<2.0	<0.0026	<0.00064	2.0
Benzene	<2.0	<0.0025	<0.00078	2.0
Trichloroethene	15	0.022	0.0041	2.0
Toluene	2.7 <sup>J</sup>	0.0037 <sup>J</sup>	0.00097 J	2.0
1,1,2-Trichloroethane	<2.0	< 0.0033	<0.00061	2.0
Tetrachloroethene	<2.0	<0.0034	<0.00050	2.0
cis-1,2-Dichloroethene	<2.0	<0.0027	<0.00067	2.0

Sample ID: 090 QK				Collected: 05/01/2017
Lab ID: 1713168008	Sam	Received: 05/11/2017		
Method: Solvent Panel Scan	Samplii	Media: Radiello 130, B	Analyzed: 05/15/2017 (190665)	
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
1,2-Dichloroethane	<2.0	<0.0026	<0.00064	2.0
Benzene	<2.0	<0.0025	<0.00078	2.0
Trichloroethene	10	0.014	0.0027	2.0
Toluene	<2.0 UJ	<0.0027 <mark>UJ</mark>	<0.00071 <mark>UJ</mark>	2.0
1,1,2-Trichloroethane	<2.0	<0.0033	<0.00061	2.0
Tetrachloroethene	<2.0	<0.0034	<0.00050	2.0
cis-1,2-Dichloroethene	<2.0	<0.0027	<0.00067	2.0

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Workorder: **34-1713168** 

Client Project ID: Grenada Manufacturing

Purchase Order: LA003307.0005 Project Manager: Paul Pope

# **Analytical Results**

Sample ID: 095 QK Collected: 05/01/2017 Lab ID: 1713168009 Sampling Location: Grenada Manufacturin Received: 05/11/2017 **Method: Solvent Panel Scan** Media: Radiello 130, Badge Analyzed: 05/15/2017 (190665) Sampling Info: Exposure 10088 Minutes **Result Analyte** (ug/sample) Result (mg/m³) RL (ug/sample) Result (ppm) 1,2-Dichloroethane <2.0 < 0.0026 < 0.00064 2.0 Benzene <2.0 < 0.0025 < 0.00078 2.0 < 0.00053 Trichloroethene <2.0 < 0.0029 2.0 Toluene <2.0 UJ <0.0027 UJ <0.00071 UJ 2.0 1,1,2-Trichloroethane <2.0 < 0.0033 < 0.00061 2.0 Tetrachloroethene < 0.00050 <2.0 < 0.0034 2.0 cis-1,2-Dichloroethene <2.0 < 0.0027 < 0.00067 2.0

Sample ID: 097 QK				Collected: 05/01/2017			
Lab ID: 1713168010	Sampling Location: Grenada Manufacturin Received: 05/11/2017						
Method: Solvent Panel Scan	Samplii	Analyzed: 05/15/2017 (190665)					
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)			
1,2-Dichloroethane	<2.0	<0.0026	<0.00064	2.0			
Benzene	<2.0	<0.0025	<0.00078	2.0			
Trichloroethene	<2.0	<0.0029	<0.00053	2.0			
Toluene	<2.0 UJ	<0.0027 UJ	<0.00071 UJ	2.0			
1,1,2-Trichloroethane	<2.0	<0.0033	<0.00061	2.0			
Tetrachloroethene	<2.0	<0.0034	<0.00050	2.0			
cis-1,2-Dichloroethene	<2.0	<0.0027	<0.00067	2.0			

# Report Authorization (/S/ is an electronic signature that complies with 21 CFR Part 11)

Method	Analyst	Peer Review
Columnt Bonel Coon	/S/ David Teynor	/S/ Jessica Helland
Solvent Panel Scan	05/18/2017 12:03	05/18/2017 14:55

# **Laboratory Contact Information**

ALS Environmental 960 W Levoy Drive Salt Lake City, Utah 84123 Phone: (801) 266-7700

Email: alslt.lab@ALSGlobal.com

Web: www.alsslc.com

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# Grenada Manufacturing

# **DATA REVIEW**

# Grenada, Mississippi

Volatile Organic Compound (VOC) Analyses

SDG #1714519

Analyses Performed By: ALS Environmental Salt Lake City, Utah

Report #27757R Review Level: Tier III

Project: LA003307.0006.00001

# **SUMMARY**

This data quality assessment summarizes the review of Sample Delivery Group (SDG) #1714519 for samples collected in association with the Grenada Manufacturing site, located in Grenada, Mississippi. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

			Sample	Parent Sample	Analysis			
Sample ID	Lab ID	Matrix	Collection Date		VOC	svoc	MET	MISC
424 JX	1714519001	Air	5/15/2017		Х			
425 JX	1714519002	Air	5/15/2017		Х			
426 JX	1714519003	Air	5/15/2017		Х			
427 JX	1714519004	Air	5/15/2017		Х			
428 JX	1714519005	Air	5/15/2017		Х			
429 JX	1714519006	Air	5/15/2017		Х			

# **ANALYTICAL DATA PACKAGE DOCUMENTATION**

The table below is the evaluation of the data package completeness.

	Reported		Performance Acceptable		Not
Items Reviewed	No	Yes	No	Yes	Required
Sample receipt condition		Х		Х	
Requested analyses and sample results		Х		Х	
Master tracking list		Х		X	
4. Methods of analysis		Х		Х	
5. Reporting limits		Х		Х	
6. Sample collection date		Х		Х	
7. Laboratory sample received date		Х		Х	
8. Sample preservation verification (as applicable)		Х		Х	
Sample preparation/extraction/analysis dates		Х		Х	
10. Fully executed Chain-of-Custody (COC) form		Х		Х	
11. Narrative summary of QA or sample problems provided		Х		Х	
12. Data Package Completeness and Compliance		Х		Х	

Note:

QA - Quality Assurance

# **ORGANIC ANALYSIS INTRODUCTION**

Samples were collected using Radiello cartidges and analysis was performed using the Solvent Panel Scan method. Data were reviewed in accordance with USEPA National Functional Guidelines of October 1999.

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and had already been subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
  - U The compound was analyzed for but not detected. The associated value is the compound quantitation limit.
  - B The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.
- Quantitation (Q) Qualifiers
  - E The compound was quantitated above the calibration range.
  - D Concentration is based on a diluted sample analysis.
- Validation Qualifiers
  - J The compound was positively identified; however, the associated numerical value is an estimated concentration only.
  - UJ The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.
  - JN The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification. The associated numerical value is an estimated concentration only.
  - UB Compound considered non-detect at the listed value due to associated blank contamination.
  - N The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification.
  - R The sample results are rejected.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

# **VOLATILE ORGANIC COMPOUND (VOC) ANALYSIS**

# 1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method		Holding Time	Preservation	
Solvent Panel Scan (SOP: IH-AN-Solvent Panel)	Air	60 days from collection to analysis	Cool to <6°C	

All samples were analyzed within the specified holding time.

# 2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

# 3. Mass Spectrometer Tuning

Mass spectrometer performance was acceptable and all analyses were performed within a 24-hour tune clock.

System performance and column resolution were acceptable.

# 4. Calibration

Satisfactory instrument calibration is established to insure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

# 4.1 Initial Calibration

The method specifies percent relative standard deviation (%RSD) and relative response factor (RRF) limits for select compounds only. A technical review of the data applies limits to all compounds with no exceptions.

All target compounds associated with the initial calibration standards must exhibit a %RSD less than the control limit (30%) and an RRF value greater than control limit (0.05).

# 4.2 Continuing Calibration

All target compounds associated with the continuing calibration standard must exhibit a percent difference (%D) less than the control limit (30%) and RRF value greater than control limit (0.05).

All compounds associated with the calibrations were within the specified control limits.

#### 5. Internal Standard Performance

Internal standard performance criteria insure that the GC/MS sensitivity and response are stable during every sample analysis. The criteria require the internal standard compounds associated with the VOC exhibit area counts are  $\pm$  40% of the area counts of the associated continuing calibration standard.

All internal standard responses were within control limits.

# 6. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) Analysis

The LCS/LCSD analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS/LCSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits.

Sample locations associated with LCS/LCSD analysis exhibiting recoveries outside of the control limits presented in the following table.

Sample Locations	Compound	LCS Recovery	LCSD Recovery		
424 JX	Benzene				
425 JX	5 JX Toluene				
426 JX	1,1,2-Trichloroethane	> UL	> UL		
427 JX 428 JX	cis-1,2-Dichloroethene				
429 JX	Tetrachloroethene	AC	Į		

Note:

AC Acceptable

The criteria used to evaluate the LCS/LCSD recoveries are presented in the following table. In the case of an LCS/LCSD deviation, the sample results are qualified as documented in the table below.

Control Limit	Sample Result	Qualification
> the upper control limit (UL)	Non-detect	No Action
> the upper control limit (OL)	Detect	J
< the lower control limit (LL) but > 10%	Non-detect	UJ
the lower control limit (LL) but > 1076	Detect	J
< 10%	Non-detect	R
1070	Detect	J

# 7. Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 25% for air matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for air matrices.

Laboratory duplicate analysis was not performed using a sample from this SDG.

# 8. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for air matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for air matrices.

A field duplicate sample was not collected in association with this SDG.

# 9. Compound Identification

Compounds are identified on the GC/MS by using the analytes relative retention time and ion spectra.

All identified compounds met the specified criteria.

# 10. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

# **DATA VALIDATION CHECKLIST FOR VOCs**

VOCs: Solvent Panel Scan	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	Required
GAS CHROMATOGRAPHY/MASS SPECTROMETR	Y (GC/M	S)			
Tier II Validation					
Holding times		Х		Х	
Reporting limits (units)		Х		Х	
Blanks					,
A. Method blanks		Х		Х	
B. Equipment blanks					Х
Laboratory Control Sample (LCS) %R		Х	Х		
Laboratory Control Sample Duplicate (LCSD) %R		Х	Х		
LCS/LCSD Precision (RPD)		Х		Х	
Field/Lab Duplicate (RPD)					Х
Dilution Factor		Х		Х	
Tier III Validation	ı	1		ı	1
System performance and column resolution		Х		Х	
Initial calibration %RSDs		Х		Х	
Continuing calibration RRFs		Х		Х	
Continuing calibration %Ds		Х		Х	
Instrument tune and performance check		Х		Х	
Ion abundance criteria for each instrument used		Х		Х	
Internal standard		Х		Х	
Compound identification and quantitation	ı	1		ı	1
A. Reconstructed ion chromatograms		Х		Х	
B. Quantitation Reports		Х		Х	
C. RT of sample compounds within the established RT windows		Х		х	
D. Transcription/calculation errors present		Х		Х	
E. Reporting limits adjusted to reflect sample dilutions  %RSD_Percent relative difference		х		Х	

%RSD Percent relative difference

%R Percent recovery

RPD Relative percent difference

%D Percent difference

VALIDATION PERFORMED BY: Jennifer Singer

SIGNATURE:

DATE: June 6, 2017

Sennifer O. Singer

PEER REVIEW: Dennis Capria

DATE: June 7, 2017

# CHAIN OF CUSTODY CORRECTED SAMPLE ANALYSIS DATA SHEETS



# **ANALYTICAL REQUEST FORM**

	<b>L</b>		г	1. REGULAR Status		•
			-	RUSH Status Requested - ADDITIONAL CH	ARGE	_
AL	s)			DATE CONTACT ALS SALT LAKE PRIOR TO SEN	DING SAMI	PLES
Date	Purchase Orde	er No. <b>L<u>A</u></b>	00330	7.0005 4. Quote No.		
Company Name	ARCADI	ţs		ALS Project Manager	AUL POP	E
				5. Sample Collection		
			•	Sampling Site SRENADA	MANUE	acturias
	<i>,</i> .					
Person to Contact  Telephone (34)  131_6503				7 -5/r	7/17	
Fax Telephone (3/7)	1					
					119/17	
E-mail Address <b>Raw</b> Billing Address (if differe	n fonker			Chain of Custody No.		
				6. How did you first learn about AL		
					0.	
HIGHLA	NDS ICHIVI	<u>UH, CO</u>				WTHE
<u> </u>						
REQUEST FOR ANALY	/SES					
Client Sample Number		Sample/Area		ANALYSES REQUESTED - Use method number if known	Units**	Lab Comments
104 BK		2150	5-17	RADI45	rylm	
105aK	/	2155	5-19	RAD 145		·
106 QK,	~	7454	517 0616	RAD 145	~	
107 QK "	//	259	9614	PAD 145	"	
logar		2204	544	FADIUS	//	
109 ak 1		2210	5/17	KAD 145	~	
110 gK:	"	mo	514	RAD145	7/	
THAK.	//	5-16 VV15	5717	RAD 145	11	
1117118						
424JX 1	SORBENT !	5-1 टा५०	2400	RAD 130	/v	
	SOCRENT TURE (PADIS)	5-1 2140 5-1 455	5-15 1400 1405	RAD 130	No.	
424JX 1	SOCRENT TURE (PADIS)	5-1 टा५०	1400	RAD 130		
424JX 1 425JX 1	SORBENT TUBE (MIDIS)	5-1 2140 5-1 455	1400 6-15 1405 1505 1501 1501 1116	EAD 130 RAD 130 RAD 13D EAD 130	N N	
424 JX ' 425 JX ' 426 JX ' 426 JX ' 427 JX '	SORBENT TURE (MD13)	5-1 455 1455 5-1 5-1 140 61	5-15 1005 5-15 2-112	PAD 130 RAD 130 RAD 130 PAD 130 RAD130	N N N	
424JX ' 425JX ' 426 JX ' 424JX :	SORBENT TURE (MD13)	5-1 140 5-1 455 5-1 105 5-1	1400 6-15 1405 1505 1501 1501 1116	EAD 130 RAD 130 RAD 13D EAD 130	N N	
424 JX  425 JX  426 JX  428 JX  428 JX  428 JX  Specify: Solid sorbent to 1. μg/sample 2. mg/m  mments	ube, e.g. Charco	5-1 1455 5-1 1455 5-1 1250 5-1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	5.5 5.5 5.5 5.5 5.5 5.5 5.5 5.5	RAD 130 Please indicate one or more units in the RAP 145	Mater; Other	
リンリゴズ・ リンプズ・ リンプズ・ リンプズ・ リンプズ・ リンプズ・ リンプズ・ Specify: Solid sorbent to 1. μg/sample 2. mg/m	ube, e.g. Charco	5-1 1455 5-1 1455 5-1 1250 5-1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	5.5 5.5 5.5 5.5 5.5 5.5 5.5 5.5	PAD 130 RAD 13	Mater; Other	
Y2YJX  Y25JX  Y26 JX  Y26 JX  Y28 JX  Y28 JX  Specify: Solid sorbent to 1. μg/sample 2. mg/m  mments	ube, e.g. Charco 3 3. ppm 4. 9	5-1 1455 5-1 1455 5-1 1250 5-1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	5.5 5.5 5.5 5.5 5.5 5.5 5.5 5.5	RAD 130 Please indicate one or more units in the RAP 145	Mater; Other	
Y2YJX  Y25JX  Y26 JX  Y26 JX  Y28 JX  Y28 JX  Y215X  Specify: Solid sorbent to  1. μg/sample 2. mg/m  mments	ube, e.g. Charco 3 3. ppm 4. 9  note 12  door Chemical H	5-1 1140 5-1	5-5 105  5-5 105  5-5 105  5-5 1016	PAD 130 RAD 130 RAP 145 RAP 145 RAP 145	Water; Othe	ntitled Units**
Y24JX  Y25JX  Y26 JX  Y26 JX  Y28 JX  Y215X  Specify: Solid sorbent to  1. μg/sample 2. mg/m  mments  *  ssible Contamination an  Chain of Custody (Opt	ube, e.g. Charco 3 3. ppm 4. 9	5-1 1140 5-1	5-5 105  5-5 105  5-5 105  5-5 1016	PAD 130 RAD 130 RAP 145 RAP 14	Water; Other	ntitled Units**
Y24JX  Y25JX  Y26 JX  Y26 JX  Y28 JX  Y28 JX  Y213X  Specify: Solid sorbent to  1. μg/sample 2. mg/m  comments  y  possible Contamination an  Chain of Custody (Opt	ube, e.g. Charco 3 3. ppm 4. 9  note 12  door Chemical H	5-1 1140 5-1	5-5 105  5-5 105  5-5 105  5-5 1016	PAD 130 RAD 130 RAP 145 RAP 145 RAP 145	Water; Other	ntitled Units**

Received by



# Amended-20170607

Report Date: June 07, 2017

Phone: (317) 231-6500

E-mail: Sarah.Jonker@arcadis.com

Workorder: **34-1714519** 

Client Project ID: Grenada Manufacturing

051617

Purchase Order: LA003307.0005 Project Manager: Paul Pope

#### **Analytical Results**

Sarah Jonker

132 E Washington St.

Indianapolis, IN 46204

Arcadis

Suite 600

Sample ID: 424 JX Collected: 05/15/2017 Lab ID: 1714519001 Sampling Location: Grenada Manufacturin Received: 05/24/2017 **Method: Solvent Panel Scan** Media: Radiello 130, Badge Analyzed: 05/31/2017 (191686) **Sampling Info: Exposure 20120 Minutes** Result **Analyte** (ug/sample) Result (mg/m³) RL (ug/sample) Result (ppm) 1,2-Dichloroethane <2.0 < 0.0013 < 0.00032 2.0 Benzene <2.0 < 0.0012 < 0.00039 2.0 Trichloroethene 4.0 43 0.0012 0.00039 2.0 Toluene 5.4 J 0.0036 J 0.00097 J 1,1,2-Trichloroethane <2.0 < 0.0017 < 0.00030 2.0 Tetrachloroethene <2.0 < 0.0017 < 0.00025 2.0 cis-1,2-Dichloroethene 20 J 0.013 0.0034 2.0

Sample ID: 425 JX					Collected: 05/15/2017		
Lab ID: 1714519002	Sampling Location: Grenada Manufacturin Received: 05/24						
Method: Solvent Panel Scan	Sampl	Media: Radiello 130	Analyzed: 05/31/2017 (191686)				
Analyte	Result (ug/sample)	Result (mg/m³)		Result (ppm)	RL (ug/sample)		
1,2-Dichloroethane	<2.0	<0.0013		<0.00032	2.0		
Benzene	<2.0	<0.0012		<0.00039	2.0		
Trichloroethene	59	0.0012		0.00039	8.0		
Toluene	7.7 J	0.0052	J	0.0014	J 2.0		
1,1,2-Trichloroethane	<2.0	<0.0017		<0.00030	2.0		
Tetrachloroethene	<2.0	<0.0017		<0.00025	2.0		
cis-1.2-Dichloroethene	9.0 J	0.0060	J	0.0015	J 2.0		

ADDRESS 960 West LeVoy Drive, Salt Lake City, Utah, 84123 USA | PHONE +1 801 266 7700 | FAX +1 801 268 9992 ALS GROUP USA, CORP. An ALS Limited Company

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# Amended-20170607

Workorder: **34-1714519** 

Client Project ID: Grenada Manufacturing

051617

Purchase Order: LA003307.0005 Project Manager: Paul Pope

#### **Analytical Results**

Analytical Results						
Sample ID: 426 JX				Collected: 05/15/2017		
Lab ID: 1714519003	Sampling Location: Grenada Manufacturin Received: 05/24/201					
Method: Solvent Panel Scan	Samni	Media: Radiello 130, E	Analyzed: 05/31/2017 (191686)			
	Result	ing inio. Exposure 201	or militates			
Analyte	(ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)		
1,2-Dichloroethane	<2.0	<0.0013	< 0.00032	2.0		
Benzene	<2.0	< 0.0012	< 0.00039	2.0		
Trichloroethene	63	0.0012	0.00039	8.0		
Toluene	5.8 J	0.0039 J	0.0010 <sup>J</sup>	2.0		
1,1,2-Trichloroethane	<2.0	<0.0017	<0.00030	2.0		
Tetrachloroethene	<2.0	<0.0017	<0.00025	2.0		
cis-1,2-Dichloroethene	9.0 J	0.0060 J	0.0015 J	2.0		

Sample ID: 427 JX				Collected: 05/15/2017
Lab ID: 1714519004	Sa	mpling Location: Gre	Received: 05/24/2017	
Method: Solvent Panel Scan	Sampl	Media: Radiello 130, ling Info: Exposure 20	Analyzed: 05/31/2017 (191686)	
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
1,2-Dichloroethane	<2.0	<0.0013	<0.00032	2.0
Benzene	<2.0	<0.0012	<0.00039	2.0
Trichloroethene	<2.0	<0.0014	<0.00027	2.0
Toluene	<2.0	<0.0013	<0.00036	2.0
1,1,2-Trichloroethane	<2.0	<0.0017	<0.00030	2.0
Tetrachloroethene	<2.0	<0.0017	<0.00025	2.0
cis-1,2-Dichloroethene	<2.0	<0.0013	<0.00034	2.0

Sample ID: 428 JX				Collected: 05/15/2017
Lab ID: 1714519005	San	Received: 05/24/2017		
Method: Solvent Panel Scan	Sampli	Media: Radiello 130, E	Analyzed: 05/31/2017 (191686)	
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
1,2-Dichloroethane	<2.0	<0.0013	<0.00032	2.0
Benzene	<2.0	<0.0012	< 0.00039	2.0
Trichloroethene	<2.0	<0.0014	<0.00027	2.0
Toluene	2.5 J	0.0017 J	0.00045 J	2.0
1,1,2-Trichloroethane	<2.0	<0.0017	<0.00030	2.0
Tetrachloroethene	<2.0	<0.0017	<0.00025	2.0
cis-1,2-Dichloroethene	<2.0	<0.0013	<0.00034	2.0



#### Amended-20170607

Workorder: **34-1714519** 

Client Project ID: Grenada Manufacturing

051617

2.0

Purchase Order: LA003307.0005 Project Manager: Paul Pope

< 0.00034

#### **Analytical Results**

Sample ID: 429 JX
Lab ID: 1714519006

Collected: 05/15/2017
Received: 05/24/2017

Method: Solvent Panel Scan Media: Radiello 130, Badge **Analyzed:** 05/31/2017 (191686) **Sampling Info: Exposure 20070 Minutes** Result **Analyte** (ug/sample) Result (mg/m³) Result (ppm) RL (ug/sample) 1,2-Dichloroethane < 2.0 < 0.0013 < 0.00032 2.0 Benzene <2.0 < 0.0012 < 0.00039 2.0 Trichloroethene <2.0 < 0.0014 < 0.00027 2.0 Toluene <2.0 < 0.0013 < 0.00036 2.0 1,1,2-Trichloroethane <2.0 < 0.0017 < 0.00030 2.0 Tetrachloroethene <2.0 < 0.0017 < 0.00025 2.0

< 0.0013

#### Comments

cis-1,2-Dichloroethene

**Workorder: 1714519** 

Report Amended to correct sampling dates per client request. No data was changed.

<2.0

## Report Authorization (/S/ is an electronic signature that complies with 21 CFR Part 11)

Method	Analyst	Peer Review
Calvert Band Coon	/S/ David Teynor	/S/ Thomas J. Masoian
Solvent Panel Scan	06/01/2017 09:57	06/01/2017 11:15

## **Laboratory Contact Information**

ALS Environmental 960 W Levoy Drive Salt Lake City, Utah 84123 Phone: (801) 266-7700

Email: alslt.lab@ALSGlobal.com

Web: www.alsslc.com

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# Grenada Manufacturing

# **DATA REVIEW**

# Grenada, Mississippi

Volatile Organic Compound (VOC) Analyses

SDG #1715149

Analyses Performed By: ALS Environmental Salt Lake City, Utah

Report #27768R Review Level: Tier III

Project: LA003307.0006.00001

# **SUMMARY**

This data quality assessment summarizes the review of Sample Delivery Group (SDG) #1715149 for samples collected in association with the Grenada Manufacturing site, located in Grenada, Mississippi. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

			Sample			Analy	sis	
Sample ID	Lab ID	Matrix	Collection Date	Parent Sample	VOC	svoc	MET	MISC
430 JX	1715149001	Air	5/15/2017		Х			

## **ANALYTICAL DATA PACKAGE DOCUMENTATION**

The table below is the evaluation of the data package completeness.

	Rep	orted	Performance Acceptable		Not
Items Reviewed	No	Yes	No	Yes	Required
Sample receipt condition		Х		Х	
2. Requested analyses and sample results		Х		Х	
Master tracking list		Х		X	
4. Methods of analysis		Х		Х	
5. Reporting limits		Х		X	
6. Sample collection date		Х		X	
7. Laboratory sample received date		Х		Х	
8. Sample preservation verification (as applicable)		Х		Х	
Sample preparation/extraction/analysis dates		Х		Х	
10. Fully executed Chain-of-Custody (COC) form		Х		Х	
11. Narrative summary of QA or sample problems provided		Х		Х	
12. Data Package Completeness and Compliance		Х		Х	

Note:

QA - Quality Assurance

#### **ORGANIC ANALYSIS INTRODUCTION**

Samples were collected using sorbent tubes and analysis was performed using EPA Method TO-17. Data were reviewed in accordance with USEPA National Functional Guidelines of October 1999.

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and had already been subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
  - U The compound was analyzed for but not detected. The associated value is the compound quantitation limit.
  - B The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.
- Quantitation (Q) Qualifiers
  - E The compound was quantitated above the calibration range.
  - D Concentration is based on a diluted sample analysis.
- Validation Qualifiers
  - J The compound was positively identified; however, the associated numerical value is an estimated concentration only.
  - UJ The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.
  - JN The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification. The associated numerical value is an estimated concentration only.
  - UB Compound considered non-detect at the listed value due to associated blank contamination.
  - N The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification.
  - R The sample results are rejected.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

#### **VOLATILE ORGANIC COMPOUND (VOC) ANALYSIS**

# 1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
EPA Method TO-17	Air	30 days from collection to analysis	Cool to <6°C

All samples were analyzed within the specified holding time.

#### 2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

#### 3. Mass Spectrometer Tuning

Mass spectrometer performance was acceptable and all analyses were performed within a 24-hour tune clock.

System performance and column resolution were acceptable.

#### 4. Calibration

Satisfactory instrument calibration is established to insure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

#### 4.1 Initial Calibration

The method specifies percent relative standard deviation (%RSD) and relative response factor (RRF) limits for select compounds only. A technical review of the data applies limits to all compounds with no exceptions.

All target compounds associated with the initial calibration standards must exhibit a %RSD less than the control limit (30%) and an RRF value greater than control limit (0.05).

## 4.2 Continuing Calibration

All target compounds associated with the continuing calibration standard must exhibit a percent difference (%D) less than the control limit (30%) and RRF value greater than control limit (0.05).

All compounds associated with the calibrations were within the specified control limits.

#### 5. Internal Standard Performance

Internal standard performance criteria insure that the GC/MS sensitivity and response are stable during every sample analysis. The criteria require the internal standard compounds associated with the VOC exhibit area counts are  $\pm 40\%$  of the area counts of the associated continuing calibration standard.

All internal standard responses were within control limits.

# 6. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) Analysis

The LCS/LCSD analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS/LCSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits.

All compounds associated with the LCS/LCSD analysis exhibited recoveries within the control limits.

# 7. Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 25% for air matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for air matrices.

Laboratory duplicate analysis was not performed using a sample from this SDG.

# 8. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for air matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for air matrices.

A field duplicate sample was not collected in association with this SDG.

## 9. Compound Identification

Compounds are identified on the GC/MS by using the analytes relative retention time and ion spectra.

All identified compounds met the specified criteria.

Sample results associated with compound that exhibited a concentration greater than the linear range of the instrument calibration are summarized in the following table.

Sample ID	Compound	Original Analysis (µg/m³)	Diluted Analysis (μg/m³)	Reported Analysis (µg/m³)
430 JX	Toluene	6.9 E		6.9 EJ

Sample results associated with compounds exhibiting concentrations greater than the linear range are qualified as documented in the table below when reported as the final reported sample result.

Reported Sample Results	Qualification
Diluted sample result within calibration range	D
Diluted sample result less than the calibration range	DJ
Diluted sample result greater than the calibration range	EDJ
Original sample result greater than the calibration range	EJ

# 10. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

# **DATA VALIDATION CHECKLIST FOR VOCs**

VOCs: EPA Method TO-17		orted	Performance Acceptable		Not	
	No	Yes	No	Yes	Required	
GAS CHROMATOGRAPHY/MASS SPECTROMETR	Y (GC/M	S)				
Tier II Validation						
Holding times		Х		Х		
Reporting limits (units)		Х		Х		
Blanks		1			1	
A. Method blanks		Х		Х		
B. Equipment blanks					Х	
Laboratory Control Sample (LCS) %R		Х		Х		
Laboratory Control Sample Duplicate (LCSD) %R		Х		Х		
LCS/LCSD Precision (RPD)		Х		Х		
Field/Lab Duplicate (RPD)					Х	
Dilution Factor		Х		Х		
Tier III Validation				ı	1	
System performance and column resolution		Х		Х		
Initial calibration %RSDs		Х		Х		
Continuing calibration RRFs		Х		Х		
Continuing calibration %Ds		Х		Х		
Instrument tune and performance check		Х		Х		
lon abundance criteria for each instrument used		Х		Х		
Internal standard		Х		Х		
Compound identification and quantitation		1			1	
A. Reconstructed ion chromatograms		Х		Х		
B. Quantitation Reports		Х		Х		
C. RT of sample compounds within the established RT windows		Х		x		
D. Transcription/calculation errors present		Х		Х		
E. Reporting limits adjusted to reflect sample dilutions		Х		Х		

%RSD Percent relative difference

%R Percent recovery

RPD Relative percent difference

%D Percent difference

VALIDATION PERFORMED BY: Jennifer Singer

SIGNATURE:

DATE: June 7, 2017

Sennifer O. Singer

PEER REVIEW: Dennis Capria

DATE: June 7, 2017

# CHAIN OF CUSTODY CORRECTED SAMPLE ANALYSIS DATA SHEETS





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174519	

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Person to Contact 💆		•				
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Fax Telephone (317)				Time Collected		
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#### Amended-20170607

Workorder: 34-1715149

Client: Arcadis, Inc.

Project Manager: Paul E. Pope

#### **Analytical Results**

Sample ID: 430 JX Sampling Site: Grenada Manufacturin Collected: 05/15/2017

Lab ID: 1715149001 Media: Radiello, Code 145 Received: 05/31/2017

Matrix: Air Sampling Parameter: Air Volume 20055

Minutes

Analysis Method - Radiello, V	olatile Organics						
Preparation: Not Applicable				, Volatile Organics Air 614 (HBN: 191841)	Instrument ID: 5975-X Percent Solid: NA Report Basis: Wet		
Analyte	Result (ng/sample)	Result (ug/m³)	Result (ppb)	RL (ng/sample)	Dilution	Qual	
Benzene	160	0.28	0.087	25	1		
Trichloroethene	95	0.17	0.032	25	1		
Toluene	4200	6.9	1.8	25	1	E J	
Tetrachloroethene	52	0.10	0.015	25	1		
cis-1,2-Dichloroethene	ND	NA	NA	NA	1		
1,2-Dichloroethane	ND	NA	NA	NA	1		
1,1,2-Trichloroethane	ND	NA	NA	NA	1		

#### Comments

**Workorder: 1715149** 

Compound flagged with an "E" qualifier had peak saturation.

EPA TO-17 Mod.: All results are semi-quantitative.

Report amended to correct sampling date per client request. No data was changed.

**Quality Control: Radiello, Volatile Organics - (HBN: 191841)** 

QC limits are advisory for this method and data presented as client information only.

#### Report Authorization (/S/ is an electronic signature that complies with 21 CFR Part 11)

Method	Analyst	Peer Review
Radiello, Volatile Organics	/S/ Lisa M. Reid	/S/ Jorden Baum
Radiello, Volatile Organics	06/02/2017 13:37	06/02/2017 14:44

#### **Laboratory Contact Information**

ALS Environmental Phone: (801) 266-7700

960 W Levoy Drive Email: alslt.lab@ALSGlobal.com

Salt Lake City, Utah 84123 Web: www.alsslc.com

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# Grenada Manufacturing

# **DATA REVIEW**

# Grenada, Mississippi

Volatile Organic Compound (VOC) Analyses

SDG #1715286

Analyses Performed By: ALS Environmental Salt Lake City, Utah

Report #27784R Review Level: Tier III

Project: LA003307.0006.00001

# **SUMMARY**

This data quality assessment summarizes the review of Sample Delivery Group (SDG) #1715286 for samples collected in association with the Grenada Manufacturing site, located in Grenada, Mississippi. The review was conducted as a Tier III evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

			Sample	5 10 1		Analy	rsis	
Sample ID	Lab ID	Matrix	Collection Date	Parent Sample	VOC	svoc	MET	MISC
R-A-5	1715286001	Air	5/30/2017		Х			
R-B-3	1715286002	Air	5/30/2017		Х			
Amb-R-S	1715286003	Air	5/30/2017		Х			
Amb-R-N	1715286004	Air	5/30/2017		Х			
Amb-R-W	1715286005	Air	5/30/2017		Х			
Amb-R-E	1715286006	Air	5/30/2017		Х			
DUP-5	1715286007	Air	5/30/2017	R-B-3	Х			

# **ANALYTICAL DATA PACKAGE DOCUMENTATION**

The table below is the evaluation of the data package completeness.

	Reported		Performance Acceptable		Not
Items Reviewed	No	Yes	No	Yes	Required
Sample receipt condition		Х		Х	
Requested analyses and sample results		Х		X	
Master tracking list		Х		X	
4. Methods of analysis		Х		X	
5. Reporting limits		Х		Х	
6. Sample collection date		Х		Х	
7. Laboratory sample received date		Х		Х	
8. Sample preservation verification (as applicable)		Х		Х	
Sample preparation/extraction/analysis dates		Х		Х	
10. Fully executed Chain-of-Custody (COC) form		Х		Х	
11. Narrative summary of QA or sample problems provided		Х		Х	
12. Data Package Completeness and Compliance		Х		Х	

Note:

QA - Quality Assurance

#### **ORGANIC ANALYSIS INTRODUCTION**

Samples were collected using Radiello cartidges and analysis was performed using the Solvent Panel Scan method. Data were reviewed in accordance with USEPA National Functional Guidelines of October 1999.

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and had already been subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
  - U The compound was analyzed for but not detected. The associated value is the compound quantitation limit.
  - B The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.
- Quantitation (Q) Qualifiers
  - E The compound was quantitated above the calibration range.
  - D Concentration is based on a diluted sample analysis.
- Validation Qualifiers
  - J The compound was positively identified; however, the associated numerical value is an estimated concentration only.
  - UJ The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.
  - JN The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification. The associated numerical value is an estimated concentration only.
  - UB Compound considered non-detect at the listed value due to associated blank contamination.
  - N The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification.
  - R The sample results are rejected.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

#### **VOLATILE ORGANIC COMPOUND (VOC) ANALYSIS**

# 1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
Solvent Panel Scan (SOP: IH-AN-Solvent Panel)	Air	60 days from collection to analysis	Cool to <6°C

All samples were analyzed within the specified holding time.

#### 2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were not detected above the MDL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

# 3. Mass Spectrometer Tuning

Mass spectrometer performance was acceptable and all analyses were performed within a 24-hour tune clock.

System performance and column resolution were acceptable.

#### 4. Calibration

Satisfactory instrument calibration is established to insure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

#### 4.1 Initial Calibration

The method specifies percent relative standard deviation (%RSD) and relative response factor (RRF) limits for select compounds only. A technical review of the data applies limits to all compounds with no exceptions.

All target compounds associated with the initial calibration standards must exhibit a %RSD less than the control limit (30%) and an RRF value greater than control limit (0.05).

# 4.2 Continuing Calibration

All target compounds associated with the continuing calibration standard must exhibit a percent difference (%D) less than the control limit (30%) and RRF value greater than control limit (0.05).

All compounds associated with the calibrations were within the specified control limits.

## 5. Internal Standard Performance

Internal standard performance criteria insure that the GC/MS sensitivity and response are stable during every sample analysis. The criteria require the internal standard compounds associated with the VOC exhibit area counts are  $\pm$  40% of the area counts of the associated continuing calibration standard.

All internal standard responses were within control limits.

# 6. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) Analysis

The LCS/LCSD analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS/LCSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits.

Sample locations associated with LCS/LCSD analysis exhibiting recoveries outside of the control limits presented in the following table.

Sample Locations	Compound	LCS Recovery	LCSD Recovery	
R-A-5	1,2-Dichloroethane	AC	> UL	
R-B-3	Tetrachloroethene	AC	> 0L	
Amb-R-S	Benzene			
Amb-R-N Amb-R-W	Toluene			
Amb-R-E	1,1,2-Trichloroethane	> UL	> UL	
DUP-5	cis-1,2-Dichloroethene			

Note:

AC Acceptable

The criteria used to evaluate the LCS/LCSD recoveries are presented in the following table. In the case of an LCS/LCSD deviation, the sample results are qualified as documented in the table below.

Control Limit	Sample Result	Qualification
> the upper central limit (LIL)	Non-detect	No Action
> the upper control limit (UL)	Detect	J
the lower central limit (LL) but > 100/	Non-detect	UJ
< the lower control limit (LL) but > 10%	Detect	J
< 10%	Non-detect	R

Control Limit	Sample Result	Qualification
	Detect	J

# 7. Laboratory Duplicate Analysis

The laboratory duplicate relative percent difference (RPD) criterion is applied when parent and duplicate sample concentrations are greater than or equal to 5 times the RL. A control limit of 25% for air matrices is applied when the criteria above is true. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the RL is applied for air matrices.

Laboratory duplicate analysis was not performed using a sample from this SDG.

# 8. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 50% for air matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of three times the RL is applied for air matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Compound	Sample Result (mg/m³)	Duplicate Result (mg/m³)	RPD
D.D.0/	Trichloroethene	0.013	0.020	42.4%
R-B-3/ DUP-5	Toluene	0.0033	0.0035	5.9%
201 0	cis-1,2-Dichlororethene	0.0014	0.0016	13.3%

The calculated RPDs between the parent sample and field duplicate were acceptable.

## 9. Compound Identification

Compounds are identified on the GC/MS by using the analytes relative retention time and ion spectra. All identified compounds met the specified criteria.

#### 10. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

# **DATA VALIDATION CHECKLIST FOR VOCs**

VOCs: Solvent Panel Scan		orted	Performance Acceptable		Not
	No	Yes	No	Yes	Required
GAS CHROMATOGRAPHY/MASS SPECTROMETR	Y (GC/M	S)			
Tier II Validation					
Holding times		Х		Х	
Reporting limits (units)		Х		Х	
Blanks					
A. Method blanks		Х		Х	
B. Equipment blanks					Х
Laboratory Control Sample (LCS) %R		Х	Х		
Laboratory Control Sample Duplicate (LCSD) %R		Х	Х		
LCS/LCSD Precision (RPD)		Х		Х	
Field/Lab Duplicate (RPD)		Х		Х	
Dilution Factor		Х		Х	
Tier III Validation					
System performance and column resolution		Х		Х	
Initial calibration %RSDs		Х		Х	
Continuing calibration RRFs		Х		Х	
Continuing calibration %Ds		Х		Х	
Instrument tune and performance check		Х		Х	
Ion abundance criteria for each instrument used		Х		Х	
Internal standard		Х		Х	
Compound identification and quantitation					,
A. Reconstructed ion chromatograms		Х		Х	
B. Quantitation Reports		Х		Х	
C. RT of sample compounds within the established RT windows		Х		х	
D. Transcription/calculation errors present		Х		Х	
E. Reporting limits adjusted to reflect sample dilutions		Х		Х	

%RSD Percent relative difference

%R Percent recovery

RPD Relative percent difference

%D Percent difference

VALIDATION PERFORMED BY: Jennifer Singer

SIGNATURE:

DATE: June 9, 2017

Sennifer O. Linger

PEER REVIEW: Dennis Capria

DATE: June 14, 2017

# CHAIN OF CUSTODY CORRECTED SAMPLE ANALYSIS DATA SHEETS

# ₩ 1715286

# ANALYTICAL REQUEST FORM

A1578	5	786	
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₩ 1715286	· · · · · · · · · · · · · · · · · · ·	1. REGULAR S	tatus	1	113004
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REQUEST FOR ANALYSES					
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DUP-S.					
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Specify: Solid sorbent tube, e	.g. Charcoal; Filter type; Im	pinger solution; Bulk san	nple; Blood; Urine; Tissue;	Soil; Water; Other	
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Received by		Da	te/Time		



Report Date: June 08, 2017

Phone: (317) 231-6500

E-mail: Sarah.Jonker@arcadis.com

Workorder: **34-1715286** 

Client Project ID: Grenada Manufacturing

053017

Purchase Order: LA003307.0005 Project Manager: Paul Pope

#### **Analytical Results**

Sarah Jonker

132 E Washington St.

Indianapolis, IN 46204

Arcadis

Suite 600

Sample ID: R-A-5 Collected: 05/30/2017 Lab ID: 1715286001 Sampling Location: Grenada Manufacturin Received: 06/01/2017 **Method: Solvent Panel Scan** Media: Radiello 130, Badge Analyzed: 06/06/2017 (192069) **Sampling Info: Exposure 41366 Minutes** Result **Analyte** (ug/sample) Result (mg/m³) RL (ug/sample) Result (ppm) 1,2-Dichloroethane <2.0 < 0.00063 < 0.00016 2.0 Benzene <2.0 <0.00060 < 0.00019 2.0 Trichloroethene 8.0 41 0.0074 0.0014 Toluene 22 0.0073 J 0.0019 2.0 1,1,2-Trichloroethane <2.0 < 0.00081 < 0.00015 2.0 Tetrachloroethene <2.0 <0.00082 < 0.00012 2.0 cis-1,2-Dichloroethene 8.9 J 0.0029 0.00073 J 2.0

Sample ID: R-B-3				Collected: 05/30/2017
Lab ID: 1715286002	Sar	mpling Location: Gren	ada Manufacturin	Received: 06/01/2017
Method: Solvent Panel Scan		Media: Radiello 130, E	Badge	Analyzed: 06/06/2017 (192069)
	Sampli	ing Info: Exposure 412	15 Minutes	
	Result			
Analyte	(ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
1,2-Dichloroethane	<2.0	< 0.00063	<0.00016	2.0
Benzene	<2.0	<0.00061	<0.00019	2.0
Trichloroethene	74	0.013	0.0024	10
Toluene	10 J	0.0033 J	0.00087 J	2.0
1,1,2-Trichloroethane	<2.0	<0.00081	<0.00015	2.0
Tetrachloroethene	<2.0	<0.00082	<0.00012	2.0
cis-1,2-Dichloroethene	4.3 <sup>J</sup>	0.0014 J	0.00035 J	2.0

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Workorder: **34-1715286** 

Client Project ID: Grenada Manufacturing

053017

Purchase Order: LA003307.0005 Project Manager: Paul Pope

# **Analytical Results**

Sample ID: Amb-R-S				Collected: 05/30/2017
Lab ID: 1715286003	Sa	mpling Location: Gre	nada Manufacturin	Received: 06/01/2017
Method: Solvent Panel Scan	Samp	Media: Radiello 130,	Analyzed: 06/06/2017 (192069)	
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
1,2-Dichloroethane	<2.0	<0.00063	<0.00016	2.0
Benzene	<2.0	<0.00060	<0.00019	2.0
Trichloroethene	<2.0	<0.00070	<0.00013	2.0
Toluene	<2.0	<0.00065	<0.00017	2.0
1,1,2-Trichloroethane	<2.0	<0.00081	<0.00015	2.0
Tetrachloroethene	<2.0	<0.00082	<0.00012	2.0
cis-1,2-Dichloroethene	<2.0	<0.00065	<0.00016	2.0

Sample ID: Amb-R-N				Collected: 05/30/2017
Lab ID: 1715286004	Sam	npling Location: Gren	ada Manufacturin	Received: 06/01/2017
Method: Solvent Panel Scan	Media: Radiello 130, Badge Sampling Info: Exposure 41340 Minutes			Analyzed: 06/06/2017 (192069)
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
1,2-Dichloroethane	<2.0	<0.00063	<0.00016	2.0
Benzene	<2.0	<0.00060	<0.00019	2.0
Trichloroethene	<2.0	<0.00070	<0.00013	2.0
Toluene	2.4 J	0.00077 J	0.00020 J	2.0
1,1,2-Trichloroethane	<2.0	<0.00081	<0.00015	2.0
Tetrachloroethene	<2.0	<0.00082	<0.00012	2.0
cis-1,2-Dichloroethene	<2.0	<0.00065	<0.00016	2.0

Sample ID: Amb-R-W				Collected: 05/30/2017
Lab ID: 1715286005	Sa	mpling Location: Gre	nada Manufacturin	Received: 06/01/2017
Method: Solvent Panel Scan	Media: Radiello 130, Badge Sampling Info: Exposure 41336 Minutes			Analyzed: 06/06/2017 (192069)
Analyte	Result (ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
1,2-Dichloroethane	<2.0	<0.00063	<0.00016	2.0
Benzene	<2.0	<0.00060	<0.00019	2.0
Trichloroethene	<2.0	<0.00070	<0.00013	2.0
Toluene	<2.0	<0.00065	<0.00017	2.0
1,1,2-Trichloroethane	<2.0	<0.00081	<0.00015	2.0
Tetrachloroethene	<2.0	<0.00082	<0.00012	2.0
cis-1,2-Dichloroethene	<2.0	<0.00065	<0.00016	2.0



#### Amended-20170608

Workorder: **34-1715286** 

Client Project ID: Grenada Manufacturing

053017

Purchase Order: LA003307.0005 Project Manager: Paul Pope

#### **Analytical Results**

Sample ID: Amb-R-E Collected: 05/30/2017 Received: 06/01/2017 Lab ID: 1715286006 Sampling Location: Grenada Manufacturin Method: Solvent Panel Scan Media: Radiello 130, Badge Analyzed: 06/06/2017 (192069) **Sampling Info: Exposure 41298 Minutes** Result (ug/sample) **Analyte** Result (mg/m³) Result (ppm) RL (ug/sample) 1,2-Dichloroethane < 2.0 < 0.00063 < 0.00016 2.0 Benzene <2.0 < 0.00061 < 0.00019 2.0 Trichloroethene < 2.0 < 0.00070 < 0.00013 2.0 Toluene 0.0045 14 J 0.0012 J 2.0 1,1,2-Trichloroethane <2.0 <0.00081 < 0.00015 2.0 Tetrachloroethene <2.0 < 0.00082 < 0.00012 2.0 cis-1,2-Dichloroethene <2.0 < 0.00065 < 0.00016 2.0

Sample ID: DUP-5				Collected: 05/30/2017
Lab ID: 1715286007	Sai	mpling Location: Gren	ada Manufacturin	Received: 06/01/2017
Method: Solvent Panel Scan		Media: Radiello 130, E	Badge	Analyzed: 06/06/2017 (192069)
	Sampl	ing Info: Exposure 412	15 Minutes	
	Result			
Analyte	(ug/sample)	Result (mg/m³)	Result (ppm)	RL (ug/sample)
1,2-Dichloroethane	<2.0	<0.00063	<0.00016	2.0
Benzene	<2.0	<0.00061	<0.00019	2.0
Trichloroethene	58	0.020	0.0038	8.0
Toluene	11 J	0.0035 J	0.00093 J	2.0
1,1,2-Trichloroethane	<2.0	<0.00081	<0.00015	2.0
Tetrachloroethene	<2.0	<0.00082	<0.00012	2.0
cis-1,2-Dichloroethene	5.1 J	0.0016 J	0.00042 J	2.0

#### Report Authorization (/S/ is an electronic signature that complies with 21 CFR Part 11)

Method	Analyst	Peer Review
Solvent Panel Scan	/S/ David Teynor	/S/ Thomas J. Masoian
	06/07/2017 15:04	06/08/2017 09:25

#### **Laboratory Contact Information**

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