

June 09, 2009

## LABORATORY REPORT

Client:

Cedar Rapids Water Cedar Rapids  
7525 Bertram Road, SE  
Cedar Rapids, IA 52403  
Attn: Mark Ultis

Work Order: LSE0259  
Project Name: CRWPC  
Project Number: [none]  
Date Received: 05/29/09

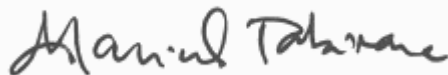
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*The Chain of Custody, 1 page, is included and is an integral part of this report. This entire report was reviewed and approved for release.*

If you have any questions relating to this analytical report, please contact your Laboratory Project Manager at 714-258-8610.

Analyses included in this report were performed by the laboratory shown at the top of this report unless otherwise indicated.

Approved By:



Marisol Tabirara  
Project Manager

Cedar Rapids Water Cedar Rapids  
7525 Bertram Road, SE  
Cedar Rapids, IA 52403  
Mark Ultis

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Project: CRWPC

Project Number: [none]

Received: 05/29/09 09:45

Reported: 06/09/09 17:50

**SAMPLE IDENTIFICATION**

SCRUBBED BIOGAS

**LAB NUMBER**

LSE0259-01

**COLLECTION**

05/28/09 14:45

**MATRIX**

Air

**CONTAINER TYPE**

Tedlar Bag 1L

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## ANALYTICAL REPORT

Analyte	Result	Data		RL	Dilution	Date Analyzed	Instrument	Analyst	QC
		Qualifiers	Units						Batch
<b>Sample ID: LSE0259-01 (SCRUBBED BIOGAS - Air)</b>						<b>Sampled: 05/28/09 14:45</b>			
<b>ASTM D1946 - Fixed Gases</b>									
Carbon dioxide	17		%(v/v)	0.010	1.0	05/29/09 13:16	GC8	ei	9E29003
Carbon monoxide	ND		%(v/v)	0.0010	1.0	05/29/09 13:16	GC8	ei	9E29003
Methane	71		%(v/v)	0.00020	1.0	05/29/09 13:16	GC8	ei	9E29003
Oxygen	2.6		%(v/v)	0.20	1.0	05/29/09 13:16	GC8	ei	9E29003
Nitrogen	11		%(v/v)	1.0	1.0	05/29/09 13:16	GC8	ei	9E29003
<b>ASTM D3588 - Heat of Combustion &amp; Specific Gravity</b>									
Heat of Combustion	710		BTU/ft <sup>3</sup>	0.10	1.0	05/29/09 13:16	GC7	TD	9F05002
<b>EPA 15/16 - Sulfur Compounds</b>									
Carbon disulfide	4.2		ppmv	0.50	5.0	05/29/09 14:21	GC7	TD	9E30002
Carbonyl sulfide	0.97		ppmv	0.10	1.0	05/29/09 13:35	GC7	TD	9E30002
Dimethyl disulfide	0.43		ppmv	0.10	1.0	05/29/09 13:35	GC7	TD	9E30002
Dimethyl sulfide	ND		ppmv	0.10	1.0	05/29/09 13:35	GC7	TD	9E30002
Hydrogen sulfide	2.6		ppmv	0.50	5.0	05/29/09 14:21	GC7	TD	9E30002
Ethyl mercaptan	0.12		ppmv	0.10	1.0	05/29/09 13:35	GC7	TD	9E30002
Methyl mercaptan	0.70		ppmv	0.10	1.0	05/29/09 13:35	GC7	TD	9E30002
<b>EPA TO3 - Volatile Organic Compounds by GC</b>									
C2	ND		ppmv	0.50	1.0	05/29/09 16:48	GC7	TD	9F05003
C3	1.1		ppmv	0.10	1.0	05/29/09 16:48	GC7	TD	9F05003
C4	0.67		ppmv	0.10	1.0	05/29/09 16:48	GC7	TD	9F05003
C5	0.29		ppmv	0.10	1.0	05/29/09 16:48	GC7	TD	9F05003
C6	0.18		ppmv	0.10	1.0	05/29/09 16:48	GC7	TD	9F05003
C7	ND		ppmv	0.10	1.0	05/29/09 16:48	GC7	TD	9F05003
C8	0.23		ppmv	0.10	1.0	05/29/09 16:48	GC7	TD	9F05003
C9	ND		ppmv	0.10	1.0	05/29/09 16:48	GC7	TD	9F05003
C10+	1.8		ppmv	0.50	1.0	05/29/09 16:48	GC7	TD	9F05003

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## PROJECT QUALITY CONTROL DATA

### Blank

Analyte	Result	Data Qualifier	Units	RL	Dilution	Date Analyzed	Instrument	Analyst	QC Batch
<b>Sample ID: 9E29003-BLK1 (Blank - Air)</b>									
<b>ASTM D1946 - Fixed Gases</b>									
Carbon dioxide	ND		%(v/v)	0.010	1.00	05/29/09 0:53	GC8	ei	9E29003
Carbon monoxide	ND		%(v/v)	0.0010	1.00	05/29/09 0:53	GC8	ei	9E29003
Methane	ND		%(v/v)	0.00020	1.00	05/29/09 0:53	GC8	ei	9E29003
Oxygen	ND		%(v/v)	0.20	1.00	05/29/09 0:53	GC8	ei	9E29003
Nitrogen	ND		%(v/v)	1.0	1.00	05/29/09 0:53	GC8	ei	9E29003
<b>Sample ID: 9E30002-BLK1 (Blank - Air)</b>									
<b>EPA 15/16 - Sulfur Compounds</b>									
Carbon disulfide	ND		ppmv	0.10	1.00	05/29/09 13:17	GC7	TD	9E30002
Carbonyl sulfide	ND		ppmv	0.10	1.00	05/29/09 13:17	GC7	TD	9E30002
Dimethyl disulfide	ND		ppmv	0.10	1.00	05/29/09 13:17	GC7	TD	9E30002
Dimethyl sulfide	ND		ppmv	0.10	1.00	05/29/09 13:17	GC7	TD	9E30002
Hydrogen sulfide	ND		ppmv	0.10	1.00	05/29/09 13:17	GC7	TD	9E30002
Ethyl mercaptan	ND		ppmv	0.10	1.00	05/29/09 13:17	GC7	TD	9E30002
Methyl mercaptan	ND		ppmv	0.10	1.00	05/29/09 13:17	GC7	TD	9E30002
<b>Sample ID: 9F05003-BLK1 (Blank - Air)</b>									
<b>EPA TO3 - Volatile Organic Compounds by GC</b>									
C2	ND		ppmv	0.50	1.00	05/29/09 16:23	GC7	TD	9F05003
C3	ND		ppmv	0.10	1.00	05/29/09 16:23	GC7	TD	9F05003
C4	ND		ppmv	0.10	1.00	05/29/09 16:23	GC7	TD	9F05003
C5	ND		ppmv	0.10	1.00	05/29/09 16:23	GC7	TD	9F05003
C6	ND		ppmv	0.10	1.00	05/29/09 16:23	GC7	TD	9F05003
C7	ND		ppmv	0.10	1.00	05/29/09 16:23	GC7	TD	9F05003
C8	ND		ppmv	0.10	1.00	05/29/09 16:23	GC7	TD	9F05003
C9	ND		ppmv	0.10	1.00	05/29/09 16:23	GC7	TD	9F05003
C10+	ND		ppmv	0.50	1.00	05/29/09 16:23	GC7	TD	9F05003

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## PROJECT QUALITY CONTROL DATA

### LCS

Analyte	Result	Data		RL	Dilution	Spike		Target Range	Instrument	Date Analyzed	QC Batch
		Qualifiers	Units			Conc	% Rec				
<b>Sample ID: 9E29003-BS1 (LCS - Air)</b>											
<b>ASTM D1946 - Fixed Gases</b>											
Carbon dioxide	1.10		%(v/v)	0.010	1.00	0.998	110%	75 - 125	GC8	05/29/09 00:00	9E29003
Carbon monoxide	0.0485		%(v/v)	0.0010	1.00	0.0455	107%	70 - 130	GC8	05/29/09 00:00	9E29003
Methane	0.0518		%(v/v)	0.00020	1.00	0.0500	104%	75 - 135	GC8	05/29/09 00:00	9E29003
Oxygen	5.35		%(v/v)	0.20	1.00	4.98	107%	70 - 130	GC8	05/29/09 00:00	9E29003
Nitrogen	25.8		%(v/v)	1.0	1.00	24.3	106%	70 - 130	GC8	05/29/09 00:00	9E29003
<b>Sample ID: 9E30002-BS1 (LCS - Air)</b>											
<b>EPA 15/16 - Sulfur Compounds</b>											
Carbon disulfide	0.949		ppmv	0.10	1.00	0.950	100%	70 - 120	GC7	05/29/09 12:41	9E30002
Carbonyl sulfide	1.05		ppmv	0.10	1.00	1.03	102%	75 - 140	GC7	05/29/09 12:41	9E30002
Dimethyl disulfide	0.300		ppmv	0.10	1.00	0.300	100%	70 - 130	GC7	05/29/09 12:41	9E30002
Dimethyl sulfide	0.975		ppmv	0.10	1.00	0.985	99%	70 - 130	GC7	05/29/09 12:41	9E30002
Hydrogen sulfide	0.793		ppmv	0.10	1.00	0.980	81%	60 - 130	GC7	05/29/09 12:41	9E30002
Ethyl mercaptan	0.766		ppmv	0.10	1.00	0.890	86%	70 - 130	GC7	05/29/09 12:41	9E30002
Methyl mercaptan	0.844		ppmv	0.10	1.00	0.930	91%	75 - 130	GC7	05/29/09 12:41	9E30002
<b>Sample ID: 9F05003-BS1 (LCS - Air)</b>											
<b>EPA TO3 - Volatile Organic Compounds by GC</b>											
C2	5.91		ppmv	0.50	1.00	5.57	106%	70 - 130	GC7	05/29/09 15:29	9F05003
C3	3.91		ppmv	0.10	1.00	3.74	105%	70 - 130	GC7	05/29/09 15:29	9F05003
C4	3.00		ppmv	0.10	1.00	2.77	108%	70 - 130	GC7	05/29/09 15:29	9F05003
C5	2.46		ppmv	0.10	1.00	2.27	108%	70 - 130	GC7	05/29/09 15:29	9F05003
C6	2.09		ppmv	0.10	1.00	1.87	112%	70 - 130	GC7	05/29/09 15:29	9F05003
C7	1.72		ppmv	0.10	1.00	1.57	109%	70 - 130	GC7	05/29/09 15:29	9F05003
C8	1.48		ppmv	0.10	1.00	1.39	106%	70 - 130	GC7	05/29/09 15:29	9F05003
C9	0.662		ppmv	0.10	1.00	0.603	110%	70 - 130	GC7	05/29/09 15:29	9F05003
C10+	0.147		ppmv	0.50	1.00	0.137	107%	70 - 130	GC7	05/29/09 15:29	9F05003

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## PROJECT QUALITY CONTROL DATA

### LCS Dup

Analyte	Result	Data		RL	Dilution	Spike		Target		RPD	Limit	Date Analyzed	QC Batch
		Qualifiers	Units			Conc	% Rec	Range					
<b>Sample ID: 9E29003-BSD1 (LCS Dup - Air)</b>													
<b>ASTM D1946 - Fixed Gases</b>													
Carbon dioxide	1.10		%(v/v)	0.010	1.00	0.998	110%	75 - 125	0.009	20	05/29/09 00:26	9E29003	
Carbon monoxide	0.0483		%(v/v)	0.0010	1.00	0.0455	106%	70 - 130	0.3	30	05/29/09 00:26	9E29003	
Methane	0.0517		%(v/v)	0.00020	1.00	0.0500	103%	75 - 135	0.3	20	05/29/09 00:26	9E29003	
Oxygen	5.34		%(v/v)	0.20	1.00	4.98	107%	70 - 130	0.2	30	05/29/09 00:26	9E29003	
Nitrogen	25.8		%(v/v)	1.0	1.00	24.3	106%	70 - 130	0	30	05/29/09 00:26	9E29003	
<b>Sample ID: 9E30002-BSD1 (LCS Dup - Air)</b>													
<b>EPA 15/16 - Sulfur Compounds</b>													
Carbon disulfide	0.971		ppmv	0.10	1.00	0.950	102%	70 - 120	2	25	05/29/09 12:59	9E30002	
Carbonyl sulfide	1.08		ppmv	0.10	1.00	1.03	105%	75 - 140	2	25	05/29/09 12:59	9E30002	
Dimethyl disulfide	0.307		ppmv	0.10	1.00	0.300	102%	70 - 130	3	30	05/29/09 12:59	9E30002	
Dimethyl sulfide	1.01		ppmv	0.10	1.00	0.985	102%	70 - 130	3	30	05/29/09 12:59	9E30002	
Hydrogen sulfide	0.807		ppmv	0.10	1.00	0.980	82%	60 - 130	2	25	05/29/09 12:59	9E30002	
Ethyl mercaptan	0.794		ppmv	0.10	1.00	0.890	89%	70 - 130	4	30	05/29/09 12:59	9E30002	
Methyl mercaptan	0.869		ppmv	0.10	1.00	0.930	93%	75 - 130	3	25	05/29/09 12:59	9E30002	
<b>Sample ID: 9F05003-BSD1 (LCS Dup - Air)</b>													
<b>EPA TO3 - Volatile Organic Compounds by GC</b>													
C2	5.85		ppmv	0.50	1.00	5.57	105%	70 - 130	0.9	30	05/29/09 15:53	9F05003	
C3	3.89		ppmv	0.10	1.00	3.74	104%	70 - 130	0.6	30	05/29/09 15:53	9F05003	
C4	3.00		ppmv	0.10	1.00	2.77	108%	70 - 130	0.1	30	05/29/09 15:53	9F05003	
C5	2.44		ppmv	0.10	1.00	2.27	107%	70 - 130	0.8	30	05/29/09 15:53	9F05003	
C6	2.06		ppmv	0.10	1.00	1.87	110%	70 - 130	2	30	05/29/09 15:53	9F05003	
C7	1.68		ppmv	0.10	1.00	1.57	107%	70 - 130	2	30	05/29/09 15:53	9F05003	
C8	1.44		ppmv	0.10	1.00	1.39	104%	70 - 130	2	30	05/29/09 15:53	9F05003	
C9	0.634		ppmv	0.10	1.00	0.603	105%	70 - 130	4	30	05/29/09 15:53	9F05003	
C10+	0.126		ppmv	0.50	1.00	0.137	92%	70 - 130	15	30	05/29/09 15:53	9F05003	

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### DATA QUALIFIERS AND DEFINITIONS

**ND** Not detected at the reporting limit (or method detection limit if shown)

