City of Santa Rosa
WATER

January 29, 2020

Jeffrey Gove
Director of Compliance and Enforcement
Bay Area Air Quality Management District
375 Beale St. St. 600
San Francisco, CA 94105

ATTN: TITLE V REPORTS

RE: Semi-Annual Monitoring Report: July - December 2019 for City of Santa Rosa Wastewater Treatment Plant, Permit for Facility #A1403

Dear Mr. Gove:

In accordance with Permit Standard Conditions Section F, this letter is provided to fulfill semi-annual monitoring reporting required for the City of Santa Rosa Wastewater Treatment Facility during the period July 1, 2019 – December 31, 2019. Pursuant to the monitoring requirements specified in the Permit, please note the following items regarding monthly and annual emissions testing:

- There was one Notice of Violation A 59207 issued on November 21, 2019 for H_2S exceedance in the gas conditioning system that feeds the co-generation Combined Heat and Power Engines. Staff believes the root cause of this exceedance was due to short-circuiting of the media in the Iron Sponge, H_2S abatement device (A-200). The media has since been replaced.

Monthly Emission Testing and Annual Source Tests (Condition #24751)
During this period, monthly portable tests were conducted by Blue Sky Environmental for emissions from digester/natural gas fueled internal combustion engines S-200, S-201, S-202 and S-203 on July 25th, August 29th, September 27th, October 24th, November 21st and December 19th of 2019, results are attached in Appendix A. Please note the following exceptions regarding engine testing:

- S-200 Engine 1 was not tested in August as it was out of service.

- S-202 Engine 3 was not tested in July, August, or September as it was out of service - except for operations related to start-up of the Selective Catalytic Reduction Unit and Oxidation Catalyst.

- S-203 Engine 4 was not tested in July, August, or September as it was out of service – except for operations related to start-up of the Selective Catalytic Reduction Unit and Oxidation Catalyst.

Per the City of Santa Rosa's Title V permit, annual source testing is required to be conducted no later than 12 calendar months after the previous source test. The most recent source test dates are listed in the table below:

Source	Test Date
S-200 Engine 1	October 17, 2019
S-201 Engine 2	June 26, 2019
S-202 Engine 3	May 30, 2019
S-203 Engine 4	August 28, 2019

Anaerobic Digesters Gas Conditioning (Condition #18871)
Weekly H_2S monitoring is conducted on the digester gas upstream of the iron sponge abatement device (A-200) for compliance with the sulfur limit of 1500 ppm and downstream of A-200 for compliance with the H_2S content limit of 50 ppm. Results of these tests are attached with this report in Appendix B.

Emergency Generators (Condition #22820)
During the reporting period, reliability-related activities performed on the emergency standby diesel generators (S-33 and S-34) were in compliance with the limitation of < 20 hours/year.

Thank you for your consideration of this matter. Please contact Sean McNeil, Deputy Director of Environmental Services, at (707) 543-3938 for any information related to this report.

I certify that based on information and belief formed after reasonable inquiry, the statements and information in this letter are true, accurate, and complete.

Sincerely,

Jennifer Burke
Director of Santa Rosa Water

Enclosure:
Appendix A - Monthly Emission Testing Results
Appendix B - Digester Gas Quality Results

cc. BAAQMD File

APPENDIX A

Monthly Emission Testing Results

TABLE #1

BAAQMD FACILITY # 1403
LAGUNA - Monthly-JULY
Engines #1, #2

ENGINE	Eng-1	Eng-2		ACTION LIMITS
Test Date	7/25/19	7/25/19		NG/DG
Test Time	0816-0831	0909-0924		
Standard Temp., °F	70	70		
Engine kW	791	799		
Engine BHp	1,060	1,071		
Fuel Flow Rate, DSCFM (nat gas) NG	6	23		
Fuel Flow Rate, DSCFM (dig gas) DG	449	409		
Fuel Methane% facility readout	64.7	63.5		
Stack Flow Rate, DSCFM (Method 19)	2,062	2,059		
Oxygen, O_2, %	8.5	8.6		
NOx, ppm	86.3	87.1		
NOx, ppm @ 15% O_2	**41.2**	**41.9**		**65/70**
NOx, lbs/hr	1.27	1.28		
NOx, lbs/day	30.5	30.7		
NOx, gm/BHp-hr	**0.54**	**0.54**		**0.75**
CO, ppm	521.1	480.7		
CO, ppm @ 15% O_2	**248.8**	**231.4**		**348**
CO, lbs/hr	4.67	4.30		
CO, lbs/day	112.1	103.2		
CO, gm/BHp-hr	**2.00**	**1.82**		

* g/BHP-hr based on Digester gas analysis dated 7/25/2019

WHERE,

ppm = Parts Per Million Concentration

Lbs/hr = Pound Per Hour Emission Rate

Tstd. = Standard Temp. (°R = °F+460)

MW = Molecular Weight

DSCFM = Dry Standard Cubic Feet Per Minute

NOx = Oxides of Nitrogen as NO_2 (MW = 46)

CO = Carbon Monoxide (MW = 28)

CALCULATIONS,

PPM @ 15% O_2 = ppm * 5.9

PPM @ 3% O_2 = ppm * 17.9

Lbs/hr = ppm x 8.223 E-05 x

Lbs/day = Lbs/hr * 24

gm/BHp-hr = Lbs/hr * 453.6

Engine BHp = Engine kW * 1.34

TABLE #1

BAAQMD FACILITY # 1403
LAGUNA - Monthly - AUG
Engine(s) #2

ENGINE		Eng-2			ACTION LIMITS
Test Date		8/29/19			NG/DG
Test Time		1338-1353			
Standard Temp., °F		70			
Engine kW		787			
Engine Bhp		1,055			
Fuel Flow Rate, DSCFM (nat gas) NG		49			
Fuel Flow Rate, DSCFM (dig gas) DG		355			
Fuel Methane% facility readout		63.8			
Stack Flow Rate, DSCFM (Method 19)		2,034			
Oxygen, O_2, %		8.5			
NOx, ppm		87.2			
NOx, ppm @ 15% O_2		**41.6**			**65/70**
NOx, lbs/hr		1.27			
NOx, lbs/day		30.4			
NOx, g/Bhp-hr		**0.54**			**0.75**
CO, ppm		536.9			
CO, ppm @ 15% O_2		**255.8**			**348**
CO, lbs/hr		4.74			
CO, lbs/day		113.8			
CO, g/Bhp-hr		**2.04**			**2.55**

* g/Bhp-hr based on Digester gas analysis dated 8/29/19

WHERE,

ppm = Parts Per Million Concentration

Lbs/hr = Pound Per Hour Emission Rate

Tstd. = Standard Temp. (°R = °F+460)

MW = Molecular Weight

DSCFM = Dry Standard Cubic Feet Per Minute

NOx = Oxides of Nitrogen as NO_2 (MW = 46)

CO = Carbon Monoxide (MW = 28)

CALCULATIONS,

PPM @ 15% O_2 = ppm * 5.9 / (20.9 - %O_2)

PPM @ 3% O_2 = ppm * 17.9 / (20.9 - %O_2)

Lbs/hr = ppm x 8.223 E-05 x DSCFM x MW / T

Lbs/day = Lbs/hr * 24

g/Bhp-hr = Lbs/hr * 453.6 / Bhp

Engine Bhp = Engine kW * 1.34

TABLE #1

BAAQMD FACILITY # 1403
LAGUNA - Monthly - SEP
Engine(s) #1 & 2

ENGINE	Eng-1	Eng-2			ACTION LIMITS
Test Date	9/27/19	9/27/19			NG/DG
Test Time	0800-0815	0818-0833			
Standard Temp., °F	70	70			
Engine kW	798	804			
Engine Bhp	1,069	1,077			
Fuel Flow Rate, DSCFM (nat gas) NG	34	32			
Fuel Flow Rate, DSCFM (dig gas) DG	395	406			
Fuel Methane% facility readout	62.2	61.9			
Stack Flow Rate, DSCFM (Method 19)	2,068	2,125			
Oxygen, O_2, %	8.6	8.7			
NOx, ppm	104.9	99.2			
NOx, ppm @ 15% O_2	**50.2**	**47.9**			**65/70**
NOx, lbs/hr	1.55	1.50			
NOx, lbs/day	37.2	36.1			
NOx, g/Bhp-hr	**0.66**	**0.63**			**0.75**
CO, ppm	522.8	548.6			
CO, ppm @ 15% O_2	**250.4**	**264.9**			**348**
CO, lbs/hr	4.70	5.06			
CO, lbs/day	112.7	121.5			
CO, g/Bhp-hr	**1.99**	**2.13**			**2.55**

* g/Bhp-hr based on Digester gas analysis dated 9/27/19

WHERE,

ppm = Parts Per Million Concentration

Lbs/hr = Pound Per Hour Emission Rate

Tstd. = Standard Temp. (°R = °F+460)

MW = Molecular Weight

DSCFM = Dry Standard Cubic Feet Per Minute

NOx = Oxides of Nitrogen as NO_2 (MW = 46)

CO = Carbon Monoxide (MW = 28)

CALCULATIONS,

PPM @ 15% O_2 = ppm * 5.9 / (20.9 - %O_2)

PPM @ 3% O_2 = ppm * 17.9 / (20.9 - %O_2)

Lbs/hr = ppm x 8.223 E-05 x DSCFM x MW /

Lbs/day = Lbs/hr * 24

g/Bhp-hr = Lbs/hr * 453.6 / Bhp

Engine Bhp = Engine kW * 1.34

TABLE #1

BAAQMD FACILITY # 1403
LAGUNA - Monthly-OCT
Engines #1, #2, #3 & #4

ENGINE	Eng-1	Eng-2	ACTION LIMITS	Eng-3	Eng-4	ACTION LIMITS
Test Date	10/24/19	10/24/19	NG/DG	10/24/19	10/24/19	NG
Test Time	1017-1032	0950-1005		1054-1109	1215-1230	
Standard Temp., °F	70	70		70	70	
Engine kW	761	774		889	915	
Engine BHp	1,020	1,037		1,191	1,226	
Fuel Flow Rate, DSCFM (nat gas) NG	31	21		112	115	
Fuel Flow Rate, DSCFM (dig gas) DG	388	407		0	0	
Fuel Methane% facility readout	64.7	63.5		67.7	67.7	
Stack Flow Rate, DSCFM (Method 19)	1,975	2,032		1,897	1,939	
Oxygen, O_2, %	8.5	8.5		9.7	9.7	
NOx, ppm	102.8	101.3		7.7	5.5	
NOx, ppm @ 15% O_2	49.0	48.3		4.1	2.9	
NOx, lbs/hr	1.45	1.47		0.10	0.08	
NOx, lbs/day	34.8	35.3		2.5	1.8	
NOx, gm/BHp-hr	**0.64**	**0.64**	**0.75**	**0.04**	**0.03**	**0.12**
CO, ppm	516.8	541.3		1.5	1.0	
CO, ppm @ 15% O_2	246.0	258.2		0.8	0.5	
CO, lbs/hr	4.43	4.78		0.01	0.01	
CO, lbs/day	106.4	114.7		0.3	0.2	
CO, gm/BHp-hr	**1.97**	**2.09**	**3.10**	**0.005**	**0.003**	**0.12**

* g/BHP-hr based on Digester gas analysis dated 10/24/2019

WHERE,

ppm = Parts Per Million Concentration

Lbs/hr = Pound Per Hour Emission Rate

Tstd. = Standard Temp. (°R = °F+460)

MW = Molecular Weight

DSCFM = Dry Standard Cubic Feet Per Minute

NOx = Oxides of Nitrogen as NO_2 (MW = 46)

CO = Carbon Monoxide (MW = 28)

CALCULATIONS,

PPM @ 15% O_2 = ppm * 5.9 / (20.9 - %O_2)

PPM @ 3% O_2 = ppm * 17.9 / (20.9 - %O_2)

Lbs/hr = ppm x 8.223 E-05 x DSCFM x MW / Tstd. °R

Lbs/day = Lbs/hr * 24

gm/BHp-hr = Lbs/hr * 453.6 / BHp

Engine BHp = Engine kW * 1.34

TABLE #1

BAAQMD FACILITY # 1403
LAGUNA - Monthly - NOV
Engine(s) #1 & 2

ENGINE	Eng-1	Eng-2			ACTION LIMITS
Test Date	11/21/19	11/21/19			NG/DG
Test Time	1224-1239	1204-1219			
Standard Temp., °F	70	70			
Engine kW	793	797			
Engine Bhp	1,063	1,068			
Fuel Flow Rate, DSCFM (nat gas) NG	10	10			
Fuel Flow Rate, DSCFM (dig gas) DG	439	439			
Fuel Methane% facility readout	62.0	62.0			
Stack Flow Rate, DSCFM (Method 19)	2,289	2,273			
Oxygen, O_2, %	8.7	8.6			
NOx, ppm	87.7	80.9			
NOx, ppm @ 15% O_2	**42.5**	**38.7**			**65/70**
NOx, lbs/hr	1.43	1.31			
NOx, lbs/day	34.4	31.5			
NOx, g/Bhp-hr	**0.61**	**0.56**			**0.75**
CO, ppm	524.0	535.4			
CO, ppm @ 15% O_2	**253.7**	**256.2**			**348**
CO, lbs/hr	5.21	5.29			
CO, lbs/day	125.0	126.9			
CO, g/Bhp-hr	**2.22**	**2.25**			**2.55**

* g/Bhp-hr based on Digester gas analysis dated 11/21/19

WHERE,

ppm = Parts Per Million Concentration

Lbs/hr = Pound Per Hour Emission Rate

Tstd. = Standard Temp. (°R = °F+460)

MW = Molecular Weight

DSCFM = Dry Standard Cubic Feet Per Minute

NOx = Oxides of Nitrogen as NO_2 (MW = 46)

CO = Carbon Monoxide (MW = 28)

CALCULATIONS,

PPM @ 15% O_2 = ppm * 5.9 / (20.9 - %O_2)

PPM @ 3% O_2 = ppm * 17.9 / (20.9 - %O_2)

Lbs/hr = ppm x 8.223 E-05 x DSCFM x MW /

Lbs/day = Lbs/hr * 24

g/Bhp-hr = Lbs/hr * 453.6 / Bhp

Engine Bhp = Engine kW * 1.34

TABLE #2

BAAQMD FACILITY # 1403
LAGUNA - Monthly - NOV
Engine(s) #3 + #4 (DG)

ENGINE			Eng-3	Eng-4	ACTION LIMITS
Test Date			11/21/19	11/21/19	NG/DG
Test Time			1000-1015	0938-0954	
Standard Temp., °F			70	70	
Engine kW			794	802	
Engine Bhp			1,064	1,075	
Fuel Flow Rate, DSCFM (nat gas) NG			21	21	
Fuel Flow Rate, DSCFM (dig gas) DG			418	418	
Fuel Methane% facility readout			63.1	63.1	
Stack Flow Rate, DSCFM (Method 19)			2,245	2,248	
Oxygen, O_2, %			8.6	8.5	
NOx, ppm			9.2	6.1	
NOx, ppm @ 15% O_2			4.4	2.9	
NOx, lbs/hr			0.15	0.10	
NOx, lbs/day			3.5	2.3	
NOx, g/Bhp-hr			**0.06**	**0.04**	**0.12**
CO, ppm			0.8	1.0	
CO, ppm @ 15% O_2			0.4	0.5	
CO, lbs/hr			0.01	0.01	
CO, lbs/day			0.2	0.2	
CO, g/Bhp-hr			**0.003**	**0.004**	**0.12**

WHERE,

ppm = Parts Per Million Concentration
Lbs/hr = Pound Per Hour Emission Rate
Tstd. = Standard Temp. (°R = °F+460)
MW = Molecular Weight
DSCFM = Dry Standard Cubic Feet Per Minute
NOx = Oxides of Nitrogen as NO_2 (MW = 46)
CO = Carbon Monoxide (MW = 28)

CALCULATIONS,

PPM @ 15% O_2 = ppm * 5.9 / (20.9 - %O_2)
PPM @ 3% O_2 = ppm * 17.9 / (20.9 - %O_2)
Lbs/hr = ppm x 8.223 E-05 x DSCFM x MW /
Lbs/day = Lbs/hr * 24
g/Bhp-hr = Lbs/hr * 453.6 / Bhp
Engine Bhp = Engine kW * 1.34

TABLE #2

BAAQMD FACILITY # 1403
LAGUNA - Monthly - DEC
Engine(s) #3 + #4 (DG)

ENGINE			Eng-3	Eng-4	ACTION LIMITS
Test Date			12/19/19	12/19/19	NG/DG
Test Time			1037-1052	1106-1121	
Standard Temp., °F			70	70	
Engine kW			764	775	
Engine Bhp			1,024	1,039	
Fuel Flow Rate, DSCFM (nat gas) NG			41	0	
Fuel Flow Rate, DSCFM (dig gas) DG			378	451	
Fuel Methane% facility readout			63.3	60.5	
Stack Flow Rate, DSCFM (Method 19)			2,068	2,127	
Oxygen, O_2, %			8.2	8.2	
NOx, ppm			12.3	9.9	
NOx, ppm @ 15% O_2			5.7	4.6	
NOx, lbs/hr			0.18	0.15	
NOx, lbs/day			4.4	3.6	
NOx, g/Bhp-hr			**0.08**	**0.07**	**0.12**
CO, ppm			-0.1	-0.6	
CO, ppm @ 15% O_2			0.0	-0.3	
CO, lbs/hr			0.00	-0.01	
CO, lbs/day			0.0	-0.1	
CO, g/Bhp-hr			**0.000**	**-0.002**	**0.12**

WHERE,

ppm = Parts Per Million Concentration
Lbs/hr = Pound Per Hour Emission Rate
Tstd. = Standard Temp. (°R = °F+460)
MW = Molecular Weight
DSCFM = Dry Standard Cubic Feet Per Minute
NOx = Oxides of Nitrogen as NO_2 (MW = 46)
CO = Carbon Monoxide (MW = 28)

CALCULATIONS,

PPM @ 15% O_2 = ppm * 5.9 / (20.9 - %O_2)
PPM @ 3% O_2 = ppm * 17.9 / (20.9 - %O_2)
Lbs/hr = ppm x 8.223 E-05 x DSCFM x MW / T
Lbs/day = Lbs/hr * 24
g/Bhp-hr = Lbs/hr * 453.6 / Bhp
Engine Bhp = Engine kW * 1.34

TABLE #1

BAAQMD FACILITY # 1403
LAGUNA - Monthly - DEC
Engine(s) #1 & 2

ENGINE	Eng-1	Eng-2			ACTION LIMITS
Test Date	12/19/19	12/19/19			NG/DG
Test Time	0835-0850	0858-0913			
Standard Temp., °F	70	70			
Engine kW	792	802			
Engine Bhp	1,061	1,075			
Fuel Flow Rate, DSCFM (nat gas) NG	49	41			
Fuel Flow Rate, DSCFM (dig gas) DG	384	392			
Fuel Methane% facility readout	64.6	63.6			
Stack Flow Rate, DSCFM (Method 19)	2,260	2,260			
Oxygen, O_2, %	8.7	8.7			
NOx, ppm	89.0	94.4			
NOx, ppm @ 15% O_2	**43.2**	**45.5**			**65/70**
NOx, lbs/hr	1.44	1.52			
NOx, lbs/day	34.5	36.5			
NOx, g/Bhp-hr	**0.61**	**0.64**			**0.75**
CO, ppm	510.4	541.9			
CO, ppm @ 15% O_2	**247.6**	**261.5**			**348**
CO, lbs/hr	5.01	5.32			
CO, lbs/day	120.3	127.7			
CO, g/Bhp-hr	**2.14**	**2.25**			**2.55**

* g/Bhp-hr based on Digester gas analysis dated 12/19/19

WHERE,

ppm = Parts Per Million Concentration

Lbs/hr = Pound Per Hour Emission Rate

Tstd. = Standard Temp. (°R = °F+460)

MW = Molecular Weight

DSCFM = Dry Standard Cubic Feet Per Minute

NOx = Oxides of Nitrogen as NO_2 (MW = 46)

CO = Carbon Monoxide (MW = 28)

CALCULATIONS,

PPM @ 15% O_2 = ppm * 5.9 / (20.9 - %O_2)

PPM @ 3% O_2 = ppm * 17.9 / (20.9 - %O_2)

Lbs/hr = ppm x 8.223 E-05 x DSCFM x MW /

Lbs/day = Lbs/hr * 24

g/Bhp-hr = Lbs/hr * 453.6 / Bhp

Engine Bhp = Engine kW * 1.34

APPENDIX B

Digester Gas Quality Results

Digester Gas Quality(UT82-0003h)
7/1/2019 - 12/31/2019

	Hydrogen Sulfide
	mg/L
Date	Gas Skid
7/1/19	0
7/8/19	0
7/15/19	0
7/22/19	0
7/29/19	0
8/5/19	0
8/12/19	0
8/19/19	0
8/26/19	23
9/2/19	12
9/9/19	26
9/16/19	0
9/23/19	33
9/30/19	25
10/7/19	35
10/14/19	0
10/21/19	6
10/28/19	77
10/29/19	0
11/4/19	0
11/11/19	1
11/18/19	1
11/25/19	1
12/2/19	1
12/9/19	0
12/16/19	0
12/23/19	0
12/30/19	0
---	---
AVG	9
MIN	0
MAX	77