

Technical Consultant: Daniel Robb

Project Participant: Aurora Ridge Dairy - 114N

1st visit: 12/4/2009

All monitoring instrumentation was inspected to insure that it is accurately installed and that it reliably measures the required data. The monitoring equipment is installed in the correct location, and meter readings were verified with one time measurements.

The Sage flow meter recording total flow was displaying an error code, and the value (in red) doesn't add up based on the flare and engine flows. This is not a major concern since we are only interested in, and getting data from, the Sage meter measuring engine flow.

2nd visit: 4/6/2010

All monitoring equipment is in same location and operating correctly. No changes were observed with the genset, electric panels, or meters. Speaking with Jason Burroughs, the facilities crops manager who maintains the digester, everything has been running well with two minor changes. First, the digester temperature was increased from 101°F to 103°F. This increased biogas production and helped the H₂S removal system run better. Secondly, manure was exceptionally dry which caused pumping issues. Since less manure was going into the digester biogas production dropped, causing generator output to drop from 500 kW to as low as 400 kW. (Between 5/1/2010 and 5/10/2010)

3rd visit: 7/15/2010

All monitoring equipment is in same location and operating correctly. No changes were observed with the genset or electric panels. The biogas flow meters were just cleaned in the beginning of July. The farm exports only ¼ of the electricity produced during summer months, and ½ or more during winter months.

4th visit: 11/2/2010

All monitoring equipment is in same location and operating correctly. No changes were observed with the genset or electric panels. Farm is generating more gas, which has to be flared due to NYSEG not allowing them to generate over 500kW. Talk of dedicated lines being run to farms to accept power to grid, which would let them increase generator set point and use the extra gas.

5th visit: 3/16/2011

All monitoring equipment is in same location and operating correctly. No changes were observed with the genset or electric panels.

6th visit: 8/4/2011

All monitoring equipment is in the same location and operating correctly. No changes were observed with the genset or electrical panels.

7th visit: 11/18/2011

All monitoring equipment is in the same location and operating correctly. No changes were observed with the genset or electrical panels.

8th visit: 1/17/2012

All monitoring equipment is in the same location and operating correctly. No changes were observed with the genset or electrical panels.

Aurora Ridge Dairy - Quarterly M&V

Notes	12/4/2009	4/6/2010	7/15/2010	11/2/2010	3/15/2011
Run Times (GHD panel)					
Genset (hrs)	1,681.4	2,112.1	3,779.8	5,935.8	9,013.8
Main Heat Zone (hrs)	680.1	850.8	888.0	934.7	1,192.1
Heat Zone 1 (hrs)	1,017.8	1,111.2	1,112.1	1,112.1	1,112.1
Heat Zone 2 (hrs)	2,264.5	5,015.3	6,954.4	8,911.3	11,633.7
Heat Zone 3 (hrs)	1,116.1	2,720.7	3,116.9	4,030.3	6,972.3
Heat Zone 4 (hrs)	342.9	622.7	681.5	725.2	2,427.5
Barn Heat (hrs)	4.8	211.3	938.0	1,011.5	1,111.3
Engine Blower (hrs)	2,000.4	2,000.4	2,000.7	2,000.7	2,000.8
Turbo Cooler (hrs)	2,080.3	5,028.0	7,420.5	10,061.1	13,158.8
Effl. Mix Pit (hrs)	178.7	244.8	371.4	670.3	835.8
Sludge Pump (hrs)	1,919.4	3,695.0	3,695.0	3,695.0	3,695.0
Crankcase Blower (hrs)	2,090.9	2,404.3	2,404.3	2,404.3	2,404.3
Gen-Tec Panel					
Engine Power (kW)	439-442	455.0	500.0	498-502	495-503
Fluke					
Engine Power (kW)	* Measure power on one conductor, and multiply by 4	360.0	-		
	* Measured on 110 A, others were 130 A, 112 A, and 117 A				
Sage Flow Meters					
Engine Flow (cfm)	Serial #: 47135	149.5	163.0	174.5	170.7
Flare Flow (cfm)	Serial #: 47136	2.5	4.1	37.0	33.1
	Serial #: 46206				
Total Flow (cfm)	*Meter displaying error code	183.0	183.0	-	-
Carbon Catcher					

Engine Flow (cfm)	148.0	171.0	175.0	171.0	177.0
Engine Flow (cf)	10,441,270	38,246,790	61,599,125	87,724,934	116,999,085
Flare Flow (cfm)	3.0	5.0	40.0	35.0	22.0
Flare Flow (cf)	581,058.0	2,010,347.0	3,119,640.0	6,607,808.0	12,567,770.0
Total Flow (cfm)	151.0	-	-	-	-
Total Flow (cf)	13,011,861.0	-	-	-	-
Engine Power (kW)	439.0	451.0	-	-	-
Engine Power (kWh)	894,644	2,223,351	3,341,763	4,593,169	6,027,898
	10 kWh in 82 seconds				
Temperatures					
Tank		180	177	165	165
Main Heat Zone (F)		150	139	142	132
Heat Zone #1 (F)		102	103	96	99
Heat Zone #2 (F)		103	104	102	100
Heat Zone #3 (F)		104	104	103	100
Heat Zone #4 (F)		104	103	103	101
One Time Measurements					
Parasitic Loads					
House Panel (kW)	2.3				
Pump Panel (kW)	23.5				
VFD - Dump Radiator (kW)	2.1				
Hot water circulation pump (kW)	0.1				
Circuit Breaker #7 (kW)	3.7				
CHP Power - Gen-Tec Panel (kW)	0.1				
Vent Fans (kW)	1.6				
House Panel (A)	4-5				
Pump Panel (A)	30.0				
VFD - Dump Radiator (A)	2.0				
Hot water circulation pump (A)	-				
Circuit Breaker #7 (A)	8.0				
CHP Power - Gen-Tec Panel (A)	0.1				
Vent Fans (A)	2.0				

8/4/2011

11/18/2011

1/17/2012

12,042.7	14,407.8	15,836.3
1,234.4	1252,3	1,273.9
1,112.1	1,112.1	1,112.1
14,708.7	17,002.5	18,443.1
8,754.2	9,933.8	11,111.6
3,401.3	3,812.5	4,978.2
1,111.3	1,111.3	1,111.3
2,000.6	2,000.1	2,000.9
16,538.2	19,078.2	20,519.1
835.8	835.8	835.8
3,695.0	3,695.0	3,695.0
2,404.3	2,404.3	2,404.3
464.0	455.0	430.0
170.6	174.0	219.0
3.6	19.8	9.0
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194.0	187.0	218.0
151,874,530	179,875,898.0	196,471,221.0
4.0	19.0	9.0
17,920,021.0	21,224,274.0	23,565,932.0
-	-	-
-	-	-
-	-	-
7,650,065	8,990,863.0	9,795,596.0
179	166.0	170.0
149	134.0	139.0
104	99.0	101.0
103	99.0	101.0
103	102.0	102.0
103	102.0	102.0