

Technical Consultant: Daniel Robb

Project Participant: Lamb Farms - 112N

1st visit: 2/23/2010

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 farm had some issues getting and keeping the engine up and running initially.

2nd visit: 6/3/2010

All monitoring equipment is in same location and operating correctly. No changes were observed with the genset, electric panels, or meters. During the spring lots of rain diluted the manure, which resulted in low biogas production. The site has been operating for a number of months yet still hasn't met the 80% efficiency, and is still waiting on their 2nd capacity payment.

The farm had had some issues over grid interconnect. Should be all worked out and they hope to be able to produce 80% of their contracted capacity soon.

3rd visit: 9/23/2010

All monitoring instrumentation is in the same location and operating correctly. The flare piping was moved and extended to allow for large cement storage bins to be installed adjacent to the digester. Two separators / bedding recovery units are to sit above the storage bins. Hw from the engine is to be run to the separator room for a small space heater.

The site finally reached 80% capacity over a month on July 17th. There were difficulties with the wireless antennae Sept. 9th. It's been fixed but is still causing problems with data collection.

The farm has provided hand logs to fill in gaps of data.

4th visit: 1/17/2010

All monitoring instrumentation is in the same location and operating correctly. There were no major issues with the system since the last visit.

5th visit: 5/4/2011

All monitoring instrumentation is in the same location and operating correctly. The engine was tuned two weeks ago, and since then has been running at 500 kW. Generator logs were provided in order to fill in back data from when the flash memory card was going bad.

6th visit: 8/25/2011

All monitoring instrumentation is in the same location and operating correctly. The unit was shut down July 21st to change the oil, and the heads ended up needing to be replaced, so it was down until July 26th.

7th visit: 11/18/2011

All monitoring instrumentation is in the same location and operating correctly.

8th visit: 1/17/2012

All monitoring instrumentation is in the same location and operating correctly.

9th visit: 5/23/2012

All monitoring instrumentation is in the same location and operating correctly.

10th visit: 8/23/2012

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

11th visit: 11/7/2012

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

12th Visit 5/7/2013:

Sage flow meters were sent back for recalibration.

Lamb Farms - Quarterly M&V

Notes	2/23/2010	6/3/2010	9/23/2010	1/17/2011	5/4/2011	8/25/2011	11/18/2011	1/17/2012	5/23/2012	8/23/2012	11/7/2012	11/7/2012
Runtime - GHD Panel	-	-	-	-	-	-	-	-	-	-	-	-
Main Heat Zone (hr)	1,705	2,091	2,130	2,911	3,176	3,300	3,313.3	3,441.9	3,508.5	3,545.0	3,734.4	3,979.8
Heat Zone 1 (hr)	1,787	2,173	2,173	3,098	4,043	4,213	5,602.9	7,015	9,915	10,887	11,875	15,160
Heat Zone 2 (hr)	1,762	3,305	3,697	5,646	6,727	7,162	9,014.3	10,367	13,094	13,171	13,333	14,411
Heat Zone 3 (hr)	1,624	2,080	2,194	2,585	3,090	3,762	5,466.3	5,979	5,979	5,979	5,978	5,979
Genset (hr)	1,806	3,717	4,965	7,518	10,014	12,023	13,700.7	15,129	17,537	18,868	20,107	24,296
Barn Heat 1 (hr)	-	-	-	-	-	-	-	-	-	-	-	-
Barn Heat (2)	-	-	-	1,287	3,854	4,653	5,166.6	6,491	7,922	7,922	8,046	12,387
Engine Blower (hr)	192	2,386	4,685	7,300	9,738	12,280	14,302.2	15,721	18,695	20,765	22,228	26,397
Turbo Cooler (hr)	54	54	54	54	54	54	53.8	54	54	54	54	54
Boiler Pump (hr)	1,502	3,025	5,713	7,872	10,439	13,146	15,045.6	16,225	17,657	17,657	17,848	22,170
Eff. Mix Pit (hr)	1,804	4,203	6,884	9,666	12,233	14,942	16,984.2	18,425	21,470	23,678	25,500	29,840
Sludge Pump (hr)	1,111	1,111	1,111	1,111	1,111	1,111	1,111.2	1,111	1,111	1,111	1,111	1,111
Crank Case Blower (hr)	536	2,931	5,538	8,320	10,887	13,598	15,640.1	17,081	20,126	22,334	24,148	28,426
Carbon Catcher	-	-	-	-	-	-	-	-	-	-	-	-
Engine Flow (cfm)	65	116	138	148	200	160	192	175	158	192	168	-
Engine Flow (cf)	795,157	16,009,090	37,343,545	61,429,785	86,343,881	113,689,605	153,048,086.0	146,385,744	173,599,217	193,860,375	210,364,386	-
Flare Flow (cfm)	76	2	2	3	2	2	5	5	6	5	8	-
Flare Flow (cf)	2,295,306	3,931,862	6,779,465	7,537,126	11,134,817	14,762,922	15,449,235.0	16,165,458	17,858,618	18,886,263	20,852,137	-
Engine 1 kWh	-	575,899	1,425,711	2,357,672	3,380,303	4,495,344	5,208,092.0	5,670,664	-	-	-	-
Engine Control Panel	-	-	-	-	-	-	-	-	-	-	-	-
Engine Output (kW)	76	252	321	358	500	364	405	359	348	441	398	442
Sage Flow Meters	-	-	-	-	-	-	-	-	-	-	-	-
Engine Flow (cfm)	65	113	137	150	200	158	84	84	-	-	-	-
Engine Flow (cf)	795,750	16,009,340	37,343,900	61,428,004	86,343,565	-	62,564,773.0	69,837,949	-	-	-	-
Flare Flow (cfm)	-	2	-	5	17	3	4	4	-	-	-	-
Flare Flow (cf)	2,295,411	-	-	-	-	-	-	-	-	-	-	-
Fluke	-	-	-	-	-	-	-	-	-	-	-	-
Engine Output (kW)	8.2 kW * 4 conductors	33	-	-	-	-	-	-	-	-	-	-
	9 kW * 4 conductors	36	-	-	-	-	-	-	-	-	-	-
	Total:	69	-	-	-	-	-	-	-	-	-	-
Digester Temps	-	-	-	-	-	-	-	-	-	-	-	-
Tank Temp (F)	138	181	176	170	179	179	173	168	162	180	156	167
Main Zone (F)	126	143	156	136	143	140	140	144	137	135	128	134
Heat Zone 1 (F)	98	99	101	98	104	94	93	99	103	102	99	99
Heat Zone 2 (F)	98	100	101	101	102	102	96	97	103	105	101	104
Heat Zone 3 (F)	98	100	102	102	102	101	99	101	106	106	101	102