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SORGHUM TEST BURN REPORT
UNITED STATES SUGAR CORPORATION

On August 17, 2009, United States Sugar Corporation (USSC) submitted a request to the Florida Department of Environmental Protection (FDEP) for approval to conduct a trial burn of sweet sorghum (sorghum) in the existing Boiler No. 8 [Emission Unit ID No. (EU) 028] at the Clewiston Sugar Mill and Refinery (Mill). FDEP subsequently issued a determination (0510003-046-AC) allowing USSC to conduct the trial burn of up to 4,000 tons of sorghum between August 31 and October 1, 2009. FDEP's determination included an exemption from the requirement to obtain an air construction permit. In order to satisfy Condition No. 5 of the permit exemption, USSC is submitting this report summarizing the results of the test burn.

Trial Burn

The trial burn of sweet sorghum was conducted on September 1 and 2, 2009. Prior to the trial burn, USSC received approximately 500 tons of wet sorghum to conduct the authorized test burn in Boiler No. 8 during off-crop operations. The sorghum delivered to the mill was segregated to a single storage pile in the fuel yard.

During the off-crop season, Boiler No. 8 is operated at less than 50-percent capacity to support the sugar refinery while firing sugar cane bagasse and wood chips. From 1 a.m. on September 1, 2009 until the beginning of the test burn, Boiler No. 8 was fired using 100-percent sugar cane bagasse. At 8 a.m. on September 1, USSC began firing a combination of sweet sorghum and sugar cane bagasse. At approximately 10 p.m. on September 1, a lightning strike occurred in the fuel yard, affecting the fuel feed system including the drying mill. USSC removed the drying mill from service and began firing 100-percent sugar cane bagasse. At approximately 11 a.m. on September 2, USSC resumed the test burn. The sorghum supply was exhausted at approximately 1 p.m. on September 2, at which time USSC resumed firing a combination of sugar cane bagasse and wood chips.

Throughout the trial burn, the fuel mix consisted of approximately 25-percent sorghum and 75-percent sugar cane bagasse. The fuel was delivered to the fuel feed system using a front-end loader. To achieve the mixture of 25-percent sorghum and 75-percent sugar cane bagasse, the front end loader fed one bucket of sorghum for every three buckets of sugar cane bagasse into the fuel feed system. Due to the high moisture content of the sorghum delivered to the mill (approximately 59- to 69-percent moisture), the fuel mixture was processed in the drying mill prior to being fired in the boiler.

During the first day of the test burn (September 1, 8 a.m. to 10 p.m.), Boiler No. 8 was operated at approximately 40 percent of maximum load, which is normal for off-crop season operations. The average heat input for the first day of the test burn, as determined by the continuous emissions monitoring system (CEMS), was 388 million British thermal units per hour (MMBtu/hr). Based on the high heating value of the sorghum and sugar cane bagasse fuel mixture, an average of 60 tons per hour (TPH) of fuel was fired in Boiler No. 8 during the first day. The average steam production rate during the first day of the test burn was 211,689 pounds per hour (lb/hr). A summary of boiler steam production, heat input, and the calculated fuel feed rates is presented in Table 1.

During the second day of the trial burn (September 2, 11 a.m. to 1 p.m.), the sorghum/bagasse fuel mixture was fired at an average rate of 60 TPH. The average steam production rate during the second day of the test burn was 212,151 lb/hr at an average heat input rate of 389.4 MMBtu/hr.

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The only problem encountered during the test burn was weather related. USSC determined that firing sorghum is similar to firing sugar cane bagasse and wood chips. USSC determined that the Clewiston Mill is capable of handling, storing, and firing sorghum without modification to the existing equipment.

Fuel Analysis

On September 1 and 2, during the trial burn, representative samples of sorghum on an as-delivered and on an as-fired basis (75-percent sugar cane bagasse, 25-percent sorghum) were collected for analysis. Each day, one set of as-delivered samples were collected from the sorghum pile in the fuel yard and two sets of as-fired samples were collected from fuel feeders serving Boiler No. 8.

Each set of as-delivered samples consisted of five representative samples taken from different locations on the sorghum pile. Samples were taken from the pile using a shovel and placed in 1-gallon Ziploc® bags. Each set of as-fired samples consisted of five representative samples taken from the fuel feeders serving Boiler No. 8. The as-fired samples for each set were collected from fuel feeder access doors and placed in 1-gallon Ziploc® bags at 5-minute intervals.

The sample sets were brought back to the mill control room where they were individually composited and thoroughly mixed. Two subsamples from each sample set were placed into Ziploc® bags and stored in an ice-filled cooler. The coolers were then transported back to the Gainesville Golder office where they were stored in a refrigerator prior to shipment to Hazen Research for proximate, ultimate, and heat content analyses.

The as-delivered sorghum had an average moisture content of 68 percent (as received), an average high heating value of 2,542 British thermal units per pound (Btu/lb) (as received), and a sulfur content of 0.10 percent (as received). The as-fired mixture of sorghum and sugar cane bagasse had an average moisture content of 59 percent (as received), an average high heating value of 3,235 Btu/lb (as received), and an average sulfur content of 0.05 percent (as received).

The results of the fuel analysis are presented in Table 2. A comparison of the minimum, maximum, and average analyses values for sugar cane bagasse, wood chips, and sorghum are presented in Table 3.

Emissions

During the test burn, the CEMS system was used to collect carbon monoxide (CO) and nitrogen oxide (NO_x) emissions data. Hourly NO_x and CO emissions are presented in Table 4.

NO_x emissions on September 1 and 2 while burning sorghum averaged 0.13 pound per million British thermal units (lb/MMBtu) and 51 lb/hr. The average NO_x emission rate while burning sorghum on September 1 and 2 was 0.13 lb/MMBtu. The average NO_x emission rate for firing 75-percent sugarcane bagasse and 25-percent wood chips just prior to the test burn was 0.13 lb/MMBtu. The average NO_x emission rate for firing 100-percent sugarcane bagasse during the test burn was 0.14 lb/MMBtu. Based on these data, it is concluded that NO_x emissions from Boiler No. 8 did not increase as a result of burning sorghum.

CO emissions averaged 1.04 lb/MMBtu and 404 lb/hr on September 1, and 1.12 lb/MMBtu and 432 lb/hr on September 2. The average CO emission rate while burning sorghum on September 1 and 2 was 1.05 lb/MMBtu. The average CO emission rate for firing 75-percent sugarcane bagasse and 25-percent wood chips was 0.64 lb/MMBtu. The average emission rate for firing 100-percent sugarcane bagasse was 0.97 lb/MMBtu. It is noted that the average CO emission rate for firing sorghum is just slightly higher than for the bagasse or wood chips fuel mixtures. This difference is not statistically significant, and is within emission measurement accuracy. Therefore, it is concluded that burning sorghum up to 25 percent by weight with bagasse does not increase CO emissions from Boiler No. 8.

Sulfur dioxide (SO_2) emissions for the test burn were calculated using fuel analysis data. The average SO_2 content for the sorghum and sugar cane bagasse mix was determined to be 0.12 lb/MMBtu. The average SO_2 content for bagasse from historic fuel analyses at US Sugar is 0.17 lb/MMBtu. The average stack test emission rate for SO_2 from Boiler No. 8 is 0.023 lb/MMBtu. Therefore, an average control efficiency of 86 percent is assumed for SO_2 emissions from Boiler No. 8. Based on the fuel analysis and the assumed control efficiency, the estimated SO_2 emissions from Boiler No. 8 during the trial burn were 6 lb/hr. The average SO_2 emission rate, calculated from fuel analyses, for the sugarcane bagasse/wood chip fuel mix was 6.25 lb/hr. The average SO_2 emission rate while burning sugarcane bagasse was 10.22 lb/hr. Based on these data, sorghum burning did not result in any increase in SO_2 emissions.

A summary of CO, NO_x, and SO_2 minimum, maximum, and average emission rates prior to and during the sorghum test burn is presented in Table 1. A summary comparing the average emission rates while burning each fuel mix is presented in Table 5.

TABLE 2
PROXIMATE, ULTIMATE, AND HEAT CONTENT ANALYSES RESULTS FOR SORGHUM, USSC
UNITED STATES SUGAR CORPORATION

		Analysis Results (dry basis)								Range			
		Sorghum [a]			25% Sorghum/75% Bagasse (dry) [b]								
Parameter	Units	9/1/2009	9/2/2009	Avg	9/1/2009	9/1/2009	9/2/2009	9/2/2009	Avg	Min	Max	Avg	Parameter
Moisture	%, as received	66.22	68.87	67.55	59.35	59.20	58.74	59.20	59.12	58.74	68.87	61.93	Moisture
Ash	%	5.36	4.90	5.13	4.65	4.53	4.27	4.48	4.48	4.27	5.36	4.70	Ash
Ash	lb/MMBtu	6.87	6.23	6.55	5.95	5.71	5.37	5.64	5.67	5.37	6.87	5.96	Ash
Volatiles	%	77.66	79.97	78.82	82.70	82.98	82.98	82.23	82.72	77.66	82.98	81.42	Volatiles
Fixed C	%	16.98	15.13	16.06	12.65	12.49	12.75	13.29	12.80	12.49	16.98	13.88	Fixed C
HHV	Btu/lb, as rec'd	2,635	2,448	2,542	3,178	3,237	3,283	3,241	3,235	2,448	3,283	3,004	HHV, as rec'd
HHV	Btu/lb, dry	7,802	7,862	7,832	7,816	7,934	7,957	7,943	7,913	7,802	7,957	7,886	HHV, dry
Carbon	%	47.19	46.86	47.03	46.16	46.49	46.39	46.52	46.39	46.16	47.19	46.60	Carbon
Hydrogen	%	5.77	5.40	5.59	5.12	5.19	5.20	5.22	5.18	5.12	5.77	5.32	Hydrogen
Nitrogen	%	0.74	0.61	0.68	0.30	0.34	0.28	0.30	0.31	0.28	0.74	0.43	Nitrogen
Sulfur	%	0.10	0.09	0.10	0.05	0.05	0.04	0.05	0.05	0.04	0.10	0.06	Sulfur
Oxygen	%	40.84	42.14	41.49	43.72	43.40	43.82	43.43	43.59	40.84	43.82	42.89	Oxygen
SO_2	lb/MMBtu	0.24	0.22	0.23	0.13	0.12	0.09	0.12	0.12	0.09	0.24	0.15	SO_2
Chlorine	%	0.32	0.19	0.25	0.052	--	--	0.041	0.05	0.04	0.32	0.15	Chlorine
F-Factor													
Fd	dscf/MMBtu	9,557	9,171	9,364	8,857	8,836	8,772	8,847	8,828	8,772	9,557	9,007	Fd

Note: % = percent.
Btu/lb = British thermal unit per pound.
C = carbon.
HHV = higher heating value.
lb/MMBtu = pounds per million British thermal units.
SO_2 = sulfur dioxide.

[a] As delivered samples collected from sorghum fuel pile.
[b] As-fired samples collected from fuel feeders. Approximately 25 percent sorghum and 75 percent sugar cane bagasse.

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TABLE 1
SORGHUM TEST BURN SUMMARY (AUGUST 28 - SEPTEMBER 2, 2009)
UNITED STATES SUGAR CORPORATION

Fuel Mix		Steam Production [a] (lb/hr)	Heat Input [a] (MMBtu/hr)	Fuel Feed [b] (TPH)	Emissions						
					SO_2 [c] (lb/hr)	NO_x Emissions [a]			CO Emissions [a]		
						ppm, 7% O_2	lb/hr	lb/MMBtu	ppm, 7% O_2	lb/hr	lb/MMBtu
75% Bagasse/25% Wood (8/28/09-8/31/09)	Minimum	199,350	366.2	45.25	9.51	40.70	41.5	0.11	170.5	89.9	0.23
	Average	**214,447**	**393.5**	**48.62**	**10.22**	**50.73**	**50.7**	**0.13**	**411.5**	**250.2**	**0.64**
	Maximum	233,885	427.8	52.86	11.11	62.70	56.9	0.15	1,031.5	614.3	1.58
100% Bagasse (9/1/09 00:00 - 07:00, 9/1/09 23:00 - 9/2/09 10:00)	Minimum	206,559	379.2	50.42	8.83	48.10	48.0	0.13	212.1	129.3	0.33
	Average	**126,856**	**388.5**	**51.65**	**9.04**	**52.29**	**52.8**	**0.14**	**616.4**	**377.5**	**0.97**
	Maximum	221,857	406.7	54.07	9.47	56.00	56.7	0.15	1,437.3	882.5	2.23
75% Bagasse/25% Sorghum (9/01/09 08:00 - 22:00)	Minimum	196,441	358.0	55.34	5.76	34.40	39.4	0.10	233.8	130.3	0.33
	Average	**211,689**	**388.1**	**59.98**	**6.25**	**53.36**	**52.1**	**0.13**	**672.9**	**403.7**	**1.04**
	Maximum	218,598	400.1	61.84	6.44	99.40	84.0	0.23	1,150.4	675.7	1.74
75% Bagasse/25% Sorghum (9/2/09 11:00 - 13:00)	Minimum	208,931	383.1	59.22	6.17	48.70	49.2	0.12	347.4	213.9	0.53
	Average	**212,151**	**389.4**	**60.20**	**6.27**	**52.33**	**39.0**	**0.13**	**723.0**	**432.0**	**1.12**
	Maximum	218,159	401.0	61.98	6.46	54.30	55.4	0.14	1,189.1	687.4	1.79
Sorghum Test Average 75% Bagasse/25% Sorghum	**Average**	**211,766**	**388.3**	**60.02**	**6.25**	**53.19**	**52.1**	**0.13**	**681.2**	**408.5**	**1.05**

[a] Based on CEMS data.
[b] Fuel feed calculated using CEMS heat input and fuel analysis HHV.
[c] SO_2 emissions calculated from fuel analysis, CEMS heat input, and an assumed control efficiency of 86 percent.

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TABLE 3
PROXIMATE, ULTIMATE, AND HEAT CONTENT ANALYSES RESULTS COMPARISON
UNITED STATES SUGAR CORPORATION

		Sorghum (dry) [a]			25% Sorghum/75% Bagasse (dry) [a]			Bagasse (dry) [b]			Wood (dry) [c]			
Parameter	Units	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Parameter
Moisture	%, as received	66.22	68.87	67.55	58.74	59.35	59.12	46.23	59.95	52.58	30.20	36.57	33.27	Moisture
Ash	%	4.90	5.36	5.13	4.27	4.65	4.48	0.87	10.64	5.00	8.46	19.04	14.78	Ash
Ash	lb/MMBtu	6.23	6.87	6.55	5.37	5.95	5.67	3.25	14.42	6.60	--	--	--	Ash
Volatiles	%	77.66	79.97	78.82	82.23	82.98	82.72	75.37	87.68	82.78	--	--	--	Volatiles
Fixed C	%	15.13	16.98	16.06	12.49	13.29	12.80	8.79	16.89	12.10	--	--	--	Fixed C
HHV	Btu/lb, as rec'd	2,448	2,635	2,542	3,178	3,283	3,235	3,498	3,962	3,761	4,626	5,350	4,901	HHV, as rec'd
HHV	Btu/lb, dry	7,802	7,862	7,832	7,816	7,957	7,913	7,378	8,356	7,931	6,932	8,018	7,345	HHV, dry
Carbon	%	46.86	47.19	47.03	46.16	46.52	46.39	45.78	50.94	48.48	46.26	48.06	47.36	Carbon
Hydrogen	%	5.40	5.77	5.59	5.12	5.22	5.18	4.71	6.62	5.81	--	--	--	Hydrogen
Nitrogen	%	0.61	0.74	0.68	0.28	0.34	0.31	0.25	0.55	0.39	--	--	--	Nitrogen
Sulfur	%	0.09	0.10	0.10	0.04	0.05	0.05	0.03	0.09	0.07	--	--	--	Sulfur
Oxygen	%	40.84	42.14	41.49	43.40	43.82	43.59	36.64	43.37	40.13	--	--	--	Oxygen
SO_2	lb/MMBtu	0.22	0.24	0.23	0.09	0.13	0.12	0.08	0.24	0.17	0.23	0.26	0.24	SO_2
Chlorine	%	0.19	0.32	0.25	0.04	0.05	0.05	--	--	--	0.26	0.20	0.18	Chlorine
F-Factor														
Fd	dscf/MMBtu	9,171	9,557	9,364	8,772	8,857	8,828	9,050	10,794	9,646	11,007	11,500	11,224	Fd

Note: % = percent.
Btu/lb = British thermal unit per pound.
C = carbon.
HHV = higher heating value.
lb/MMBtu = pounds per million British thermal units.
SO_2 = sulfur dioxide.

[a] Based on fuel analysis presented in Table 2.
[b] Based on multiple fuel analyses conducted from 2002-2006.
[c] Based on fuel analyses conducted in 2006.

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TABLE 4
SORGHUM TEST BURN HOURLY CEMS DATA
UNITED STATES SUGAR CORPORATION

Hour	O_2 (%)	NO_x (ppm)	NO_x (ppm @7% O_2)	NO_x (lb/mmBtu)	NO_x (lbs)	CO (ppm)	CO (ppm @7% O_2)	CO (lbs)	CO (lb/MMBtu)	Wet O_2 (%)	Steam Production (lb/hr)	Heat Input (mmBtu)
75% Bagasse, 25% Wood Chips												
8/31/2009 0:00	9.2	43.5	51.7	0.13	52.7	743.4	883.2	548.5	1.34	7.9	223807	410.4
8/31/2009 1:00	8.8	41.6	47.8	0.13	50.5	310.7	356.9	229.7	0.58	7.8	216458	396.6
8/31/2009 2:00	8.9	43.9	50.9	0.13	52.1	415.8	481.6	300.2	0.77	7.9	213237	390.2
8/31/2009 3:00	8.8	42.3	48.6	0.13	49.3	618.1	710	438.1	1.12	7.6	212889	389.7
8/31/2009 4:00	8.9	35.1	40.7	0.11	42.3	369.1	427.5	270.5	0.68	8.1	215953	396.1
8/31/2009 5:00	8.9	37.1	43	0.11	44.2	358.8	415.6	259.9	0.66	8	215557	394.7
8/31/2009 6:00	8.9	37	42.9	0.11	44	358.7	415.5	259.6	0.66	8	215357	393.9
8/31/2009 7:00	9.4	39.5	47.7	0.12	47.8	335	404.9	246.8	0.64	8.6	212186	388.5
8/31/2009 8:00	9.5	34.8	42.4	0.11	41.5	654.3	797.8	474.5	1.22	8.4	211836	387.8
8/31/2009 9:00	9.7	40.3	50	0.13	49.1	324.5	402.7	240.9	0.62	8.8	211695	387.5
8/31/2009 10:00	9.3	42.6	51	0.13	50.8	284.2	340.6	206.4	0.53	8.5	211861	387.6
8/31/2009 11:00	9.3	39.9	47.8	0.12	47.6	288.7	345.9	209.8	0.54	8.5	211696	387.6
8/31/2009 12:00	9.5	41.6	50.7	0.12	49.8	563.5	687.1	410.4	0.99	8.3	225528	414.1
8/31/2009 13:00	9.5	42.4	51.7	0.13	50.5	553.7	675.1	401.4	1.02	8.5	214941	393.8
8/31/2009 14:00	9.8	44.8	56.1	0.14	53.3	469.6	588.1	340.2	0.88	8.9	210562	386.5
8/31/2009 15:00	8.8	44.1	50.7	0.13	52.5	530.5	609.4	384.6	0.96	7.9	216459	399.4
8/31/2009 16:00	9.2	44.6	53	0.13	52.8	432.8	514.2	311.8	0.79	8.3	214205	392.3
8/31/2009 17:00	9.5	44.4	54.1	0.14	53.2	483.3	589.3	352.7	0.92	8.6	209711	384.9
8/31/2009 18:00	10.1	44	56.6	0.15	55.2	318.5	409.9	243.4	0.66	9.3	201267	369.7
8/31/2009 19:00	10.3	43.9	57.6	0.14	53.8	502.8	659.3	374.9	0.97	9.1	209688	386
8/31/2009 20:00	9.9	43.3	54.7	0.14	52.5	277.4	350.5	204.6	0.54	8.9	207668	380.7
8/31/2009 21:00	10	42.1	53.7	0.14	50.8	287.5	366.6	211.1	0.58	9.2	199350	366.2
8/31/2009 22:00	10	40.3	51.4	0.13	49.2	276.1	352.1	205.1	0.56	9.2	199914	368.5
8/31/2009 23:00	9.4	39.1	47.3	0.12	47.3	441	533	325.1	0.83	8.5	212600	391.7
Minimum	**8.0**	**34.8**	**40.70**	**0.11**	**41.50**	**128.8**	**170.50**	**89.90**	**0.23**	**7.10**	**199,350**	**366.2**
Average	**9.2**	**42.4**	**50.73**	**0.13**	**50.67**	**344.1**	**411.54**	**250.24**	**0.64**	**8.39**	**214,447**	**393.5**
Maximum	**10.6**	**47.8**	**62.70**	**0.15**	**56.90**	**912.8**	**1,031.50**	**614.30**	**1.58**	**9.70**	**233,885**	**427.8**
100% Bagasse												
9/1/2009 0:00	10	42.4	54.1	0.14	52.4	584.8	745.8	440.1	1.14	8.9	211103	386.9
9/1/2009 1:00	9.6	45.1	55.5	0.13	54.2	1089	1339.6	797.2	1.98	7.7	219697	402.8
9/1/2009 2:00	9.5	41.1	50.1	0.13	51.9	197.8	241.2	152	0.39	8.4	213367	392.5
9/1/2009 3:00	9	44.9	52.4	0.14	54.6	489.3	571.5	362.3	0.94	7.9	209094	385.6
9/1/2009 4:00	9.4	45.6	55.1	0.15	56	290.1	350.6	216.8	0.57	8.4	207528	380.1
9/1/2009 5:00	9.1	47.1	55.5	0.15	56.7	307.1	361.8	224.9	0.59	8.2	209075	383.7
9/1/2009 6:00	9	47.2	55.1	0.14	55.9	566.1	661.2	407.9	1.04	7.9	213466	391.7
9/1/2009 7:00	8.8	46.1	53	0.14	55	546.8	628.1	397.4	1.03	7.8	211244	387.6
Minimum	**8.8**	**41.1**	**50.1**	**0.13**	**51.9**	**197.8**	**241.2**	**152.0**	**0.39**	**7.7**	**207,528**	**380.10**
Average	**9.3**	**44.9**	**53.9**	**0.14**	**54.6**	**508.9**	**612.5**	**374.8**	**0.96**	**8.2**	**211,822**	**388.86**
Maximum	**10.0**	**47.2**	**55.5**	**0.15**	**56.7**	**1,089.0**	**1,339.6**	**797.2**	**1.98**	**8.9**	**219,697**	**402.80**
75% Bagasse, 25% Sorghum												
9/1/2009 8:00	9.5	48.8	59.5	0.15	58.2	656	799.9	476.3	1.23	8.2	211633	387.3
9/1/2009 9:00	9.5	42.8	52.2	0.13	50.4	943.5	1150.4	675.7	1.74	8.1	211289	387.5
9/1/2009 10:00	9.7	43.7	54.2	0.14	53.2	545.5	677	404.2	1.04	8.5	212359	389
9/1/2009 11:00	9.4	39	47.1	0.12	46.7	877.4	1060.5	639.7	1.64	8.1	212524	389.2
9/1/2009 12:00	9.7	43.8	54.4	0.14	53.5	435	539.9	323.4	0.83	8.6	212676	389.7
9/1/2009 13:00	9.7	41.8	51.9	0.13	51.2	328.8	408.1	245.1	0.63	8.7	212644	389.5
9/1/2009 14:00	9.3	37.7	45.2	0.12	46.3	677.7	812.1	506.1	1.30	8.2	212488	389.8
9/1/2009 15:00	9.6	42	51.7	0.13	52.4	302.3	371.9	229.7	0.58	8.6	214213	394.9
9/1/2009 16:00	9.8	43.2	54.1	0.14	54.7	199.3	249.6	153.7	0.39	8.9	212635	391.8
9/1/2009 17:00	11.9	36.6	56.5	0.13	51.8	151.4	233.8	130.3	0.33	11.3	211779	389.8
9/1/2009 18:00	12.9	57.2	99.4	0.23	84	495.6	861.1	443.2	1.24	12.1	196441	358
9/1/2009 19:00	10.2	35.8	46.5	0.12	46	302.1	392.4	236.2	0.62	9.1	209650	383.8
9/1/2009 20:00	10	39.6	50.5	0.12	50	814	1038	625.8	1.56	8.7	218598	400.1
9/1/2009 21:00	9.8	34.2	42.8	0.11	43.8	832.5	1042.5	648.7	1.66	8.4	214053	391.9
9/1/2009 22:00	8.6	30.4	34.4	0.10	39.4	403.4	455.9	317.9	0.82	7.7	212346	388.6
Minimum	**8.6**	**30.4**	**34.4**	**0.10**	**39.4**	**151.4**	**233.8**	**130.3**	**0.33**	**7.7**	**196,441**	**358.0**
Average	**10.0**	**41.1**	**53.4**	**0.13**	**52.1**	**531.0**	**672.9**	**403.7**	**1.04**	**8.9**	**211,689**	**388.1**
Maximum	**12.9**	**57.2**	**99.4**	**0.23**	**84.0**	**943.5**	**1,150.4**	**675.7**	**1.74**	**12.1**	**218,598**	**400.1**
100% Bagasse												
9/1/2009 23:00	9.9	38.1	48.1	0.13	48	230.7	291.5	177	0.46	8.9	208737	382.7
9/2/2009 0:00	9.3	43	51.5	0.13	52	1199.5	1437.3	882.5	2.23	7.8	214063	395.3
9/2/2009 1:00	9.6	43.2	53.1	0.13	53.4	400	492	300.7	0.75	8.3	216831	399
9/2/2009 2:00	9.4	42.7	51.6	0.14	52.2	458.8	554.5	341.1	0.89	8.3	207562	381.5
9/2/2009 3:00	9.2	41.7	49.5	0.13	50.3	577.9	686.6	424.7	1.11	8.1	208340	382.8
9/2/2009 4:00	9.1	42.8	50.4	0.14	52.3	442.6	521.4	329.2	0.86	8.1	207564	382.8
9/2/2009 5:00	9.1	41.8	49.2	0.13	51.1	389.2	458.5	289.6	0.76	8.1	208191	383.1
9/2/2009 6:00	9.1	44.1	51.9	0.14	51.2	1150.8	1355.6	813	2.14	7.7	206559	379.2
9/2/2009 7:00	9.8	39.5	49.5	0.13	49.8	181	226.7	138.8	0.36	8.7	211917	388.4
9/2/2009 8:00	9.8	40.4	50.6	0.13	50.7	169.4	212.1	129.3	0.33	8.6	211887	388.4
9/2/2009 9:00	9.8	42.8	53.6	0.14	53.2	199.7	250.1	151	0.39	8.6	211908	388.2
9/2/2009 10:00	9.2	47.1	56	0.14	56	793.2	942.3	574	1.41	7.8	221857	406.7
Minimum	**9.1**	**38.1**	**48.10**	**0.13**	**48.0**	**169.4**	**212.10**	**129.30**	**0:33**	**7.70**	**206,559**	**379.20**
Average	**9.4**	**42.3**	**51.25**	**0.13**	**51.7**	**516.1**	**619.05**	**379.24**	**0.98**	**8.25**	**211,285**	**388.18**
Maximum	**9.9**	**47.1**	**56.00**	**0.14**	**56.0**	**1,199.5**	**1,437.30**	**882.50**	**2.23**	**8.90**	**221,857**	**406.70**
75% Bagasse, 25% Sorghum												
9/2/2009 11:00	9.1	41.3	48.7	0.12	49.2	294.9	347.4	213.9	0.53	7.8	218159	401
9/2/2009 12:00	9.4	44.9	54.3	0.13	51.5	983.8	1189.1	687.4	1.79	7.6	209363	384.2
9/2/2009 13:00	9.5	44.3	54	0.14	55.4	518.8	632.6	394.8	1.03	8.3	208931	383.1
Minimum	**9.1**	**41.3**	**48.7**	**0.12**	**49.2**	**294.9**	**347.40**	**213.90**	**0.53**	**7.60**	**208,931.00**	**383.10**
Average	**9.3**	**43.5**	**52.3**	**0.13**	**52.0**	**599.2**	**723.03**	**432.03**	**1.12**	**7.90**	**212,151.00**	**389.43**
Maximum	**9.5**	**44.9**	**54.3**	**0.14**	**55.4**	**983.8**	**1,189.10**	**687.40**	**1.79**	**8.30**	**218,159.00**	**401.00**

Checked by: DB
Reviewed by: DB

Golder Associates

TABLE 5
FUEL TYPE EMISSIONS COMPARISON
UNITED STATES SUGAR CORPORATION

Fuel Mix		Steam Production [a] (lb/hr)	Heat Input [a] (MMBtu/hr)	Fuel Feed [b] (TPH)	Emissions SO_2 [c] (lb/hr)	Emissions NO_x [a] (lb/MMBtu)	Emissions CO [a] (lb/MMBtu)
75% Bagasse/25% Wood (8/28/09-8/31/09)	**Average**	**214,447**	**393.5**	**48.62**	**10.22**	**0.13**	**0.64**
100% Bagasse (9/1/09 00:00 - 07:00, 9/1/09 23:00 - 9/2/09 10:00)	**Average**	**126,856**	**388.5**	**51.65**	**9.04**	**0.14**	**0.97**
Sorghum Test Average 75% Bagasse/25% Sorghum	**Average**	**211,766**	**388.3**	**60.02**	**6.25**	**0.13**	**1.05**

[a] Based on CEMS data.
[b] Fuel feed calculated using CEMS heat input and fuel analysis HHV.
[c] SO_2 emissions calculated from fuel analysis, CEMS heat input, and an assumed control efficiency of 86 percent.

Checked by: DB
Reviewed by: DB