Golder Associates

October 23, 2009

093-87525

Mr. Jeffery F. Koerner, New Source Review Section Company
Florida Department of Environmental Protection
Bob Martinez Center
2600 Blair Stone Road
Tallahassee, FL 32399-2400

RE: UNITED STATES SUGAR CORPORATION - CLEWISTON MILL
BOILER NO. 8, PERMIT NO. PSD-FL-333C
UPDATE OF STACK MOISTURE AND LOAD CORRELATION
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

Dear Mr. Koerner:

United States Sugar Corporation (U.S. Sugar) has received the Florida Department of Environmental Protection's (FDEP's) request for additional information (RAI) dated September 29, 2008, regarding updating of the correlation between stack moisture and load for Boiler No. 8. Each of FDEP's requests is answered below, in the same order as they appear in the RAI letter.

Comment 1. **At full load operation, how much water is being injected with the urea for NO_x control? What is this amount of water in terms of the flue gas moisture content?**

Response: The urea is delivered and stored as a 50-percent aqueous solution (i.e., 50 percent urea, 50 percent water). Hourly continuous emission monitoring system (CEMS) data for Boiler No. 8 from the first calendar quarter of 2009, where it was operating at heat input rates greater than 1,000 million British thermal units per hour (MMBtu/hr), are presented in Table 1. These data were analyzed for urea injection rate. The average urea injection rate was calculated to be 41.9 gallons per hour (gal/hr) corresponding to an average heat input of 1,031 MMBtu. With 50-percent water content in the urea solution, the average water injection rate is 21 gal/hr or 174.4 pounds per hour (lb/hr). Using the average stack gas flow rate of 349,229 actual cubic feet per minute (acfm) and the average temperature of 278 degrees Fahrenheit (°F), the flue gas moisture content, due to urea injection, is calculated to be 0.025 percent.

Comment 2. **See Table 1 from the September submittal. Each of the test runs conducted on 11/29/07 (RATA-1, RATA-2 and RATA-4) and 11/30/07 (C-5, C-6 and C-7), the tested heat input rate was between 90% and 99%. Based on the requested moisture correlation equation, the modified NO_x emissions rate is under-predicted in each case and the average difference is 8.3%. In fact, the modified flue gas moisture correlation under-predicts 25 of the 33 test runs presented. Can the correlation equation be further adjusted?**

Response: Additional data from the stack tests performed on December 11, 2008 and January 30, 2009 have been added to the historic stack test data, and the revised data set is presented in Table 2. In consideration of FDEP's question as to whether the correlation equation could be further adjusted, the "average" moisture content from historic stack tests was examined in lieu of a correlation equation. All the moisture data are closely grouped within a narrow range, and using the average moisture content simplifies the analysis.

Review of the moisture stack test data also show distinctly higher average moisture values prior to January 2007. The average moisture value was 28.3 percent for the

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2005-2006 time period, but only 26.0 percent for the 2007-2009 time period. This difference is most likely due to the addition of the new sugarcane Grinding Mill that was installed at Clewiston in the fall of 2007. Therefore, only the 2007 and subsequent high-load data were further evaluated, being representative of current operation of the boiler.

The data presented in Table 2 show the average stack gas moisture content of 26.03 percent for the 2007-2009 operations at high load (on-crop), and 22.7 percent for low load (off-crop) operations (2005-2006). Note that no low load operation data are available subsequent to 2006.

The average percent difference in stack test moisture content and original CEMS data moisture content is 28.7 percent for the high load data and 33.4 percent for the low load data. Using the average percent moisture content in place of each of the individual CEMS moisture values, there is a difference of only 0.2 percent for on-crop operations and a difference of only 1.0 percent for off-crop operations. This is a very significant improvement as compared to the original requested moisture correlation, which resulted in an average difference of 6 percent.

The average stack test percent moisture data presented in Table 2 were then used to modify the original CEMS NO_x emissions data. This analysis is presented in Table 3. Based on using the average moisture value, the modified NO_x emission rates show an average difference of 4.4 percent or 0.0058 pound per million British thermal units (lb/MMBtu), and a maximum difference of 0.02 lb/MMBtu. These differences are relatively low when compared to the NO_x emission limit of 0.14 lb/MMBtu. The original NO_x stack test data and original CEMS data show an average difference of 6.2 percent and 0.0071 lb/MMBtu. Therefore, using the average moisture content from the stack tests instead of the CEMS moisture data does not result in a loss in accuracy of the NO_x data.

Boiler No. 8 is continuing to experience significant downtime during certain periods due to the CEMS wet oxygen (O_2) monitor, which, along with the dry O_2 monitor, provides the stack gas moisture content. The wet O_2 monitor requires significant maintenance to maintain operations. Therefore, U.S. Sugar is requesting to use the average percent moisture value of 26.0 percent for high load (on-crop) operations and 22.7 percent moisture for low load (off-crop) operations in lieu of using the previously requested correlation equation. As additional stack testing is performed, the data will be analyzed and the corresponding average moisture values will be updated as needed.

Comment 3. **See Tables 1 and 2 of the recent September submittal. Note "a" indicates that the "stack test heat input rate" is based on a boiler efficiency of 62%. What is the "CEMS heat input rate" based on? Which heat input rate was used to determine NO_x emissions in terms of lb/MMBtu for each of the following cases: original NO_x stack test data, original NO_x CEMS data, and modified NO_x CEMS data?**

Response: The CEMS heat input rate is calculated based on the monitored steam rate of the boiler and the enthalpy of steam and feedwater, and then using 62-percent thermal efficiency. The heat input rate used to determine lb/MMBtu for the three sets of data was as follows:

- Original NO_x stack test data: based on the heat input rate from the respective stack test run. This heat input rate is based on the steam rate and the steam and feed water enthalpy values determined by logging the steam flow temperature and pressure during each stack test run and using 62-percent boiler efficiency.
- Original NO_x CEMS data: emission calculation is the heat input rate from the CEMS, which is based on the monitored steam rate of the boiler and the enthalpy of steam and feedwater, and then using 62-percent thermal efficiency. These

data are extracted from the Data Acquisition and Handling System (DAHS) for the exact times of the stack test runs.

- Modified NO_x CEMS data: based on the original heat input calculated by the CEMS. Only the stack gas moisture content was altered in the lb/MMBtu calculation.

Comment 4. **See Table 1 from the September submittal. Your letter indicates that additional test runs have been included. This may be true for mid and high loads, but the new table ignores operation at low loads. See the bottom of Table 1 from the May submittal. There appears to be a break in the data between low load operation (~50% load) and mid/high load operation (75% to 100%). Also, the 9 runs of low load data presented in the May submittal indicate a poor correlation of load versus flue gas moisture content. Additional flue gas moisture testing between 50% and 75% of base load is necessary to fill in these gaps.**

Response: U.S. Sugar does not typically operate Boiler No. 8 at loads between 50 percent and 75 percent of base load, either during the crop season or during the off-crop season. Due to its combustion efficiency, U.S. Sugar's goal is to operate the boiler at as high a load as possible during the crop season. However, since the boiler is "load-following", at times the boiler is operated at 50- to 75-percent load out of necessity. During the off-crop season, the boiler is operated at just below 50 percent of the maximum load to support the sugar refinery, since the refinery does not require any more steam than this.

Hourly heat input data for 2008, from the CEMS computer, were examined for heat input rate trends. The data show that the boiler operated between 50 percent and 75 percent of the maximum load (539 MMBtu to 808 MMBtu) for 1,781 hours out of a total of 7,500 boiler operating hours. This equates to approximately 24 percent of the total operating time. Supporting data and a plot of hourly heat input rates are presented in Table 4 and Figure 1.

Stack testing on Boiler No. 8 is never conducted at 50- to 75-percent load, since compliance testing is required to be conducted at 90 to 100 percent of maximum permitted load. Compliance testing is always conducted at 90- to 100-percent load, except for certain special tests that were conducted at low load operation.

The signed professional engineer (P.E.) certification statement is included with this response.

Thank you for consideration of this information. If you have any questions, please do not hesitate to call me at (352) 336-5600.

Sincerely,

GOLDER ASSOCIATES INC.

David A. Buff

David A. Buff, P.E., Q.E.P.
Principal Engineer

cc: Keith Tingberg, U.S. Sugar
Ajaya Satyal, FDEP

Attachments

DB/tlc

Golder Associates

Professional Engineer Certification

1. Professional Engineer Name: **David A. Buff**
   Registration Number: **19011**
2. Professional Engineer Mailing Address...
   Organization/Firm: **Golder Associates Inc.****
   Street Address: **6026 NW 1st Place**
   City: **Gainesville** State: **FL** Zip Code: **32607-6018**
3. Professional Engineer Telephone Numbers...
   Telephone: **(352) 336-5600** ext. **21145** Fax: **(352) 336-6603**
4. Professional Engineer E-mail Address: **dbuff@golder.com**
5. Professional Engineer Statement:

I, the undersigned, hereby certify, except as particularly noted herein, that:*

(1) To the best of my knowledge, there is reasonable assurance that the air pollutant emissions unit(s) and the air pollution control equipment described in this application for air permit, when properly operated and maintained, will comply with all applicable standards for control of air pollutant emissions found in the Florida Statutes and rules of the Department of Environmental Protection; and

(2) To the best of my knowledge, any emission estimates reported or relied on in this application are true, accurate, and complete and are either based upon reasonable techniques available for calculating emissions or, for emission estimates of hazardous air pollutants not regulated for an emissions unit addressed in this application, based solely upon the materials, information and calculations submitted with this application.

(3) If the purpose of this application is to obtain a Title V air operation permit (check here ☐, if so), I further certify that each emissions unit described in this application for air permit, when properly operated and maintained, will comply with the applicable requirements identified in this application to which the unit is subject, except those emissions units for which a compliance plan and schedule is submitted with this application.

(4) If the purpose of this application is to obtain an air construction permit (check here ☐, if so) or concurrently process and obtain an air construction permit and a Title V air operation permit revision or renewal for one or more proposed new or modified emissions units (check here ☒, if so), I further certify that the engineering features of each such emissions unit described in this application have been designed or examined by me or individuals under my direct supervision and found to be in conformity with sound engineering principles applicable to the control of emissions of the air pollutants characterized in this application.

(5) If the purpose of this application is to obtain an initial air operation permit or operation permit revision or renewal for one or more newly constructed or modified emissions units (check here ☐, if so), I further certify that, with the exception of any changes detailed as part of this application, each such emissions unit has been constructed or modified in substantial accordance with the information given in the corresponding application for air construction permit and with all provisions contained in such permit.

David A. Buff
Signature

10/19/09
Date

(seal)

*Attach any exception to certification statement.
**Board of Professional Engineers Certificate of Authorization #00001670.

TABLE 1
UREA INJECTION RATES AT HIGH LOAD OPERATION
U.S. SUGAR - CLEWISTON MILL

Date and Time	Heat Input (MMBtu)	Urea Injection (gal)	Stack Flow (acfm)	Temp (°F)
01/01/2009 02:00	1,027	53.3	367,267	247.2
01/03/2009 05:00	1,006	40.0	352,683	245.5
01/03/2009 08:00	1,000	37.5	356,967	254.2
01/06/2009 14:00	1,012	44.5	348,483	241.3
01/09/2009 03:00	1,010	42.4	363,167	242.4
01/09/2009 04:00	1,035	39.5	355,283	261.3
01/13/2009 06:00	1,011	47.2	342,550	251.8
01/14/2009 03:00	1,009	44.2	328,483	254.5
01/14/2009 04:00	1,032	27.0	326,650	255.3
01/14/2009 06:00	1,020	25.1	318,550	255.9
01/14/2009 07:00	1,015	37.2	312,333	249.6
01/19/2009 12:00	1,031	30.9	258,617	250.7
01/19/2009 21:00	1,019	15.4	258,517	252.6
01/19/2009 22:00	1,050	17.9	248,567	242.9
01/20/2009 10:00	1,017	34.6	279,917	245
01/20/2009 15:00	1,055	42.7	273,150	252.2
01/20/2009 17:00	1,003	15.1	226,133	248.6
01/22/2009 03:00	1,013	19.3	261,617	247.2
01/22/2009 04:00	1,055	21.0	261,350	246
01/22/2009 05:00	1,064	16.1	245,017	245.3
01/22/2009 06:00	1,088	22.8	252,750	245.5
01/22/2009 07:00	1,002	18.6	247,650	312.2
01/22/2009 19:00	1,075	19.3	280,650	316.3
01/23/2009 16:00	1,011	28.3	294,867	310
01/24/2009 13:00	1,006	26.8	281,500	258.1
01/27/2009 05:00	1,010	15.7	200,283	258
01/27/2009 06:00	1,093	16.2	190,233	256.4
01/27/2009 07:00	1,010	13.3	190,950	261.7
01/27/2009 15:00	1,056	25.9	232,967	261.3
01/27/2009 16:00	1,037	28.3	244,867	260.7
01/27/2009 17:00	1,115	28.4	252,900	261.3
01/27/2009 18:00	1,048	25.6	255,733	261.3
01/27/2009 19:00	1,049	25.3	250,950	261.1
01/27/2009 20:00	1,040	25.3	241,150	264.7
01/28/2009 04:00	1,151	35.5	257,767	264.3
01/28/2009 05:00	1,164	24.5	268,917	264.9
01/28/2009 06:00	1,166	21.7	276,400	260.7
01/28/2009 07:00	1,057	18.1	249,050	260.5
01/28/2009 08:00	1,029	35.6	249,950	261.3
01/28/2009 09:00	1,010	29.7	245,250	261.1
01/28/2009 10:00	1,019	28.5	252,767	259.4
01/28/2009 11:00	1,026	16.3	247,917	259.7
01/28/2009 12:00	1,024	24.9	268,500	259.9
01/28/2009 13:00	1,019	24.8	264,350	252.8
01/28/2009 14:00	1,044	25.3	264,900	258.3
01/28/2009 15:00	1,022	21.7	267,567	252.1
01/28/2009 18:00	1,060	38.2	275,600	250.7
01/28/2009 19:00	1,054	35.1	279,083	248.8
01/28/2009 20:00	1,064	30.7	287,300	256.9
01/28/2009 21:00	1,060	30.0	298,300	258.4
01/28/2009 22:00	1,065	29.7	298,600	259.1
01/29/2009 07:00	1,027	30.1	245,467	255.1
01/29/2009 08:00	1,032	30.7	258,667	246.1
01/29/2009 09:00	1,001	32.6	263,983	250
01/29/2009 11:00	1,000	32.7	285,033	256.6
01/29/2009 16:00	1,001	38.3	280,233	256.3
01/29/2009 17:00	1,057	29.3	298,917	246
01/29/2009 19:00	1,003	48.5	301,917	251
01/29/2009 20:00	1,054	44.2	297,050	254.2
01/30/2009 09:00	1,015	24.5	271,900	250.1
01/30/2009 17:00	1,015	28.3	273,783	250.6
02/02/2009 19:00	1,002	35.6	292,783	249
02/03/2009 16:00	1,013	17.6	264,850	248.1
02/05/2009 21:00	1,023	39.1	406,967	248
02/05/2009 22:00	1,026	27.4	394,417	246.7
02/05/2009 23:00	1,012	40.1	444,950	268.2
02/06/2009 10:00	1,026	33.3	405,750	269.4
02/10/2009 06:00	1,018	43.2	428,133	262.3
02/11/2009 10:00	1,056	51.3	421,917	267.4
02/14/2009 04:00	1,019	57.4	441,100	269.1
02/14/2009 05:00	1,016	59.0	454,433	271.3
02/14/2009 06:00	1,007	67.7	460,733	276
02/14/2009 07:00	1,028	44.0	467,633	262.7
02/14/2009 09:00	1,009	49.9	430,950	263
02/14/2009 20:00	1,010	30.0	379,167	264.5
02/15/2009 01:00	1,076	63.7	455,817	251.4
02/15/2009 02:00	1,056	69.4	440,233	252.2
02/15/2009 07:00	1,033	69.3	431,400	259
02/15/2009 10:00	1,033	41.0	436,117	240.1

TABLE 1
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U.S. SUGAR - CLEWISTON MILL

Date and Time	Heat Input (MMBtu)	Urea Injection (gal)	Stack Flow (acfm)	Temp (°F)
02/15/2009 17:00	1,002	41.8	397,350	240.7
02/15/2009 18:00	1,031	41.1	417,033	239.9
02/15/2009 19:00	1,002	61.6	398,750	237
02/15/2009 20:00	1,037	70.1	416,933	237.9
02/15/2009 21:00	1,020	49.1	418,850	239
02/15/2009 22:00	1,075	43.0	431,950	245.5
02/16/2009 09:00	1,007	44.9	401,583	249
02/16/2009 22:00	1,010	67.6	418,533	249.4
02/16/2009 23:00	1,026	67.5	423,283	252.2
02/17/2009 01:00	1,008	44.8	440,233	252.8
02/17/2009 02:00	1,012	77.4	444,300	253.2
02/17/2009 03:00	1,008	77.9	440,250	252.3
02/17/2009 05:00	1,005	68.5	433,467	257.3
02/17/2009 06:00	1,035	71.1	456,667	255.4
02/17/2009 07:00	1,033	66.9	458,650	253.6
02/17/2009 08:00	1,019	63.2	430,800	249.3
02/17/2009 09:00	1,052	70.3	440,283	247.3
02/17/2009 10:00	1,004	75.6	436,933	287.2
02/17/2009 12:00	1,041	71.7	456,550	294.1
02/17/2009 19:00	1,015	38.8	417,283	293.7
02/19/2009 02:00	1,003	41.0	402,717	292.9
02/19/2009 05:00	1,028	77.5	404,717	277.9
02/19/2009 13:00	1,061	66.2	390,533	295.3
02/20/2009 04:00	1,001	32.1	429,033	297
02/20/2009 06:00	1,033	42.6	393,317	299.5
02/20/2009 07:00	1,009	32.8	412,700	301.9
02/20/2009 08:00	1,001	49.1	430,867	303.3
02/21/2009 04:00	1,017	48.0	406,817	302.7
02/21/2009 05:00	1,017	70.9	406,083	303.3
02/21/2009 06:00	1,011	33.8	408,017	301.1
02/21/2009 07:00	1,001	80.1	402,583	300
02/21/2009 08:00	1,016	64.5	405,483	302
02/21/2009 09:00	1,016	59.1	421,817	303.6
02/21/2009 10:00	1,010	39.3	400,850	301.7
02/22/2009 21:00	1,017	42.4	404,167	287.1
02/23/2009 05:00	1,000	43.0	398,567	287.2
02/23/2009 06:00	1,009	39.1	387,650	290.4
02/23/2009 07:00	1,036	23.6	380,767	288
02/23/2009 21:00	1,017	52.5	390,117	294.2
02/24/2009 02:00	1,016	61.7	408,233	295.1
02/24/2009 05:00	1,037	42.8	398,950	298.4
02/24/2009 06:00	1,078	73.0	421,300	295.2
02/25/2009 02:00	1,017	46.8	391,017	299.2
02/25/2009 04:00	1,030	26.9	398,050	300.5
02/25/2009 05:00	1,080	57.9	413,233	302.5
02/25/2009 06:00	1,035	43.8	415,183	292.6
02/25/2009 21:00	1,026	46.2	394,883	294.9
02/25/2009 22:00	1,015	76.6	395,483	286.5
02/26/2009 02:00	1,006	50.8	376,100	298.1
02/26/2009 17:00	1,042	70.3	396,650	295.5
02/27/2009 01:00	1,016	73.4	435,783	297.7
02/27/2009 04:00	1,053	68.0	442,333	292
02/27/2009 06:00	1,049	56.9	411,433	287.7
02/27/2009 17:00	1,057	57.5	412,817	301.6
02/27/2009 18:00	1,056	72.9	387,717	301.7
02/27/2009 19:00	1,053	62.9	405,817	300.8
02/27/2009 23:00	1,068	83.9	419,450	299.5
02/28/2009 05:00	1,019	68.6	445,500	300.6
02/28/2009 07:00	1,016	45.7	441,017	291.6
03/01/2009 18:00	1,036	70.7	448,933	289.8
03/01/2009 19:00	1,032	77.2	429,417	289
03/01/2009 21:00	1,074	85.8	447,183	289.9
03/01/2009 22:00	1,025	70.1	434,633	292.6
03/01/2009 23:00	1,053	80.3	435,483	281.1
03/02/2009 11:00	1,008	37.8	387,900	294.4
03/02/2009 21:00	1,027	39.3	434,433	295.6
03/03/2009 02:00	1,002	29.8	392,617	295.9
03/03/2009 04:00	1,034	37.4	377,867	294.2
03/03/2009 05:00	1,036	32.5	380,300	294.2
03/03/2009 06:00	1,021	39.7	384,000	293.7
03/03/2009 07:00	1,067	65.2	387,083	284.8
03/03/2009 11:00	1,035	26.8	292,200	286.6
03/03/2009 12:00	1,063	21.4	306,667	289
03/03/2009 13:00	1,024	21.8	324,200	288.5
03/03/2009 14:00	1,025	22.3	322,700	288.4
03/03/2009 19:00	1,009	43.7	349,450	284.3
03/03/2009 20:00	1,080	67.4	340,800	284.8
03/03/2009 21:00	1,071	35.0	285,033	285.9
03/03/2009 22:00	1,107	22.9	243,517	289.6
03/03/2009 23:00	1,101	26.0	273,550	287.5

TABLE 1
UREA INJECTION RATES AT HIGH LOAD OPERATION
U.S. SUGAR - CLEWISTON MILL

Date and Time	Heat Input (MMBtu)	Urea Injection (gal)	Stack Flow (acfm)	Temp (°F)
03/04/2009 00:00	1,047	16.9	309,550	289.6
03/04/2009 01:00	1,084	31.2	315,867	290
03/04/2009 05:00	1,003	16.1	233,667	297.2
03/04/2009 06:00	1,068	17.7	255,283	298.3
03/04/2009 07:00	1,032	14.2	287,567	287.9
03/04/2009 09:00	1,015	14.7	271,350	305.6
03/06/2009 00:00	1,000	31.9	392,500	306.9
03/06/2009 01:00	1,009	25.3	326,433	296.5
03/08/2009 04:00	1,049	28.8	331,367	298
03/08/2009 05:00	1,034	26.3	302,167	293.3
03/08/2009 12:00	1,003	20.4	309,600	297.5
03/10/2009 03:00	1,000	25.1	315,683	304.9
03/10/2009 06:00	1,032	44.6	332,950	298.8
03/11/2009 01:00	1,023	38.5	350,300	294.6
03/12/2009 02:00	1,006	27.6	325,817	302.8
03/12/2009 06:00	1,012	40.5	354,100	298.5
03/12/2009 13:00	1,019	24.8	341,967	297.1
03/17/2009 01:00	1,047	70.3	381,983	299.5
03/17/2009 02:00	1,016	76.1	383,517	299.2
03/17/2009 16:00	1,049	22.4	294,733	302.4
03/17/2009 17:00	1,040	30.9	314,500	296.1
03/17/2009 18:00	1,023	29.8	315,867	290.2
03/17/2009 19:00	1,032	39.1	323,683	290.7
03/17/2009 20:00	1,007	27.4	319,183	294
03/18/2009 00:00	1,002	37.8	317,650	291.6
03/18/2009 08:00	1,033	62.1	359,583	294.2
03/18/2009 13:00	1,040	71.1	349,967	299.2
03/18/2009 16:00	1,027	78.7	393,950	295.4
03/20/2009 04:00	1,007	36.2	368,650	296.2
03/20/2009 05:00	1,025	36.6	361,933	295.8
03/20/2009 06:00	1,028	26.6	329,200	282.1
03/21/2009 01:00	1,010	19.0	259,483	292.9
03/21/2009 02:00	1,031	22.8	315,883	289.9
03/21/2009 03:00	1,057	33.4	304,983	289.1
03/21/2009 04:00	1,011	28.8	308,667	286.8
03/21/2009 08:00	1,064	37.4	326,233	285.6
03/21/2009 09:00	1,037	71.3	358,650	285.4
03/21/2009 10:00	1,030	19.4	302,100	283.6
03/21/2009 11:00	1,033	37.8	283,733	286.1
03/21/2009 18:00	1,011	47.4	374,450	295.8
03/23/2009 04:00	1,057	49.8	375,200	290.4
03/23/2009 05:00	1,025	63.3	354,250	287.5
03/23/2009 23:00	1,008	36.4	359,433	289
03/25/2009 18:00	1,007	37.0	372,233	292.1
03/25/2009 19:00	1,012	36.3	357,433	287
03/26/2009 06:00	1,006	37.8	399,617	295.4
03/26/2009 17:00	1,024	36.1	395,617	292.1
03/26/2009 22:00	1,017	55.4	368,633	291.7
03/26/2009 23:00	1,021	32.0	364,717	294.7
03/27/2009 00:00	1,033	40.9	372,667	293.5
03/27/2009 01:00	1,001	32.4	356,633	294.3
03/27/2009 02:00	1,069	35.7	287,317	292.6
03/27/2009 03:00	1,034	35.5	287,600	293.9
03/27/2009 17:00	1,005	40.6	357,083	296.2
03/27/2009 21:00	1,051	41.7	301,933	290.8
03/28/2009 07:00	1,000	44.2	329,917	287.9
03/28/2009 19:00	1,039	42.8	352,967	290.6
03/29/2009 15:00	1,033	32.7	373,117	292.9
03/29/2009 16:00	1,042	44.2	363,467	290.5
03/29/2009 17:00	1,048	68.8	356,300	289.9
03/29/2009 18:00	1,018	54.2	352,117	290.2
03/29/2009 21:00	1,036	60.6	356,600	295
03/30/2009 01:00	1,045	40.6	369,400	291.1
03/30/2009 02:00	1,028	66.4	356,817	288.2
03/30/2009 05:00	1,012	20.0	276,267	293
03/30/2009 06:00	1,014	22.4	297,900	288.3
03/30/2009 10:00	1,041	27.5	372,367	293.5
03/31/2009 20:00	1,048	34.8	361,667	295.9
03/31/2009 22:00	1,038	67.0	355,533	296.8
Average	**1,031**	**41.9**	**349,229**	**277.7**

Checked by: NG
Reviewed by: DB

TABLE 2
BOILER 8 COMPARISON OF STACK TEST MOISTURE DATA TO CEMS MOISTURE DATA
U.S. SUGAR - CLEWISTON MILL

						Original Moisture Data			Modified Moisture (average)[b]	
Test Date	Fuel	Run	Run Times	Stack Test Heat Input [a] (MMBtu/hr)	CEMS Heat Input (MMBtu/hr)	Stack Test Data (% H_2O)	CEMS Data (% H_2O)	Percent Difference (%)	Modified CEMS Data (% H_2O)	Percent Difference (%)
High Load Operation (Crop Season)										
03/26/05	Bagasse	RATA-5	1125-1146	875.7	877.1	28.38	22.41	21.0	28.27	0.4
03/26/05	Bagasse	RATA-6	1438-1459	855.4	857.7	27.89	22.91	17.9	28.27	-1.4
03/26/05	Bagasse	RATA-7	1534-1555	906.8	912.8	27.89	23:38	16.2	28.27	-1.4
03/26/05	Bagasse	RATA-8	1720-1741	873.8	877.5	27.59	21.42	22.4	28.27	-2.5
03/26/05	Bagasse	RATA-9	1806-1827	885.7	884.0	27.59	21.35	22.6	28.27	-2.5
03/26/05	Bagasse	RATA-10	1842-1903	844.6	840.5	27.59	22.72	17.7	28.27	-2.5
01/10/06	Bagasse	C-1	1000-1105	967.6	971.7	29.33	25.42	13.3	28.27	3.6
01/10/06	Bagasse	C-2	1241-1346	970.2	972.7	29.31	24.49	16.4	28.27	3.5
01/10/06	Bagasse	C-3	1455-1600	967.6	969.4	27.11	26.15	3.5	28.27	-4.3
01/10/06	Bagasse	C-4	1708-1814	949.6	951.0	29.77	23.85	19.9	28.27	5.0
01/11/06	Bagasse	C-5	0941-1110	910.2	936.7	29.02	22.72	21.7	28.27	2.6
01/11/06	Bagasse	C-6	1236-1340	987.3	981.8	29.67	20.17	32.0	28.27	4.7
01/11/06	Bagasse	C-7	1432-1536	978.9	984.9	30.09	22.42	25.5	28.27	6.0
01/11/06	Bagasse	C-8	1635-1656	810.8	815.0	27.01	22.26	17.6	28.27	-4.7
01/11/06	Bagasse	C-9	1710-1731	869.9	874.2	27.01	22.12	18.1	28.27	-4.7
01/11/06	Bagasse	C-10	1743-1804	939.7	943.7	27.01	21.88	19.0	28.27	-4.7
			Average =	**912.1**	**915.7**	**28.27**	**22.9**	**19.1**	**28.27**	**-0.2**
01/05/07	Bagasse	C-1	1059-1203	919.5	920.4	24.23	18.19	24.9	26.03	-7.4
01/05/07	Bagasse	C-2	1346-1450	960.3	962.5	23.85	18.03	24.4	26.03	-9.1
01/05/07	Bagasse	C-3	1623-1727	948.0	957.4	24.35	17.83	26.8	26.03	-6.9
01/05/07	Bagasse	Gases-4	1821-1922	859.2	860.7	24.35	18.38	24.5	26.03	-6.9
01/06/07	Bagasse	RATA-4	0937-1007	954.1	948.7	26.23	16.69	36.4	26.03	0.8
01/06/07	Bagasse	RATA-5	1018-1048	954.1	955.4	26.23	17.73	32.4	26.03	0.8
01/06/07	Bagasse	RATA-6	1138-1208	961.1	963.9	25.57	17.97	29.7	26.03	-1.8
01/06/07	Bagasse	RATA-7	1222-1251	961.1	961.4	25.57	18.45	27.8	26.03	-1.8
01/06/07	Bagasse	RATA-8	1325-1355	912.5	924.2	26.12	20.74	20.6	26.03	0.3
01/06/07	Bagasse	RATA-9	1430-1459	912.5	909.1	26.12	19.07	27.0	26.03	0.3
11/29/07	Bagasse	RATA-1	1122-1226	968.3	971.0	26.92	18.1	32.8	26.03	3.3
11/29/07	Bagasse	RATA-2	1317-1420	980.7	988.0	24.79	17.2	30.6	26.03	-5.0
11/30/07	Bagasse	RATA-4	0806-0913	1,377.0	1,002.0	24.44	18.0	26.4	26.03	-6.5
11/30/07	Bagasse	C-5	1016-1116	1,061.9	1,066.0	26.58	18.1	31.9	26.03	2.1
11/30/07	Bagasse	C-6	1246-1346	1,011.6	1,015.0	25.69	18.3	28.8	26.03	-1.3
11/30/07	Bagasse	C-7	1534-1634	1,063.3	1,065.0	24.84	17.3	30.4	26.03	-4.8
11/30/07	Bagasse	RATA-8	1741-1755	977.0	872.0	25.17	18.5	26.5	26.03	-3.4
12/11/08	Bagasse	RATA-1	0850-0915	1,037.9	1,037.9	28.84	19.5	32.5	26.03	9.7
12/11/08	Bagasse	RATA-2	0940-1001	1,037.9	1,037.9	28.84	19.6	31.9	26.03	9.7
12/11/08	Bagasse	RATA-3	1030-1051	1,037.9	1,037.9	28.84	18.7	35.3	26.03	9.7
12/11/08	Bagasse	RATA-4	1130-1151	992.3	992.3	27.25	18.2	33.1	26.03	4.5
12/11/08	Bagasse	RATA-5	1210-1231	992.3	992.3	27.25	20.3	25.3	26.03	4.5
12/11/08	Bagasse	RATA-6	1300-1321	992.3	992.3	27.25	19.4	28.8	26.03	4.5
12/11/08	Bagasse	RATA-9	1700-1721	983.7	983.7	27.63	19.6	29.2	26.03	5.8
12/11/08	Bagasse	RATA-10	1755-1815	1,001.5	1,001.5	26.92	18.8	30.3	26.03	3.3
12/11/08	Bagasse	RATA-12	1920-1941	1,001.5	1,001.5	26.92	19.4	27.9	26.03	3.3
01/30/09	Bagasse	C-1	0831-1021	980.0	980.3	25.45	18.4	27.9	26.03	-2.3
01/30/09	Bagasse	C-2	1256-1432	922.0	931.7	24.9	18.7	24.7	26.03	-4.5
01/30/09	Bagasse	C-3	1531-1701	984.0	965.4	24.47	18.6	24.1	26.03	-6.4
			Average =	**991.2**	**975.8**	**26.03**	**18.5**	**28.7**	**26.03**	**-0.2**
Low Load Operation (Off-Crop Season)										
6/1/2006	Bagasse	1	1244-1350	507.2	453.8	26.73	0.00	100.0	22.73	15.0
6/1/2006	Bagasse	2	1712-1818	466.4	459.5	24.13	11.47	52.5	22.73	5.8
6/2/2006	Bagasse	3	0843-0948	547.0	446.5	21.61	0.00	100.0	22.73	-5.2
6/2/2006	Bagasse	4	1124-1232	481.3	404.2	21.65	11.36	47.5	22.73	-5.0
6/2/2006	Bagasse	5	1337-1444	428.3	415.5	20.04	12.42	38.0	22.73	-13.4
09/16/05	Wood Chips	1	0944-1050	427.2	427.2	26.13	25.22	3.5	22.73	13.0
09/16/05	Wood Chips	2	1149-1253	421.3	421.3	30.61[c]	23.54	23.1	22.73	25.7
09/16/05	Wood Chips	3	1327-1433	424.2	424.2	26.59	24.17	9.1	22.73	14.5
8/22/2006	Wood Chips	1	1036-1142	403.5	372.5	21.33	12.34	42.1	22.73	-6.6
8/22/2006	Wood Chips	2	1320-1426	383.6	372.8	21.12	12.30	41.8	22.73	-7.6
8/22/2006	Wood Chips	3	1530-1636	411.4	366.4	20.86	11.91	42.9	22.73	-9.0
			Average[d] =	**427.5**	**407.1**	**22.73**	**16.1**	**33.4**	**22.73**	**-1.0**

[a] Based on stack test calculations using 62-percent boiler efficiency.

[b] Based on average moisture data from historic stack tests.

[c] Considered an outlier.

[d] Average does not include moisture equal to zero.

Checked by: NG
Reviewed by: DB

Golder Associates

TABLE 3
COMPARISON OF NO_x STACK TEST DATA TO CEMS DATA, BOILER NO. 8
U.S. SUGAR, CLEWISTON MILL

Test Date	Fuel	Run	Run Times	Stack Test [a] Heat Input (MMBtu/hr)	CEMS Heat Input (MMBtu/hr)	Original NO_x Data: Original NO_x Stack Test Data (lb/MMBtu)	Original NO_x Data: Original NO_x CEMS Data (lb/MMBtu)	Original NO_x Data: Difference (lb/MMBtu)	Original NO_x Data: Percent Difference (%)	Modified NO_x Data w/Avg. Moisture [b]: Modified CEMS Data (lb/MMBtu)	Modified NO_x Data w/Avg. Moisture [b]: Difference (lb/MMBtu)	Modified NO_x Data w/Avg. Moisture [b]: Percent Difference (%)
High Load Operation (Crop Season)												
01/05/07	Bagasse	C-1	1059-1203	919.5	920.4	0.131	0.141	-0.010	7.6	0.127	0.004	3.3
01/05/07	Bagasse	C-2	1346-1450	960.3	962.5	0.132	0.140	-0.008	6.1	0.126	0.006	4.2
01/05/07	Bagasse	C-3	1623-1727	948.0	957.4	0.126	0.137	-0.011	8.7	0.123	0.003	2.6
01/05/07	Bagasse	Gases-4	1821-1922	859.2	860.7	0.127	0.129	-0.002	1.6	0.117	0.010	8.1
01/06/07	Bagasse	RATA-4	0937-1007	954.1	948.7	0.153	0.157	-0.004	2.6	0.140	0.013	8.7
01/06/07	Bagasse	RATA-5	1018-1048	954.1	955.4	0.113	0.125	-0.012	10.6	0.112	0.001	1.1
01/06/07	Bagasse	RATA-6	1138-1208	961.1	963.9	0.115	0.125	-0.010	8.7	0.112	0.003	2.4
01/06/07	Bagasse	RATA-7	1222-1251	961.1	961.4	0.121	0.131	-0.010	8.3	0.118	0.003	2.2
01/06/07	Bagasse	RATA-8	1325-1355	912.5	924.2	0.114	0.125	-0.011	9.6	0.116	-0.002	-1.7
01/06/07	Bagasse	RATA-9	1430-1459	912.5	909.1	0.125	0.141	-0.016	12.8	0.129	-0.004	-2.9
11/29/07	Bagasse	RATA-1	1122-1226	968.3	971.0	0.109	0.110	-0.001	0.9	0.102	0.007	6.6
11/29/07	Bagasse	RATA-2	1317-1420	980.7	988.0	0.129	0.130	-0.001	0.8	0.116	0.013	10.2
11/30/07	Bagasse	RATA-4	0806-0913	1,377.0	1,002.0	0.142	0.150	-0.008	5.6	0.130	0.012	8.2
11/30/07	Bagasse	C-5	1016-1116	1,061.9	1,066.0	0.135	0.147	-0.012	8.9	0.133	0.002	1.5
11/30/07	Bagasse	C-6	1246-1346	1,011.6	1,015.0	0.133	0.136	-0.003	2.3	0.123	0.010	7.8
11/30/07	Bagasse	C-7	1534-1634	1,063.3	1,065.0	0.126	0.132	-0.006	4.8	0.118	0.008	6.6
11/30/07	Bagasse	RATA-8	1741-1755	977.0	872.0	0.106	0.120	-0.014	13.2	0.110	-0.004	-3.8
12/11/08	Bagasse	RATA-5	1210-1231	992.3	899.5	0.116	0.120	-0.004	3.5	0.112	0.004	3.4
12/11/08	Bagasse	RATA-6	1300-1321	992.3	1,012.8	0.127	0.132	-0.005	4.0	0.122	0.006	4.4
12/11/08	Bagasse	RATA-10	1755-1815	1,001.5	1,001.0	0.142	0.136	0.006	4.2	0.121	0.020	14.4
			Average =	**988.4**	**962.8**	**0.126**	**0.133**	**-0.0071**	**6.2**	**0.120**	**0.0058**	**4.4**
Low Load Operation (Off-Crop Season)												
09/16/05	Wood Chips	1	0944-1050	427.2	427.2	0.108	0.112	-0.004	3.7	0.116	-0.008	-7.6
09/16/05	Wood Chips	2	1149-1253	421.3	421.3	0.088	0.104	-0.016	18.2	0.105	-0.017	-19.0
09/16/05	Wood Chips	3	1327-1433	424.2	424.2	0.101	0.106	-0.005	5.0	0.108	-0.007	-7.4
			Average =	**424.2**	**424.2**	**0.099**	**0.107**	**-0.008**	**8.9**	**0.110**	**-0.011**	**-11.3**

[a] Based on stack test calculations using 62-percent boiler efficiency.

[b] Based on using the average moisture from historic stack tests, which is 26.03-percent for high load operation and 22.73 for low load operation.

Checked by: NG
Reviewed by: DB

Golder Associates

TABLE 4
HEAT INPUT RATES
USSC - BOILER 8

2008 ANNUAL OPERATION

Heat input (% of max)	Hours	Percentage
Total Boiler Hours	7,500	100
75% - 100% (808 - 1170 MMBtu/hr	3,455	46
50% - 74% (539 - 797 MMBtu/hr)	1,781	24
0% - 49% (0 - 528 MMBtu/hr)	2,264	30

2008 CROP SEASON OPERATION

Heat input (% of max)	Hours	Percentage
Total Boiler Hours	5,307	100
75% - 100% (808 - 1170 MMBtu/hr	3,454	65
50% - 74% (539 - 797 MMBtu/hr)	1,619	31
0% - 49% (0 - 528 MMBtu/hr)	234	4

Checked by: NG
Reviewed by: DB

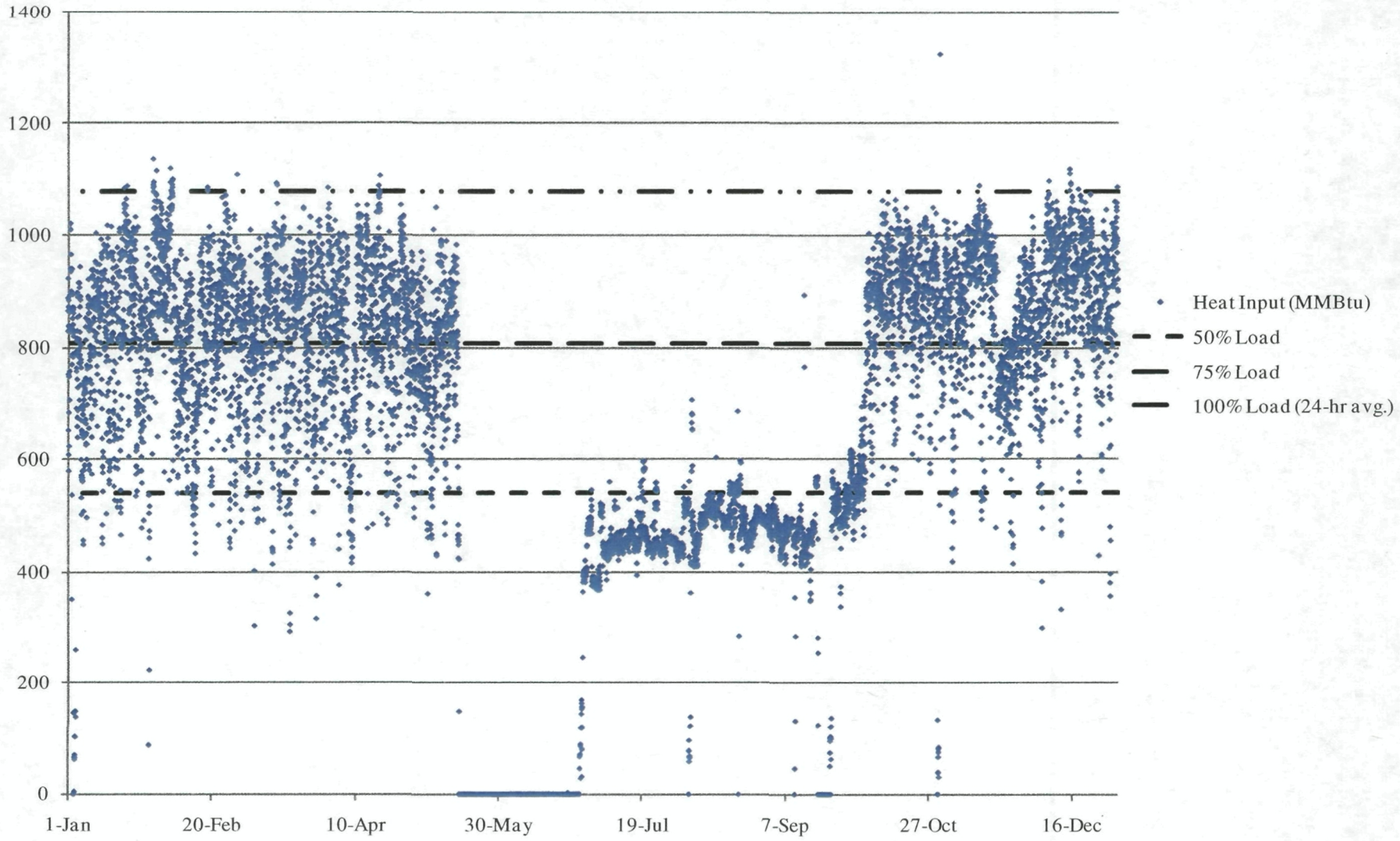

Figure 1
2008 Hourly Heat Input

Source: Golder, 2009.

Checked by: NG
Reviewed by: DB

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