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**RECEIVED**

**AUG 17 2009**



August 13, 2009

**BUREAU OF AIR REGULATION**

0938-7660

Florida Department of Environmental Protection  
Department of Air Resources Management  
2600 Blair Stone Road, MS 5500  
Tallahassee, FL 32399-2400

Attention: Mr. Jeffery Koerner, P.E., Air Permitting North

**RE: UNITED STATES SUGAR CORPORATION (U.S. SUGAR) – CLEWISTON MILL  
REQUEST TO CONDUCT SORGHUM TEST BURN ON BOILER NO. 8**

**0586003-046-AL**

Dear Mr. Koerner:

United States Sugar Corporation (U.S. Sugar) owns and operates a sugar mill and sugar refinery located in Clewiston, Hendry County, Florida. U.S. Sugar is requesting authorization from the Florida Department of Environmental Protection (FDEP) to conduct a test burn using sweet sorghum in Boiler No. 8 at the Clewiston sugar mill. U.S. Sugar desires to burn sweet sorghum in its boilers as a supplemental fuel, which would add sorghum to the supplemental fuels (fuel oil and wood chips) that are currently burned in the boilers. If the test burn is successful, sorghum would be used as fuel when bagasse is not available, primarily in the off-season, to reduce the amount of wood chips fired in the boiler.

U.S. Sugar is requesting authorization to conduct a test burn on Boiler No. 8 while burning up to 1,000 tons of sweet sorghum in the boiler, in order to verify the adequacy of the fuel feed system and the operation of the boiler when firing sorghum. Due to the characteristics of sweet sorghum, no increase in emissions of any regulated air pollutants from burning sorghum is expected.

U.S. Sugar operates five boilers at the Clewiston Mill: Boiler Nos. 1, 2, 4, 7, and 8. Each of the boilers is permitted to burn bagasse and No. 2 fuel oil. Boiler Nos. 7 and 8 are also permitted to burn wood chips, although Boiler No. 7 must still complete initial stack testing while burning wood chips. Boiler Nos. 1, 2, and 4 each have a wet scrubber controlling particulate matter (PM) emissions, while Boiler Nos. 7 and 8 each have a wet sand separator to remove sand and particulates from the flue gas prior to the induced draft fan, followed by an electrostatic precipitator (ESP) for PM control. Boiler No. 8 also has a selective non-catalytic reduction (SNCR) system for controlling emissions of nitrogen oxides (NO<sub>x</sub>).

During the off-season, Boiler No. 8 is primarily operated, and provides steam to the sugar refinery. During the off-season, Boiler No. 8 burns bagasse as available from the bagasse storage pile, but also can burn wood chips as a supplemental fuel, since not enough excess bagasse may be generated during the crop season to fully support off-season operations. Boiler No. 8 has been selected for the test burn since it is the most likely boiler to burn the sweet sorghum fuel. This also has the benefit of being able to use data from the continuous emissions monitoring system (CEMS) for carbon monoxide (CO) and NO<sub>x</sub>, to determine if there is any effect on emissions from burning sweet sorghum.

#### **TEST BURN PROGRAM**

A test burn period is requested for testing up to 4,000 tons of sweet sorghum in Boiler No. 8. The test burn period is planned to begin the week of August 31, 2009, and to run through October 1, 2009, which is the planned date of the 2009-2010 crop season. U.S. Sugar proposes to provide a 3-day notice to FDEP (since no actual stack testing will be conducted), because the exact harvest date for the sweet sorghum cannot be fixed, due to a number of factors such as weather, maturing of the crop, etc.

The test burn will be conducted during the Clewiston Mill's off-season operation (i.e., only the sugar refinery is operating; the sugar mill is shut down). Therefore, Boiler No. 8 will not be able to reach 90 percent of full load during the test burn. The expected load will be about 250,000 pounds per hour (lb/hr) steam, which represents about 43 percent of the maximum 24-hour load of 575,000 lb/hr steam. However, this would represent maximum off-season operation.

The expected mix of biomass fuels during the test burn is 75 percent bagasse/25 percent sweet sorghum. A typical off-season fuel mix for Boiler No. 8 is 75 percent bagasse/25 percent wood chips. Therefore, the sweet sorghum would effectively replace the wood chip fuel. With this fuel mix, the fuel feed rate to Boiler No. 8 would be approximately 53 tons per hour (TPH) bagasse, and 17 TPH sweet sorghum.

NO<sub>x</sub> and CO emissions from Boiler No. 8 flue gas will be recorded during the test burn using the installed CEMS.

### AIR EMISSIONS

The fuel analyses for the carbonaceous fuels fired in Boiler No. 8 are presented in Table 1, and are compared to sweet sorghum. U.S. Sugar believes that sweet sorghum can be burned in Boiler No. 8 while meeting all permitted emission limits, and that no increase in emissions of any regulated pollutant should occur. Although the available analysis for sweet sorghum is currently limited, the available data indicate that it has a somewhat higher heating value than wood chips. The expected as-burned moisture content of sweet sorghum is approximately 50 percent, which is lower than bagasse.

The analysis of sweet sorghum is very similar to bagasse and wood chips, it being a biomass fuel. It also has the advantage of being an unadulterated biomass fuel, whereas bagasse has gone through processing (being a co-product of the sugar cane processing operation), and wood chips can contain some impurities, depending on origin.

Therefore, the very small amount of sweet sorghum that will be burned in Boiler No. 8 should result in no impact on emissions. Also, the test burn will only last a short time due to the small amount of sorghum that will be available.

It is requested that U.S. Sugar be granted permission to conduct the sweet sorghum test burn as described in this letter. Please call or e-mail me if you have any questions concerning this additional information.

Sincerely,

**GOLDER ASSOCIATES INC.**

*David A. Buff*  
David A. Buff, P.E., Q.E.P.

Principal Engineer  
Florida P.E. #19011

SEALS

DB/iz

Enclosures

cc: K. Tingberg, USSC  
C. Rionda, SERF  
A. Satyal, FDEP Ft. Myers

**TABLE 1**  
**FUEL ANALYSIS RESULTS FOR U.S. SUGAR, CLEWISTON MILL**

Parameter	Units	Bagasse (dry basis) <sup>a</sup>			Wood Chips (dry basis) <sup>b</sup>			Sweet Sorghum (dry basis)	
		Min	Max	Avg	Min	Max	Avg	Stalks	Biomass <sup>c</sup>
High Heating Value	Btu/lb	7,602	8,356	7,920	4,709	8,510	7,074	7,604	7,696
Moisture	%, as received	48.99	55.07	51.63	26.4	47.4	33.4	21.2	43
Ash	%	0.87	8.40	4.53	2.7	45.7	18.5	6.0	5.4
Carbon	%	46.11	50.94	48.10	46.8	48.8	47.7	47.2	45.7
Hydrogen	%	4.71	6.62	5.91	5.47	5.57	5.53	5.8	5.9
Nitrogen	%	0.25	0.41	0.35	0.31	0.51	0.43	0.51	1.37
Oxygen	%	37.05	43.37	40.86	28.4	36.9	33.0	40.4	41.5
Sulfur	%	0.03	0.09	0.06	0.07	0.09	0.08	0.11	0.13
Sulfur dioxide	lb/MMBtu	0.08	0.24	0.16	0.22	0.24	0.23	0.30	0.36
Chlorine	%	0.038	0.092	0.058	0.15	0.21	0.17	0.39	0.17

Note:

Btu/lb = British thermal units per pound.

lb/MMBtu = pounds per million British thermal units.

<sup>a</sup> Proximate, Ultimate, and Heat Content Analyses Results for Bagasse for U.S. Sugar, Clewiston, 2002-2005.

<sup>b</sup> Wood Chip Analysis Results, 2005-2007.

<sup>c</sup> Includes stalks, leaves and grain.