ADDENDUM TO

TECHNICAL EVALUATION
&
PRELIMINARY DETERMINATION

APPLICANT

Southeast Renewable Fuels, LLC (SRF)
6424 Northwest 5th Way
Fort Lauderdale, FL 33309

PROJECT

Sweet Sorghum-to-Ethanol Advanced Biorefinery
ARMS Facility ID No. 0510032

DEP File No. 0510032-001-AC (PSD-FL-412)

COUNTY

Hendry County, Florida

PERMITTING AUTHORITY

Florida Department of Environmental Protection
Division of Air Resource Management
Bureau of Air Regulation
Special Projects Section
2600 Blair Stone Road, MS# 5505
Tallahassee, Florida 32399-2400

November 19, 2010
(Addendum to Technical Evaluation and Preliminary Determination dated October 28, 2010)

1. Project Information

On October 28, 2010 the Florida Department of Environmental Protection (Department) distributed the "Intent to Issue Air Permit" to construct a 22.11 million gallons per year (MGPY) sweet sorghum-to-ethanol advanced biorefinery based on sweet sorghum grown on adjacent farmland. The leftover stalk fiber (bagasse) and wood (to augment the bagasse will be used as fuel in a biomass boiler to make process steam and up to 30 megawatts (gross) of electricity. The SRF facility will be located just East of County Road (CR) 835 at the intersection with Hill Grade Road and approximately 13 miles south southwest of Clewiston/Lake Okeechobee in Hendry County.

The distributed package included the Department's Draft Air Construction Permit, the "Written Intent to Issue Air Permit," the "Technical Evaluation and Preliminary Determination (TEPD)," and the "Public Notice of Intent to Issue Air Permit."

The project triggered the state rules for the prevention of significant deterioration (PSD) at Section 62-212.400, Florida Administrative Code (F.A.C.) but not the federal PSD rules at 40 Code of Federal Regulations (CFR), Part 52, Section 52.21.

The Department sent copies of the package to various agencies and the governing body of the nearby Seminole Reservation. SRF did not publish the notice and on November 9, 2010 requested an extension of time in which to file a Petition for Administrative Proceedings pursuant to Rule 62-110.106(4), Florida Administrative Code (F.A.C.). The extension was granted by the Department on November 17, 2010.

The Department and applicant met on November 15 to discuss and resolve their issues and avoid the need for such an administrative hearing. The meeting initiated a process that culminated in a settlement stipulation that was signed by the Department and SRF on November 19, 2010 and also resulted in a revised package which was distributed on November 19 including this addendum to the TEPD. The key issues and their resolution are discussed in the following sections.

2. Removal of Requirement to Install at least one Catalyst

The permit included a requirement to install a selective catalytic reduction (SCR) system or an oxidation catalyst (Ox-cat). The typical function of SCR is to control nitrogen oxides (NO_X) in order to comply with best available control technology (BACT) limits. The typical function of Ox-cat is to control carbon monoxide (CO) and volatile organic compounds (VOC) in order to comply with BACT limits.

Either catalyst is also effective in the control of organic hazardous air pollutants (HAP) including dioxin and furan (D/F). Refer to the Table 1 below reproduced from the previous TEPD. The applicant estimated that the project would emit less than 10 TPY of any individual HAP and less than 25 TPY of all HAP.

Table 1 – Applicant's Estimated PTE of HAP from the SRF Project in TPY

Pollutant	HCl	HF	Cl_2	Key Metal HAP [1]	Key Organic HAP [2,3]	Other HAP	Total
Boiler	0.91	0.03	2.66	0.99	13.87	0.31	18.77
Ethanol Process					3.46		3.46
Other Sources						0.75 [4]	0.75
Total	0.91	0.03	2.66	0.99	17.33	1.06	22.98

1. Key metal HAP for the boiler consist of chromium (Cr), lead (Pb), manganese (Mn) and nickel (Ni).
2. Key organic HAP for the boiler consist of acetaldenhyde (C_2H_4O), acrolein (C_3H_4O), benzene (C_6H_6), Bis(2-ethylhexyl) phthalate ($C_{24}H_{38}O_4$), 1,4-Dichlorobenzene ($C_6H_4Cl_2$), formaldehyde (CH_2O), hexane (C_6H_{14}), styrene (C_8H_8), toluene (C_7H_8), polycyclic aromatic hydrocarbon/polycyclic organic matter (PAH/POM).
3. Key Organic HAP for the ethanol process consists of: acetaldehyde (C_2H_4O), acrolein (C_3H_4O), formaldehyde (CH_2O) and methanol (CH_4O).
4. This includes all HAP for all other sources such as fugitive emissions from equipment leaks and tanks.

Because the applicant has not yet determined whether a bubbling fluidized bed (BFB) bed or a grate stoker boiler will be constructed, it is not yet certain which catalyst (if any) will be required to meet the Department's BACT For example, the recently permitted 39.4 MGPY Highlands Ethanol Facility (HEF) project (the project most similar to SRF) will rely on a BFB boiler and selective non-catalytic reduction (SNCR) to meet the NO_X BACT limit and good combustion practices (GCP) to meet the CO BACT limit (i.e. without Ox-cat).

Additionally, the USEPA will finalize two maximum achievable control technology (MACT) rules as 40 CFR Part 63, Subparts DDDDD and JJJJJJ applicable to major and area sources respectively for the kind of boilers under consideration by SRF. The final rules will affect the type of boiler selected by the applicant and will affect the actual control equipment installed.

SRF provided the Department with a set of measures which they believe will reduce emissions of HCl to the point where the Department will have reasonable assurance that the project will not be a major source of HAP without the specific requirement of a catalyst to effect lower organic HAP emissions.

Paraphrasing, the key measures are:

- SRF will not collect and use sorghum harvest residue (such as leaves and seed clusters) as fuel in the boiler;
- SRF will specify in its contracts with growers that incidental adherence of such parts of the plants to the harvested stalks is to be minimized (limited to 5 percent or less);
- SRF will design the previously planned wet cyclone located between the furnace and the electrostatic precipitator (ESP) in such a manner that HCl control is enhanced;
- SRF will design the planned dry sorbent injection system (DSIS) including the use of reagents such as trona to further enhance HCl control; and
- SRF plans to review the kinds of fertilizers used by growers and strive to work with the growers to reduce use of chlorine-containing fertilizers.

With such measures, SRF believes and the Department accepts that HCl emissions can be reduced to 2.0 TPY thus obviating the requirement to install SCR catalyst or Ox-cat to suppress organic HAP emissions to values less than estimated in Table 1. The applicant may elect to install a catalyst based upon boiler type selected and future MACT requirements. The permit allows the installation of a catalyst should the applicant decide to do so.

3. HCl Continuous Emission Monitoring System (CEMS)

The original draft permit allowed SRF greater emissions of HCl than estimated requested (8.0 TPY versus 0.91 TPY). SRF has since requested a limit of 2.0 TPY of HCl. Therefore the estimated HAP emissions will be 24.1 TPY. The applicant has requested that the Department remove the requirements in the draft permit to install a HCl and HF-CEMS in light of the applicant's low emission estimates for these pollutants.

By removing the catalyst requirement, organic HAP emissions will not be suppressed and a higher HCl emission rate can no longer be accommodated within a HAP limitation less than 25 TPY. Whereas the HCl-CEMS was required to insure HCl emissions did not exceed 10 TPY, now it is equally needed to insure that total HAP will be less than 25 TPY.

The Department will remove the requirement to install a HF-CEMS because there is good reason to believe that emissions of HF will be an order of magnitude less than HCl. If HCl emissions are less than or equal to 2.0 TPY then HF emissions will very likely be less than 0.2 TPY and the 25 TPY total HAP ceiling will not be breached due to excessive HF emissions.

4. Ammonia (NH_3) Slip

The applicant will comply with the NO_X limit given in the draft permit of 0.10 pounds per million Btu (lb/mmBtu) or 0.08 lb/mmBtu based on the installation of a grate stoker boiler or a BFB boiler, respectively. At the same time, the project will comply with a limit of 0.10 lb CO/mmBtu regardless of the type of boiler installed.

The applicant advised that FuelTech, a well-known supplier of SNCR systems, will guarantee NH_3 slip of 25 parts per million by volume, dry (ppmvd) for the BFB boiler (35 ppmvd for the grate stoker boiler) rather than 10 ppmvd as required in the previously distributed draft permit. For reference, 10 ppmvd NH_3 slip is readily achievable while complying with the NO_X BACT limits if SCR catalyst is used.

The Department will provide for the greater NH_3 slip requested by SRF and notes the following:

- Some of the NH_3 slip will tend to reduce HCl emissions because it will react with HCl to form ammonium chloride (NH_4Cl);
- Some of the NH_3 slip will tend to react with small amounts of sulfur dioxide (SO_2), sulfur trioxide (SO_3) and sulfuric acid mist (H_2SO_4) present in the exhaust to form ammoniated sulfates and sulfites; and
- Ammoniated chlorides and sulfates/sulfites will contribute to particulate matter (PM/PM_{10}) and visible emissions (opacity).

5. PM/PM_{10} and VE Limits

The applicant requested that the PM/PM_{10} limits from the boiler be specified as 0.015 rather than 0.01 pounds per million Btu (lb/mmBtu). The two limits are for practical purposes almost equal in terms of the expressed significant figures.

In view of the greater NH_3 slip requested and the resulting additional ammoniated chlorides and sulfates/sulfites, PM/PM_{10} the Department will adjust the limit to 0.015 lb/mmBtu as requested by the applicant. However the Department has limited VE to 10 percent (%), which will encourage the applicant to design and operate the SNCR or SCR system such that NH_3 emissions are actually minimized. Examples of such designs were given in the original TEPD as exemplified by the Covanta VLN™ system employing GCP and SNCR.

It is also possible to design a wet scrubber before the stack and stripper that can remove NH_4Cl and provide for the recovery and reuse of NH_3, thus minimizing slip and VE, achieving good NO_X removal, and reducing the cost of reagent without necessarily installing a catalyst.

6. SO_2 Limit

The applicant originally requested separate limits of 0.025 and 0.11 lb SO_2/mmBtu from the boiler when firing bagasse/wood and bagasse/wood/biogas combinations respectively. The Department required that SRF operate a hydrogen sulfide (H_2S) scrubber whenever biogas is used to supplement the bagasse/wood boiler fuel and to meet a single limit of 0.025 lb SO_2/mmBtu whether or not biogas is burned in the boiler.

The applicant requested an increase to 0.06 lb SO_2/mmBtu as a single limit and clarification that the H_2S scrubber and other equipment related to SO_2 control must be operated only to the extent necessary to meet the single limit. The other SO_2 control equipment includes a dry sorbent injection system (DSIS) and limestone injection into the furnace (particularly the BFB boiler).

The requested limit is equal to the BACT SO_2 limit assigned to the HEF project. The Department will make the change as requested.

7. Comparison of SRF and HEF Project BACT Determinations

Table 2 is a comparison of the SRF and HEF ethanol project BACT determinations.

Table 2 – Applicant's Estimated PTE of HAP from the SRF Project in TPY

Project Location	CO	VOC	NO_X	PM/PM_{10} [a]	SO_2	NH_3	VE
HEF , Highlands County BFB Boiler (2010)	0.10 30-day GCP	0.005 stack test GCP	0.075 30-day SNCR [b]	0.01 (f) Stack test fabric filter	0.06 30-day BFB limestone	10 ppmvd	10%
SRF, Hendry County BFB Boiler (2010)	0.10 30-day GCP	0.010 stack test GCP	0.08 30-day SNCR [b]	0.015 (f) stack test ESP	0.06 30-day BFB limestone sorbent in ducts	25 ppmvd	10%
SRF, Hendry County Grate Stoker (2010)	0.10 30-day GCP	0.010 stack test GCP	0.10 30-day SNCR [b]	0.015 (f) stack test ESP	0.06 30-day sorbent in ducts	35 ppmvd	10%

a. (f) means filterable PM/PM10 only and excludes condensable PM/PM_{10}
b. SCR is allowed in conjunction with or as an alternative to SCR

Although the emission limits from the SRF project will be somewhat greater than those from the HEF project, they are not much different. Both projects were permitted under the Department's PSD program and required BACT determinations although both of them would not be considered major stationary sources subject to PSD and BACT per the federal PSD regulations.

8. Conclusion

The Department confirms its previous conclusion that the proposed project will comply with all applicable state and federal air pollution control regulations as conditioned by the revised Draft Permit.