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Golder Associates

November 17, 2010 093-87660

Florida Department of Environmental Protection
ATTN: Ms. Trina Vielhauer, Chief, Bureau of Air Regulation
Division of Air Resource Management
2600 Blairstone Road
Tallahassee, Florida 32399-2400

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BUREAU OF
AIR REGULATION

RE: SOUTHEAST RENEWABLE FUELS, LLC
DEP FILE NO. 0510032-001-AC (PSD-FL-412)
ADVANCED BIOREFINERY PERMIT APPLICATION
ADDITIONAL INFORMATION SUBMITTAL

Dear Ms. Vielhauer:

In follow-up to our meeting Monday, November 15, 2010, regarding the Southeast Renewable Fuels, LLC (SRF) Sweet Sorghum-to-Ethanol Advanced Biorefinery, we are providing additional information to the Department, as discussed in our meeting. The additional information is contained below and also provided in the attachment.

I. Cost of HCl/HF CEMS

Based on quotes from CEMS Solutions, the total cost of a complete CEMS package including opacity COMS, SO_2, NOx, CO, O_2, probe, sample lines, data acquisition system, shelter, etc., would be $142,000. The HCl/HF CEMS would add an additional $75,000 to $95,000 to this price, depending on the type of analyzer selected. The analyzer itself costs between $60,000 and $80,000.

Further investigation revealed that removing HF from the required CEMS would only drop the overall cost by about $3,000.

Further investigation also revealed that what would be considered an HCl "process monitor" would be the lower cost analyzer (i.e., ~$60,000). There would still be some additional cost to integrate it into the CEMS overall system.

A shown above, the HCl CEMS is extremely costly. SRF will likely go with the bubbling fluidized bed (BFB) boiler option, which has greater inherent HCl control due to contact of the combustion gases with the bed material. SRF is also proposing further reasonable assurance (see below), including an initial testing program and a lower HCl annual emission limit than contained in DEP's draft permit. For these reasons, we request that the HCl/HF CEMS requirement be removed from the permit.

II. Boiler NO_x Emissions

The bubbling fluidized bed boiler manufacturer has estimated uncontrolled NO_x emissions of 0.18 lb/MMBtu from the boiler. Based on the boiler design information, FuelTech, Inc. has quoted that an SNCR system can achieve the following NO_x emissions and ammonia slip:

1. 0.10 lb/MMBtu @ 10 ppmvd ammonia slip
2. 0.08 lb/MMBtu @ 25 ppmvd ammonia slip

SRF prefers the first option (0.10 lb/MMBtu) due to the lower ammonia slip, which reduces the potential for downstream corrosion in the economizer, air preheater, ductwork and stack. This option also reduces the potential for a visible plume and reduced $PM_{2.5}$ emissions.

III. Reasonable Assurance for Limiting HCl Emissions from Boiler

Presented below are further reasonable assurances for limiting the HCl emissions from the biomass boiler and therefore insuring the SRF facility will be a minor source of HAPs emissions.

1. Adhere to fertilization practices which minimize amount of chlorides added to soil
2. Adhere to harvesting practices which minimize amount of "trash" delivered to plant
   - Utilize harvesters which separate sorghum trash from stalks and leave trash in fields.
   - Limit sorghum trash content of deliveries from fields at no more than approximately 5 percent
3. Any trash delivered in the sorghum to the facility will go through the ethanol process (i.e., shredding, washing, etc.), and will become part of the sorghum bagasse. No trash will be sent directly to the boiler as fuel.
4. Conduct weekly sampling/analysis of sorghum bagasse from ethanol process to determine level and variability of chloride content- during first year of operation.
5. Conduct monthly sampling/analysis of wood material in wood storage pile to determine level and variability of chloride content- during first year of operation.
6. Accept annual HCl emission limit for boiler of 2.0 TPY. Short-term limit (if imposed) should be 2.6 lb/hr based on wood-firing only.
7. Boiler stack testing program during first year of operation: see Preliminary HCl Testing Protocol attached.
   - Develop final testing program protocol and submit to DEP prior to testing
   - During stack testing events, conduct concurrent sorghum feedstock, sorghum bagasse, and wood sampling/analysis for chlorine content
   - Continuously monitor dry sorbent injection rates during all testing
   - Evaluate variability of chlorine content of sorghum feedstock, sorghum bagasse and wood, as well as HCl emissions
   - Determine parametric relationship between dry sorbent injection rate, chlorine content of fuels, and HCl/Cl_2 emissions
8. Based on stack testing program, operate dry sorbent injection system at appropriate minimum rates to insure continuous compliance
9. Conduct quarterly stack sampling for HCl/Cl2 emissions (3 runs each quarter) while burning sorghum bagasse, and conduct semi-annual stack sampling for HCl/Cl2 emissions (3 runs each) while burning wood.

10. The wet cyclone will be designed to provide additional HCl control through pH control of the scrubbing liquid. During the initial construction of the wet cyclone, provisions will be made to add pH control at a later date, if it becomes necessary to meet the HCl emission limit.

IV. PRELIMINARY LEAK DETECTION AND REPAIR (LDAR) PROGRAM

A preliminary LDAR program was developed for the SRF facility pursuant to Subpart VVa and is attached.

V. Biomass Boiler Emission Limits

A. PM – As discussed previously with the Department, the PM limit for the Biomass Boiler will be revised to 0.015 lb/MMBtu.

B. SO_2 – As discussed, due to the biogas H_2S content, the SO_2 emission limit will be increased to 0.06 lb/MMBtu, 12-month rolling average. This is essentially the same limit issued to the Verenium Highlands Ethanol facility, which is 0.06 lb/MMBtu based on a 30-day rolling average. When biogas is being burned in the boiler, the biogas scrubber will be operated as necessary to meet the SO_2 emission limit.

C. HF – It is proposed to eliminate the HF emission limit. The estimated maximum HF emissions contained in the permit application are very low (0.031 TPY), and does not warrant an emission limit. Initial and annual stack testing can be performed to verify the emission factor and the annual emissions.

Thank you for considering this additional 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: Don Markley, SRF
Carlos Rionda, SRF
Jerry Paul, Capital Energy
Ronnie Moore, DEP
Al Linero, DEP
Angela Morrison, HG&S

Attachments

DB/edk

PRELIMINARY LEAK DETECTION AND REPAIR (LDAR) PROGRAM

The following preliminary Leak Detection and Repair (LDAR) program was developed for the Southeast Renewable Fuels (SRF) facility pursuant to Subpart VVa.

LDAR Program

1. PURPOSE

The objective of this procedure is to establish guidelines for implementing and managing an LDAR program at the SRF facility located near Clewiston, Florida. The use of this procedure will assure compliance with federal and state regulations.

2. SCOPE

The provisions of this Subpart VVa apply to affected facilities in the synthetic organic chemicals manufacturing industry. In the case of the SRF facility, the affected facility is the process equipment that produces ethanol. The group of all equipment (defined in §60.481a) within a process unit is an affected facility. This LDAR procedure applies to all regulated components within a process unit which are in volatile organic compound (VOC) service at the SRF facility. A "Process unit" for purposes of Subpart VVa means the following:

> *the components assembled and connected by pipes or ducts to process raw materials and to produce, as intermediate or final products, one or more of the chemicals listed in §60.489. A process unit can operate independently if supplied with sufficient feed or raw materials and sufficient storage facilities for the product. For the purpose of this subpart, process unit includes any feed, intermediate and final product storage vessels (except as specified in §60.482-1a(g)), product transfer racks, and connected ducts and piping.*
>
> "Storage vessel" under Subpart VVa is defined as follows:
>
> *A tank or other vessel that is used to store organic liquids that are used in the process as raw material feedstocks, produced as intermediates or final products, or generated as wastes. Storage vessel does not include vessels permanently attached to motor vehicles, such as trucks, railcars, barges or ships.*
>
> "In VOC service" means:
>
> *The piece of equipment contains or contacts a process fluid that is at least 10 percent VOC by weight.*

The preliminary applicability of Subpart VVa to each emissions unit at the SRF facility is presented below:

EU-001: Biomass Material Handling and Preparation
- Not Applicable – Contains no fluids or no fluids in VOC service

EU-002: Cogeneration Biomass Boiler
- Applicable only to the closed vent system routing the biogas to the boiler

EU-003: Cooling Towers
- Not Applicable – Contains no fluids in VOC service

EU-004: Ethanol Production Process
- Applicable

EU-005: Bioreactors and Biogas Flare
- Applicable to bioreactors and closed vent system to flare and to biomass boiler

EU-006: Storage Tanks
- Applicable to tanks in ethanol process and storage tanks that are in VOC service

EU-007: Truck Rack Product Loadout and Flare
- Applicable

EU-008: Miscellaneous Storage Silos
- Not Applicable – Contains no fluids or no fluids in VOC service

EU-009: Two Emergency Generators
- Not Applicable – Not part of ethanol production process

EU-010: Emergency Diesel Fueled Fire Pump Engine
- Not Applicable – Not part of ethanol production process

EU-011: Facility-Wide Fugitive VOC Emission Leaks
- Only applicable as identified above for each emissions unit.

3. LDAR PROGRAM

A. Identification of Components

- Each regulated equipment/component in VOC service will be identified on a site plot plan or on a continuously updated equipment log.
- A unique identification (ID) number will be assigned to each regulated component.
- Purchase tags and physically locate each regulated component in the facility, verify its location on the piping and instrumentation diagrams (P&IDs) or process flow diagrams, and tag each component. Update the equipment log if necessary.
- Record each regulated component and its unique ID number in a log.
- Promptly note in the equipment log when new and replacement pieces of equipment are added and equipment is taken out of service.

B. Leak Definition

- The leak definition/criteria for each regulated component will be identified. The definition of a "leak" varies by regulation, equipment type, service (e.g., light liquid, heavy liquid, gas/vapor), and monitoring interval. Certain equipment leak requirements define a leak based on visual inspections and observations (such as fluids dripping, spraying, misting, or clouding from or around components), sound (such as hissing), and smell.

C. Monitoring Components

- The monitoring intervals for each regulated equipment/component will be identified. Monitoring intervals vary according to the equipment/component type, i.e., weekly, monthly, quarterly, or annually.
- Monitor all regulated components in accordance with EPA Method 21 (40 CFR Part 60 Appendix A) at the intervals specified. Obtain background readings from regulated equipment designated as no detectable emissions: perform initially, annually, and when requested by FDEP.

D. Repairing Components

- All leaking components will be repaired as soon as practicable, but no later than five days for first attempt at repair and 15 days for final attempt at repair.
- Perform follow-up monitoring of the repaired component to ensure the component is not "leaking".
- Place all leaking components that would require a process unit shutdown on the Delayed Repair List. Record the component ID number and an explanation of why the component cannot be repaired immediately. Also include an estimated date for repairing the equipment.

E. Recordkeeping

- Maintain a list of all ID numbers for all equipment/components subject to the LDAR program.
- For valves designated as "unsafe to monitor", maintain a list of ID numbers and an explanation/review of conditions for the designation.
- Maintain detailed schematics, equipment design specifications (including dates and descriptions of any changes), and piping and instrumentation diagrams.
- Maintain the results of performance testing and leak detection monitoring, including leak monitoring results per the leak frequency, monitoring leak-less equipment, and non-periodic event monitoring.

  - Attach ID tags to all leaking equipment.
  - Maintain records of the equipment/component ID number, the instrument and operator ID numbers, and the date the leak was detected.

- Maintain a list of the dates of each repair attempt and an explanation of the attempted repair method.
- Maintain a list of the dates of successful repairs and include the results of monitoring test to determine the leak was repaired successfully.

PRELIMINARY HCL EMISSIONS TESTING PROTOCOL

Within 180 days of completing construction of the boiler, SRF shall conduct a series of HCl stack tests to determine the HCl emission rate under a variety of operating conditions and the impact of the DSIS controls on reducing HCl emissions. A correlation between dry sorbent injection rates, operating conditions, and HCl emissions shall be developed based on the testing.

A. For each set of operating conditions being evaluated, the permittee shall conduct at least a 1-hour test run to determine HCl emissions. At least twelve such test runs shall be conducted to evaluate the effect of HCl emissions based on the feedstock being used and injection rates (three different feedstocks at four different injection rates).

B. Tests shall be conducted using three different feedstocks: (i) 100 percent bagasse, (ii) 100 percent wood, and (iii) a blend of bagasse and wood that is representative of intended operating conditions.

C. The chlorine content of each feedstock and feedstock mixture used during the emissions testing shall be determined and correlated to the emission testing results.

D. At least one emission test shall be conducted with the DSIS not in operation. At least three other emission tests shall be conducted with the DSIS in operation. These tests shall be conducted at three varying injection rate levels.

E. Within 45 days following submittal of the emissions test report and no later than 90 days following the last test run conducted, the permittee shall submit a DSIS report summarizing the following: (i) the feedstock used and the corresponding chlorine content, (ii) the unit operating rate, (iii) the DSIS injection rate, and (iv) the relative influence of each operating parameter. The report shall also provide information as to the appropriate injection rate for each feedstock (and corresponding chlorine content) that will ensure compliance with the HCl emission limit (which could be a zero injection rate).

F. If the DSIS is insufficient, alone, to ensure compliance with the HCl emission limit based on this testing, then the permittee shall notify the FDEP and shall be given 180 days within which to upgrade the wet sand separator (cyclone) to include pH control for the scrubbing media which will result in additional HCl controls to further reduce HCl emissions to levels sufficient to ensure compliance with the HCl emission limit. Initial installation of the wet sand separator (cyclone) will allow for the pH controls to be added later if the testing program demonstrates that the additional controls are needed to achieve the HCl emissions limit. Compliance testing shall be performed within 60 days after completing the upgrade on the wet sand separator (cyclone).

G. For the first year of operation only, permittee shall conduct quarterly stack sampling for HCl emissions (3 runs each quarter) while burning sorghum bagasse and shall conduct semi-annual stack sampling for HCl emissions (3 runs each) while burning wood. Permittee shall conduct concurrent sorghum feedstock, bagasse, and wood sampling and analysis for chlorine content of the feedstock used during the stack testing. Permittee shall also continuously monitor the dry sorbent injection rates during all testing.

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

11/17/2010
Date

(seal)

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