UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

SEP 2 6 2012

OFFICE OF
AIR AND RADIATION

Mr. Christopher Frantz
Sabine Biofuels II, LLC.
Two Northpoint Drive, Suite 950
Houston, Texas 77060

Dear Mr. Frantz:

You requested a determination of whether Sabine's proprietary biodiesel product, when made with biogenic waste oils/fats/greases, would qualify as biomass-based diesel and advanced biofuel under the Renewable Fuel Standard Program (RFS).

The Sabine fuel pathway is not described under the existing approved fuel pathways in the RFS regulations. Through the petition process described under 40 CFR 80.1416, Sabine submitted data to EPA necessary to perform a lifecycle greenhouse gas analysis of the Sabine fuel pathway. In conducting our detailed assessment, my staff largely relied on a similar Petition approval for the Endicott Process, adjusting the analysis to account for the differences in the Sabine production process. The enclosed document "Sabine Biofuels Request for Fuel Pathway Determination under the RFS2" describes the data submitted by Sabine, the analysis conducted by the EPA, and our determination of the lifecycle greenhouse gas emissions associated with the fuel production pathway described in Sabine's petition.

Based on our assessment, fuel produced using the Sabine biodiesel pathway with biogenic waste oils/fats/greases qualifies under RFS for Biomass-Based Diesel and Advanced Biofuel (D-codes 4 & 5, respectively) RINs. This is based on Sabine meeting the other RFS regulations regarding the use of biogenic waste oils/fats/greases such as having an approved food waste separation plan in place. This approval applies specifically to Sabine Biofuels II, LLC, and to the process, materials used, fuel produced, and process energy sources as specified in the petition request submitted by Sabine.

The OTAQ Reg: Fuels Programs Registration and OTAQEMTS: OTAQ EMTS Application will be modified to allow Sabine to register and generate RINs for the production of biodiesel from the above feedstocks using a production process identified in EMTS as "Sabine Process."

If you have additional questions about this or related issues, please contact Vincent Camobreco of my staff at 202-564-9043.

Sincerely,

Margo Tsirigotis Oge, Director
Office of Transportation and Air Quality

Enclosure

Sabine Biofuels Request for Fuel Pathway Determination under the RFS2
Office of Transportation and Air Quality
September 21, 2012

Summary: On April 6, 2011 EPA issued a decision determining that fuel produced using the Endicott biodiesel pathway qualifies under the renewable fuel standard (RFS) program for Biomass-Based Diesel and Advanced Biofuel (D-codes 4 & 5, respectively) Renewable Identification Numbers (RINs). The pathway was determined to qualify based on an analysis of soybean oil as a feedstock. However, our approval also covered certain other feedstocks that have been analyzed as part of the March, 2010 RFS rule and determined to have lower impact on greenhouse gas (GHG) emissions than soybean oil. These additional feedstocks are:

- Oil from annual cover crops;
- Algal oil;
- Biogenic waste oils/fats/greases;
- Non-food grade corn oil

The approval applied specifically to Endicott Biofuels II, LLC, and to the process, materials used, fuel produced, and process energy sources as outlined and provided in the petition request submitted by Endicott Biofuels II, LLC ("Endicott"). EPA indicated we would extend a similar approval to other petitioners utilizing the same fuel pathway as Endicott upon verification that the pathway is indeed the same (see: http://www.epa.gov/otaq/fuels/renewablefuels/compliancehelp/endicott-determination.pdf).

Sabine Biofuels II, LLC ("Sabine"), a subsidiary affiliate of Endicott, requested the Agency extend a similar approval to their facility / process as utilizing the same fuel pathway as Endicott. Upon review, the Agency determined that the Sabine process is not the same fuel pathway as what was approved under the Endicott decision. However, through the petition process described under 40 CFR 80.1416, EPA performed a lifecycle greenhouse gas emissions analysis of the Sabine biodiesel pathway. This involved a straightforward application of the same methodology, and much of the same modeling used for the Endicott Petition analysis. The main difference between this analysis and the analyses completed for the Endicott Petition is the feedstock source. The Sabine process outsources one of the components of the Endicott process evaluated previously. The Sabine process facility will be utilizing high Free Fatty Acid (FFA) feedstocks as opposed to the vegetable and algal oils considered as part of the Endicott process. There are also minor differences in the yield and amounts of co-products produced. These differences generally lead to reductions in lifecycle GHG emissions for the Sabine process compared to that evaluated for the Endicott process.

EPA performed its assessment based on the modeling done for the Endicott Petition and use of biogenic waste oils/fats/greases. Based on the data submitted by Sabine and the existing biogenic waste oils/fats/greases modeling for the March, 2010 RFS rule, EPA conducted a lifecycle assessment and determined that the Sabine biodiesel pathway meets the 50% lifecycle GHG threshold requirement

defined in Clean Air Act (CAA) section 211(o)(1) for biomass-based diesel and advanced biofuels. Therefore, the Sabine biodiesel pathway qualifies for generating RINs for Biomass-Based Diesel and Advanced Biofuel (D-codes 4 & 5, respectively).

This document is organized as follows:

- *Section I. Required Information and Criteria for Petition Requests*: This section contains information on the background and purpose of the petition process, the criteria EPA uses to evaluate the petitions and the information that is required to be provided under the petition process as outlined in 40 CFR 80.1416. This section is not specific to Sabine's request and applies to all petitions submitted pursuant to 40 CFR 80.1416.
- *Section II. Available Information*: This section contains background information on Sabine and describes the information that Sabine provided and how it complies with the petition requirements outlined in Section I.
- *Section III. Analysis and Discussion*: This section describes the lifecycle analysis done for the Sabine biodiesel pathway and identifies how it differs from the analysis done for the Endicott biodiesel pathways. This section also describes how we have applied the lifecycle results to determine the appropriate D-Codes for the Sabine biodiesel pathway.
- *Section IV. Public Participation*: This section describes how this petition is an extension of the analysis done as part of the RFS2 final rulemaking.
- *Section V. Conclusion*: This section summarizes our conclusions regarding Sabine's petition, including the D-codes Sabine may use in generating RINs for fuel produced using the Sabine biodiesel pathway.

I. Required Information and Criteria for Petition Requests

A. Background and Purpose of Petition Process

As part of changes to the Renewable Fuel Standard program required by the Energy Security and Independence Act of 2007 (EISA), EPA adopted new regulations that specified the types of renewable fuels eligible to participate in the RFS program and the procedures by which renewable fuel producers and importers could generate Renewable Identification Numbers (RINs) for the qualifying renewable fuels they produce through approved fuel pathways. See 75 FR 14670 (March 26, 2010); 75 FR 26026 (May 10, 2010); 75 FR 37733 (June 30, 2010); 75 FR 59622 (September 28, 2010); 75 FR 76790 (December 9, 2010); 75 FR 79964 (December 21, 2010).

Pursuant to § 80.1426(f) (1) of the RFS regulations:

Applicable pathways. D codes shall be used in RINs generated by producers or importers of renewable fuel according to the pathways listed in Table 1 to this section, subparagraph 6 of this section, or as approved by the Administrator.

Table 1 to § 80.1426 of the RFS regulations lists the three critical components of a fuel pathway: (1) fuel type, (2) feedstock, and (3) production process. Each specific combination of the three components, or fuel pathway, is assigned a D code. EPA may also independently approve additional fuel pathways not currently listed in Table 1 for participation in the RFS program, or a third party may petition for EPA to evaluate a new fuel pathway in accordance with § 80.1416. In addition, producers of facilities identified in 40 CFR 1403(c) and (d) that are exempt from the 20% GHG emissions reduction requirement of the Act may generate RINs with a D code of 6 pursuant to 80.1426(f)(6) for a specified baseline volume of fuel.

The petition process under § 80.1416 allows parties to request that EPA evaluate a new fuel pathway's lifecycle GHG reduction and provide a determination of the D code for which the new pathway may be eligible.

B. Required Information in Petitions

As specified in 40 CFR 80.1416(b)(1), petitions must include all of the following information, and should also include as appropriate supporting documents such as independent studies, engineering estimates, industry survey data, and reports or other documents supporting any claims:

- The information specified under § 80.76 (Registration of refiners, importers or oxygenate blenders).
- A technical justification that includes a description of the renewable fuel, feedstock(s), and production process. The justification must include process modeling flow charts.
- A mass balance for the pathway, including feedstocks, fuels produced, co-products, and waste materials production.
- Information on co-products, including their expected use and market value.
- An energy balance for the pathway, including a list of any energy and process heat inputs and outputs used in the pathway, including such sources produced off site or by another entity.
- Any other relevant information, including information pertaining to energy saving technologies or other process improvements.
- Other additional information as requested by the Administrator to complete the lifecycle greenhouse gas assessment of the new fuel pathway.

In addition to the requirements stated above, parties who use a feedstock not previously evaluated by EPA must also include the following, and should also include as appropriate supporting information such as state, county, or regional crop data, commodity reports, independent studies, industry or farm survey data, and reports or other documents supporting any claims:

- Type of feedstock and description of how it meets the definition of renewable biomass.
- Market value of the feedstock.
- List of other uses for the feedstock.
- List of chemical inputs needed to produce the renewable biomass source of the feedstock and prepare the renewable biomass for processing into feedstock.
- Energy needed to obtain the feedstock and deliver it to the facility. If applicable, identify energy needed to plant and harvest the source of the feedstock and modify the source to create the feedstock.
- Current and projected yields of the feedstock that will be used to produce the fuels.
- Other additional information as requested by the Administrator to complete the lifecycle greenhouse gas assessment of the new fuel pathway.

II. Available Information

A. Background on Sabine

Sabine submitted a petition requesting authorization to generate D code 4 and 5 RINs for fuel produced through the Sabine biodiesel pathway.[1] A petition is required because the Sabine biodiesel process is not included as an approved process under the Advanced Biofuel or Biomass-Based Diesel categories in Table 1 to § 80.1426 of the RFS regulations. Sabine's process also does not qualify under the existing Endicott Petition determination because of differences in the process compared to the Endicott approval. Sabine uses the same basic proprietary Endicott process except a portion of the process is performed offsite.

B. Information Available Through Existing Modeling

As discussed, a fuel pathway under RFS is defined by three components: (1) fuel type, (2) feedstock, and (3) production process. For the Sabine biodiesel pathway addressed in Sabine's

[1] The D-Code 5 that is relevant for this petition is for biodiesel. This should not be confused with the other D-Code 5 pathways (e.g., ethanol, renewable diesel, jet fuel, heating oil, and naptha from non-cellulosic portions of separated food wastes, or sugarcane ethanol from fermentation).

petition, Sabine would use feedstock and produce a fuel that has already been analyzed as part of the Endicott Petition. Therefore, no new feedstock modeling and no new emissions impact modeling of using biodiesel as a transportation fuel was required as that was already done as part of the March, 2010 RFS final rule as applied to the Endicott Petition. This petition only requires EPA to evaluate a modified fuel production process.

The same analytical approach that was used to evaluate the lifecycle GHG emissions of the Endicott Petition was used to analyze the Sabine biodiesel pathway. The only difference is that the fuel production process step was adjusted to reflect the Sabine process. The Sabine fuel production process was evaluated for its direct emissions and its impact on the amount of feedstock and fuel produced which in turn impacts other parts of the analysis as described in the following sections.

Replacing the production process data used in the Endicott Petition with the Sabine process data resulted in the following changes to the modeling (described in more detail in the following sections):

- Amount of energy used by the fuel production process and associated emissions from fuel production and use changed to reflect Sabine's data provided in their energy balance
- Amount and type of materials used in the fuel production process and associated emission factors for production of those materials changed to reflect Sabine's data provided in their mass balance

This was a straightforward analysis based on existing modeling done for the Endicott Petition and substituting Sabine's proprietary process data, which only altered the amounts of inputs and outputs. The analyses completed for this petition utilizes the same fundamental modeling approach as was used in the Endicott Petition analyses.

C. Information Submitted by Sabine

Sabine has supplied all the required information on their production process that EPA needs to analyze their product and make a determination. Information submitted includes a technical justification that has a description of the fuel, feedstocks used, and their proprietary production process with modeling flow charts, a detailed mass and energy balance of the process with information on co-products as applicable, and other additional information as needed to complete the lifecycle greenhouse gas assessment.

III. Analysis and Discussion

A. Lifecycle Analysis

Determining a fuel pathway's compliance with CAA section 211(o)'s lifecycle GHG reduction thresholds requires a comprehensive evaluation of the renewable fuel, as compared to the gasoline and diesel that it replaces, on the basis of its lifecycle GHG emissions. The GHG emissions assessments

must evaluate the aggregate quantity of GHG emissions (including direct emissions and significant indirect emissions such as significant emissions from land use changes) related to the full lifecycle, including all stages of fuel and feedstock production, distribution, and use by the ultimate consumer.

In examining the full lifecycle GHG impacts of renewable fuels for the RFS program, EPA considers the following:

- Feedstock production – based on agricultural sector models that include direct and indirect impacts of feedstock production.
- Fuel production – including process energy requirements, impacts of any raw materials used in the process, and benefits from co-products produced.
- Fuel and feedstock distribution – including impacts of transporting feedstock from production to use, and transport of the final fuel to the consumer.
- Use of the fuel – including combustion emissions from use of the fuel in a vehicle.

EPA's evaluation of the lifecycle GHG emissions of the Sabine biodiesel pathway under this petition request is consistent with CAA section 211(o)'s applicable requirements, including the definition of lifecycle GHG emissions and threshold evaluation requirements. It was based on information regarding Sabine's production process that was submitted under a claim of Confidential Business Information (CBI) by Sabine on August 3, 2012. The information provided included the mass and energy balances necessary for EPA to evaluate the lifecycle GHG emissions of the Sabine biodiesel pathway.

The lifecycle GHG emissions of fuel produced pursuant to the Sabine biodiesel pathway were determined as follows:

Feedstock production – The Sabine biodiesel pathway involves the use of FFA feedstocks, which have already been evaluated as part of the March, 2010 RFS final rule and the Endicott Petition as biogenic waste oils/fats/greases and, therefore, no new feedstock production modeling was required.

The main difference between the Endicott Petition previously analyzed and the Sabine process is that Sabine is purchasing high FFA feedstocks directly while the Endicott process assumed purchase of any level fatty acid oils from renewable biomass feedstocks. Sabine plans to purchase high FFA feedstocks either directly or from the oleochemical industry which could convert any type of oil from renewable biomass into FFAs through a fat-splitting process that produces glycerine and FFAs. As discussed, the Endicott process and existing biodiesel pathways in the March, 2010 RFS final rule are approved for a number of different feedstocks including:

- Soybean oil
- Oil from annual cover crops;

- Algal oil;
- Biogenic waste oils/fats/greases; and
- Non-food grade corn oil

Any of these oils could be used by the oleochemical industry and converted into FFAs. The Sabine petition focuses primarily on biogenic waste oils/fats/greases as the feedstock, which is an approved feedstock under Table 1 to § 80.1426, and our evaluation was based on biogenic waste oils/fats/greases as the feedstock.

Sabine provided, as part of the information claimed CBI, their process yield in terms of pounds of FFA used per year in order to produce a given quantity of finished product. Sabine also provided information on the energy required by the oleochemical industry to process the FFA feedstock upstream of the Sabine process. This information was used to determine the GHG impacts associated with the feedstock used in the process. Feedstock GHG emissions were based on the upstream GHG impacts of biogenic waste oils/fats/greases from the March, 2010 RFS final rule and the information provided by Sabine on energy use to process the biogenic waste oils/fats/greases into FFAs.

The Endicott Petition evaluation included co-product credit from glycerine produced from converting oils from renewable biomass into FFAs. As discussed this process is happening at the oleochemical industry to produce FFAs for the Sabine process. For this petition we do not consider co-product credit for the glycerine produced during the fat-splitting process. This is a conservative approach that assumes no beneficial use of the glycerine.

Fuel production – Sabine's fuel production method is very similar to the Endicott approved process. Sabine's biodiesel process (like Endicott's) only uses methanol in the conversion of the feedstock to biodiesel, whereas other production methods utilize additional chemicals (e.g., sodium hydroxide, HCl, and sodium methoxide). In addition, there is a co-product produced called pitch. To analyze the GHG impacts of Sabine's biodiesel pathway, EPA utilized the same approach that was used to determine the impacts of processes in the Endicott Petition approval.

The GHG emissions for the fuel production component of Sabine's fuel lifecycle determination were based on the following emission sources:

- Type and amount of energy used and associated emissions per mmBtu of fuel produced
- Type and amount of raw materials used and associated emissions per mmBtu of fuel produced
- Beneficial use of any co-products produced

The amount and type of energy used was taken from Sabine's mass balance & energy balance submitted to EPA. Sabine submitted energy data on natural gas (in Btus) and electricity (in kWhs) inputs, as well as gallons of fuel produced.

The natural gas use was based on the heat required for process steam. The electrical energy use was based on electricity used for pumps, motors, and controls. The emissions from the use of this energy was calculated by multiplying the amount of energy by emission factors for fuel production and combustion, based on the same method and factors used in the March, 2010 RFS final rulemaking. The emission factors for the different fuel types are from GREET and were based on assumed carbon contents of the different process fuels. The emissions from producing electricity in the U.S. were also taken from GREET and represent average U.S. grid electricity production emissions.

Emissions from other material used in the Sabine biodiesel process were based on multiplying the amount of material used by emission factors for material production and use. Material use amount was based on Sabine's mass balance submitted to EPA. Sabine provided input data on FFAs and methanol. The emission factor for Sabine's methanol was based on the emission factor for methanol already developed as part of the March, 2010 RFS final rule (as an input to the soybean biodiesel pathway).

As previously mentioned, Sabine's biodiesel pathway produces co-product pitch (also known as "distillate bottoms"), which is a residue from the distillation process. For the Endicott Petition we assumed that pitch is burned on-site at the biofuel facility to displace a portion of the natural gas that would have otherwise been purchased for heat and power. Sabine provided information that the pitch will be sold off-site to displace residual oil and that is the displacement credit assumed here for the Sabine process.

Fuel and feedstock distribution – Sabine's feedstock and fuel type were already considered as part of the March, 2010 RFS final rule and the Endicott Petition. Therefore, the existing feedstock and fuel distribution lifecycle GHG impacts for soybean oil and biodiesel were applied to Sabine's analysis.

Use of the fuel – Sabine's biodiesel pathway produces a fuel that was analyzed as part of the March, 2010 RFS final rule and the Endicott Petition. Thus, the fuel combustion emissions calculated as part of that final rule for biodiesel were applied to our analysis of the Sabine biodiesel pathway.

Sabine's fuel was then compared to baseline petroleum diesel, using the same value for baseline diesel as in the March, 2010 RFS final rule analysis. The results of the analysis indicate that the Sabine biodiesel pathway would result in a GHG emissions reduction of 82% compared to the diesel fuel it would replace, as discussed in the following section.

B. Application of the Criteria for Petition Approval

Sabine's petition request involved a fuel pathway with a new production process, using feedstocks and producing a fuel product already considered as part of the March, 2010 RFS final rule. Sabine provided all the necessary information that was required for this type of petition request.

Based on the data submitted and information already available through analyses conducted for the March, 2010 RFS final rule and the Endicott Petition, EPA conducted a lifecycle assessment and determined that the Sabine biodiesel pathway would meet the 50% lifecycle GHG threshold requirement specified for biomass-based diesel and advanced biofuels.

Table 1 below breaks down by stage the lifecycle GHG emissions for the Sabine biodiesel pathway, the Endicott pathway utilizing soybean oil, and the 2005 diesel baseline. This table demonstrates the contribution of each stage in the fuel pathway and its relative significance in terms of GHG emissions.

Table 1: Lifecycle GHG Emissions for Sabine Biodiesel Pathway, 2022 (kg CO2-eq./mmBtu)

Fuel Type	Sabine Biodiesel (using FFAs)	Endicott Biodiesel (using soybean oil)	RFS2 2005 Diesel Baseline
Net Domestic Agriculture (w/o land use change)		-11	
Net International Agriculture (w/o land use change)		1	
Domestic Land Use Change		-10	
International Land Use Change, Mean *(Low/High)*		47 *(16/83)*	
Fuel Production	13	11	18
Fuel and Feedstock Transport	4	4	*
Tailpipe Emissions	1	1	79
Total Emissions, Mean *(Low/High)*	**18**	**43 *(12/80)***	**97**

*Emissions included in fuel production stage.

IV. Public Participation

The definitions of biomass-based diesel and advanced biofuel in CAA 211(o)(1) each specify that the terms mean renewable fuel that have " lifecycle greenhouse gas emissions, as determined by the Administrator, after notice and opportunity for comment, that are at least 50 percent less than the baseline lifecycle greenhouse gas emissions. . .." As part of the March, 2010 RFS rulemaking process, we took public comment on our lifecycle assessment of the biogenic waste oils/fats/greases biodiesel pathways, including all models used and all modeling inputs and evaluative approaches. We also acknowledged that it was unlikely that our final regulations would address all possible qualifying fuel production pathways, and we took comment on allowing the generation of RINs using a temporary D code in certain circumstances while EPA was evaluating such new pathways and updating its regulations. After considering comments, we finalized the current petition process, where we allow for EPA approval of certain petitions without going through additional rulemaking if we can do so as a

reasonably straightforward extension of the assessments conducted as part of the March, 2010 RFS rule, whereas rulemaking would be conducted to respond to petitions requiring new modeling. See 58 FR 14797 (March 26, 2010).

In responding to this petition, we have largely relied on the same biogenic waste oils/fats/greases biodiesel modeling that we conducted for the March, 2010 RFS final rule, and have simply adjusted the analysis to account for Sabine's unique production process. This includes use of the same emission factors and types of emission sources that were used in the March, 2010 RFS final rule analysis. Thus, the fundamental analyses relied on for this decision have been made available for public comment as part of that rulemaking, consistent with the reference to notice and comment in the statutory definitions of "biomass-based diesel" and "advanced biofuel." Our approach today is also consistent with our description of the petition process in the preamble to the March, 2010 RFS rule, as our work in responding to the petition was a logical extension of analyses already conducted.

V. Conclusion

Based on our assessment, fuel produced using the Sabine biodiesel pathway with biogenic waste oils/fats/greases qualifies under RFS for Biomass-Based Diesel and Advanced Biofuel (D-codes 4 & 5, respectively) RINs. This is based on Sabine meeting the other RFS regulations regarding the use of biogenic waste oils/fats/greases such as having an approved food waste separation plan in place.

This approval applies to Sabine Biofuels II, LLC, and to the process, materials used, fuel produced, and process energy sources as outlined and provided in the petition request submitted by Sabine. EPA will extend a similar approval to other petitioners utilizing the same fuel pathway as Sabine upon verification that the pathway is indeed the same. This approval is effective as of September 26, 2012, but does not meet the requirements for delayed RINs outlined in 80.1426(g)(1)(ii).

The OTAQ Reg: Fuels Programs Registration and OTAQEMTS: OTAQ EMTS Application will be modified to allow Sabine to register and generate RINs for the production of biodiesel from the above feedstocks using a production process of "Sabine Process."