Staff Summary
Method 2B Application
Endicott Biofuels II, LLC
Palm Fatty Acid Distillates to Biodiesel
(BIOD012)

Deemed Complete Date: December 9, 2013
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Certified Date: TBD

Plant Summary

Endicott Biofuels LLC will soon begin producing biodiesel (BD) from palm fatty acid distillates (PFAD) at its newly constructed plant in Port Arthur, Texas. During the development of this facility, Endicott formed a joint venture with an independent refiner, HollyFrontier Corporation. This collaboration resulted in an entity known as Sabine Biofuels II, LLC. The Port Arthur plant is designed to produce 30 million gallons of BD annually.

Unlike the more common fatty-acid methyl ester process, which cannot tolerate high fatty acid concentrations, the patented Endicott Process employed at Sabine utilizes free fatty acids to produce BD. This is accomplished via reactive distillation using the Davy process[1]. Because the Sabine Process desires free fatty acids, all natural fats or oils are accessible but those fats or oils that are waste in nature are preferred. The Sabine Process can also process glyceride oils by breaking them down into their free fatty acid components in a pre-treatment step.

Sabine's process yields a high-BTU, renewable co-product known as pitch. Because it is similar to Number 6 heavy fuel oil in terms of heat content and viscosity, pitch can displace Number 6 fuel oil in the marketplace. Number 6 fuel oil is commonly used to fuel large ocean-going vessels. The co-product credit for pitch was calculated based on its ability to displace Number 6 fuel oil in such vessels.

PFAD is a low-value byproduct of the palm oil production process. It is normally used in the U.S. as a livestock feed supplement. When it is used to produce biodiesel, therefore, PFAD inherits the GHG emissions associated with the feed that replaces it in the livestock feed market. That feed is distiller's grains with soluables (DGS) from dry mill ethanol plants.

Sabine obtains PFAD from various palm oil refineries in Southeast Asia. This feedstock is transported 30 miles via heavy-duty truck from the refiner to the port for loading onto an ocean tanker. The ocean tanker then travels approximately 13,300 miles to the Port of Houston. From the Port of Houston, the feedstock is transferred to a barge and travels 102 miles to the Sabine plant in Port Arthur. The resulting BD is then transported approximately 1,600 miles by rail to California.

[1] Davy Process: Patented process in distillation

Carbon Intensity of the Fuel Produced

The Low Carbon Fuel Standard (LCFS) lookup table currently contains no PFAD-to-biodiesel pathways utilizing the Sabine process. Therefore, the Sabine Biofuels pathway falls under the Method 2B provisions of the LCFS. Because the Sabine Biofuels application was submitted under the Method 2B process, it is not subject to the substantiality requirements with which Method 2A applications must comply (a minimum improvement of five gCO_2e/MJ, and a minimum production volume of ten million gallons per year).

The pitch co-product from Sabine's process yields a co-product credit of 18.04 gCO_2e/MJ. This credit is partially offset by the CI associated with the PFAD feedstock. Sabine estimated that CI by equating it with the co-product credit that dry mill ethanol plants earn for selling DGS into the livestock feed market (where it displaces corn). That credit is 11.51 gCO_2e/MJ. Combining this credit and feedstock CI with the GHG emissions from the fuel production, transport, and use phases of the fuel life cycle produces an overall pathway carbon intensity at 10.64 gCO_2e/MJ (as shown in Table 1).

Operations at the Sabine plant will be subject to the following conditions. These conditions are designed to ensure that the CI of the plant remain at or below the value appearing in Table 1. These conditions must be met for every gallon sold in California:

1) All gallons produced under all certified LCFS Method 2 pathways shall inherit the same CI increment from the consumption of process energy at the plant. The applicants may not allocate process energy CIs so as to reduce the total life cycle CI of some subset of the gallons produced (e.g., those being shipped to California) and increase the CI of the remaining gallons. An example of such a reallocation would be associating California-bound gallons with the consumption of biogas and non-California-bound gallons with the consumption of natural gas.
2) Except for periods of abnormal operations, such as planned maintenance or unpredictable, unavoidable, and uncontrollable *force majeure* events, the total thermal and electrical energy use values specified in the Sabine application shall not be exceeded.
3) Because the pathway carbon intensity value shown in Table 1 was based on projected production parameters rather than actual operational data, Sabine will submit thermal and electrical energy purchase receipts and pitch production records covering the first two years of operation to staff. Records must be submitted at intervals no greater than a calendar quarter. If those receipts indicate that Sabine's actual pathway carbon intensity is higher than the approved LCFS carbon intensity shown in Table 1, staff may adjust that certified value upwards.

Table 1: Proposed Lookup Table Entry

Fuel	Pathway Identifier	Pathway Description	Carbon Intensity in gCO_2e/MJ (Including Indirect Effects)		
			Direct Emissions	Land Use or Other Indirect Effect	Total
Biodiesel	BIOD012	2B Application (Specific Conditions Apply): Southeast Asian palm fatty acid distillates to Biodiesel; produced in Texas; pitch as co-product.	10.64	0	10.64

Staff Analysis and Recommendation

Staff has reviewed the Sabine Biofuels Plant application, and finds the following:

- Staff has replicated, using the CA-GREET spreadsheet, the carbon intensity values calculated by the applicant; and
- Staff agrees that the plant's actual energy consumption is not likely to exceed the energy consumption levels specified in the applicant's Method 2B application.

On the basis of these findings, staff recommends that Sabine Biofuels' application for a Method 2B pathway be approved.