PRELIMINARY DRAFT POSTED FOR PUBLIC COMMENT
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American Renewable Fuel Suppliers (ARFS)
Ethanol Dehydration Method 2B Pathway

Plant Summary

The ARFS plant is an ethanol dehydration plant located in Acajutla, El Salvador. The plant, which uses Number 6 fuel oil for process fuel and purchases electricity from the local utility, dehydrates Brazilian hydrous ethanol to 99.5 percent purity. Hydrous sugarcane ethanol consisting of 95 percent ethanol is transported to the ARFS facility via oceangoing tanker. Ethanol from arriving tankers is pumped into ARFS's storage tanks. Because hydrous ethanol is an azeotropic mixture, the water cannot be removed through simple distillation. ARFS separates water from ethanol by extractive distillation with monoethylene glycol. Anhydrous ethanol is pumped into on-site storage tanks, and then onto oceangoing tankers for export. Most of the anhydrous ethanol produced is shipped to the United States. The plant has a production capacity of about 60 million gallons per year of anhydrous ethanol.

ARFS exports anhydrous sugarcane ethanol to the U. S. under the Caribbean Basin Initiative (CBI), an economic incentive program in which Caribbean Basin countries are permitted to export ethanol to the U.S. duty-free. CBI countries are collectively allowed to export a volume of ethanol equal to seven percent of the American consumption for the prior year. Ethanol imported directly to the U. S. from Brazil is subject to import duties.

Carbon Intensity of the Fuel Produced

The Low Carbon Fuel Standard (LCFS) Lookup Table currently contains no pathway for the ethanol dehydration process. Therefore, the ARFS pathway falls under the Method 2B provisions of the LCFS. Because ARFS's 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 5 gCO_2e/MJ, and a minimum production volume of ten million gallons per year).

The total carbon intensity (CI) of the anhydrous ethanol produced by ARFS consists of the CI associated with the Brazilian sugarcane ethanol that is dehydrated in the plant, plus the CI of the dehydration process itself. The ARFS carbon intensity increment also includes a small transportation component reflecting the shipping distance differential between the existing Brazilian pathways and the proposed CBI pathway. The LCFS Lookup Table currently contains three Brazilian sugarcane ethanol pathways. The proposed ARFS pathway adds 10.56 gCO_2e/MJ to these pathways, resulting in the final carbon intensities shown in Table 1.

The operations at the plant will be subject to the following conditions designed to ensure that the carbon intensity values shown in Table 1 will be met during real time operations:

1) ARFS's total energy and electricity use values will become operating conditions upon approval by the Executive Officer of the proposed carbon intensity values. Energy and electricity use shall not exceed the current values that are classified by the applicant as confidential business information.
2) The CIs shown in Table 1 shall be reportable under the California Low Carbon Fuel Standard only when plant process thermal energy is generated with Number 6 fuel oil.
3) If ARFS uses either of its two lowest carbon intensity values, the Brazilian suppliers of hydrous ethanol must be registered with the ARB and must demonstrate that their plants qualify for the lower carbon intensity values claimed.

Table 1: Proposed Lookup Table Entries

Fuel/Feedstock	Proposed Lookup Table Pathway Description	Carbon Intensity in gCO_2e/MJ (Including Indirect Effects)	Do Special Conditions Apply? (Y/N)[1]
Anhydrous Ethanol/Hydrous Ethanol	Brazilian sugarcane ethanol dehydrated in El Salvador; Brazilian ethanol production includes mechanized harvesting, and export of electricity to the grid	68.96	Y
Anhydrous Ethanol/Hydrous Ethanol	Brazilian sugarcane ethanol dehydrated in El Salvador; Brazilian ethanol production includes export of electricity to the grid	76.96	Y
Anhydrous Ethanol/Hydrous Ethanol	Brazilian sugarcane ethanol dehydrated in El Salvador; standard Brazilian ethanol production process.	83.96	Y

[1] The special conditions to which this column refers are discussed in the "Carbon Intensity of the Fuel Produced" section of this summary

Staff Analysis and Recommendation

Staff has reviewed the ARFS Plant application, and finds the following:

- Staff has replicated, using the CA-GREET spreadsheet, the carbon intensity values calculated by the applicant;
- Staff agrees that the preliminary energy values in the application accurately represent the ARFS plant's actual energy use values.

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