PRELIMINARY DRAFT SUBMITTED FOR PUBLIC COMMENT
January 24, 2011

Green Plains Shenandoah Corn Ethanol LCFS Pathway 2A Application

Plant Summary

The Green Plains Shenandoah corn ethanol plant is located in Shenandoah, Iowa. The Shenandoah plant has an ethanol production capacity of about 50 million gallons per year of denatured ethanol. The plant is a dry mill, ICM-designed, natural gas-fired plant producing modified distillers grains with solubles (MDGS) with an average moisture content of about 53 percent and dry distillers grains with solubles (DDGS) with an average moisture content of about 10 percent. About 76 percent of the distiller's grains produced is DDGS, while about 24 percent is MDGS.

Carbon Intensity of Ethanol Produced

Although the Shenandoah plant produces distiller's grains with solubles (DGS) at two distinct moisture levels, it is applying for a single carbon intensity. The DDGS and MDGS are produced simultaneously; there is no practical way to collect data on the emissions associated with 100 percent DDGS and 100 percent MDGS. The carbon intensity of the Shenandoah plant, as calculated by Green Plains Shenandoah, is 58.14 gCO_2e/MJ of ethanol produced, excluding the carbon intensity from land use change emissions. Including the land use change carbon intensity value of 30 gCO2e/MJ, the carbon intensity for the Shenandoah plant is 88.14 gCO2e/MJ. The reference carbon intensity from the LCFS Lookup Table is 98.4 gCO_2e/MJ for midwestern gas-fired plants producing DDGS. This reference value also applies to plants producing MDGS. Because the proposed carbon intensity (CI) is five or more gCO_2e/MJ below the reference pathway CI, the proposed pathway meets the LCFS substantiality requirement. Table 1 shows the carbon intensity value for the Green Plains Shenandoah Plant.

Table 1: Proposed Lookup Table Entry for the Green Plains Shenandoah Plant

Fuel/Feedstock	Proposed Lookup Table Pathway Description	Carbon Intensity (Including Indirect Effects)	Do Special Conditions Apply? (Y/N)[1]
Ethanol/Corn	MW Dry Mill, Natural Gas, MDGS and DDGS	88.14	Y

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

The Green Plains Shenandoah plant achieves a lower carbon intensity value relative to the reference pathway through two principal means. First, the plant incorporates modern plant design developed by ICM that results in less energy use in the plant. Energy use at the Shenandoah plant is below the 36,000 BTU per gallon energy use value that forms the basis of the carbon intensity for the reference dry DGS pathway. Second, electricity use at the Shenandoah plant is

below the 1.08 kw-hr per gallon that is assumed for the reference pathway.[1] The energy use value, electricity use value, and DDGS ratio of the Shenadoah plant will become operating conditions upon approval by the Executive Officer of the carbon intensity value. The energy use and electricity use values shall not exceed the current values that are classified by the applicant as confidential business information. The ratio of DDGS to total distiller's grains with solubles (DGS) shall not exceed 76 percent, on an annual basis.

Staff Analysis and Recommendation

Staff has reviewed the Green Plains Shenandoah application and has replicated, using the CA-GREET spreadsheet, the carbon intensity value calculated by Green Plains Shenandoah. Green Plains Shenandoah has provided documentation of the Shenandoah plant's energy use and ethanol production. Staff is satisfied that the energy value in the application accurately represents the plant's energy value. Staff is satisfied that the electricity use value in the application accurately represents the plant's electricity value. Staff believes that the carbon intensity value calculated by Green Plains Shenandoah is sustainable. Consequently, staff believes that the carbon intensity value of 88.14 gCO_2e/MJ accurately represents the carbon intensity value of the Shenandoah City plant. Therefore, staff recommends that Green Plains Shenandoah's application for a Method 2A corn ethanol pathway be approved.

[1] Actual plant energy use values are classified as confidential business information and not reported herein.