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FLINT HILLS resources®

May 23, 2013

California Air Resources Board
Stationary Source Division
Criteria Pollutants Branch – 6th floor
1001 I Street
PO Box 2815
Sacramento, CA 95812

Re: Flint Hills Resources Fairmont, Nebraska (Originally Owned by ABE-Fairmont, LLC) Method 2A New Pathway Application – Revision to Correct Natural Gas Consumption from GHV to LHV Basis

We recently learned that invoices from our natural gas supplier for the natural gas consumed at our ethanol plant located near Fairmont, Nebraska are on a gross or higher heating value basis (GHV or HHV), contrary to our earlier understanding that the invoices were on a lower heating value (LHV) basis.[1] The amount of natural gas shown on the invoices was the source of the information for the natural gas consumed during the production period. This amount was the basis for the btu/gallon of ethanol used in the calculation of our carbon intensity value using the CA-GREET model.

The direct energy input for the ethanol production segment of the Corn Ethanol (Dry Mill) pathway energy use in the CA-GREET model 1.b is on the basis of LHV.[2] We have revised the energy input to put the natural gas used per gallon of ethanol on an LHV basis. The conversion factor we have used is based on the natural gas HHV and LHV physical properties in the CA-GREET model 1.b. The LHV/HHV ratio for natural gas is 0.90 using the natural gas LHV of 930 btu/ft3 and HHV of 1,030 btu/ft3.[3] This conversion factor is consistent with the reported conversion factor from the natural gas suppliers and with natural gas being composed mainly of methane. This changes our total direct energy

[1] Please refer to the letter accompanying this request attesting to GHV being the basis for the natural gas measurement. This letter documents the basis for our request to correct the CI value of our pathway based on the revised and corrected CA-GREET model input values.
[2] Detailed California-Modified GREET Pathway for Corn Ethanol Well-to-Wheel (WTW) lifecycle analysis, Version 2.1, published February 27, 2009, page 28, which states "GHG from ethanol production for dry mills is calculated based on the assumptions in Table 4.04 below and the results are shown in Table 4.05. The direct energy input for each fuel used is calculated by multiplying the total process energy (LHV) input of 36,000 Btu/gal with the percentage natural gas fuel share (89.8)." In the Corn Ethanol WTW analysis, there are 12 other references to LHV.
[3] CA-GREET Model 1.b, Fuel_Specs worksheet, cells C45 and D45.

input from 29,467 btu/gal to 26,790 btu/gal. Our power use does not change, but in the CA-GREET model, power is a percentage of total direct energy input. As a result, the percentage changes from 6.423% to 7.065%. When these input values are used, the carbon intensity value of our pathway changes from 88.84 gCO2e/MJ to **86.62** gCO2e/MJ.

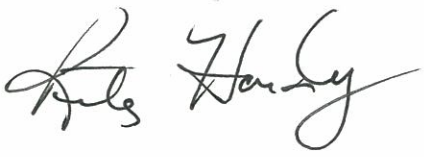
The tables in the appendix show the calculation of the input values used for the revised CI, the table of input values, and calculation of the revised CI. The production period and underlying data and documentation for this revision is identical to the original Method 2A application. The only corrections and revisions have been those described in the preceding paragraph. The tables in the appendix are to be treated as replacements of the like tables in the documents submitted with the original application.

We are also providing the ARB with the revised CA-GREET model with the revised input values for the new pathway.

We affirm that the current and anticipated future plant operations are consistent with the operations described in the original LCFS Method 2A new pathway application that is posted on the ARB web-site. We affirm that the plant continues to operate, and is expected to continue to operate, at, or below, its approved LCFS pathway CI, even on the requested corrected basis.

We request that our pathway be corrected with the revised CI value. This will enable us to better supply the California market our ethanol. We also apologize for the fact that the correct heating value basis was not recognized sooner.

Sincerely,



Rita Hardy
Vice President, Quality and Compliance
Flint Hills Resources, LP

Appendix

Table 1: Calculation of the FHR (formerly ABE) Fairmont, NE Pathway CI Value

FHR (Formerly ABE) Fairmont Ethanol Plant Sub-Pathway of the Midwest Dry Mill Ethanol Plant, 91% DDGS/8% MDGS, NG Fuel Pathway							
		CA-GREET Model Output					
	IPPC factors	Corn	Ethanol	Calculations to convert Output to g/CO2e/MJ			
	gCO2e/g	*Btu or Grams per mmbtu of Fuel Throughput*				gCO2e/mmbtu	**gCO2e/MJ**
		US Avg Corn	91% DDGS/8% MDGS	Corn w/ loss	Total Corn + EtOH		
Total energy		187,036	1,295,824	187,131	1,482,955		
VOC		16.749	54.164	17	71		
CO		151.106	22.966	151	174		
CH4	25	17.380	53.439	17	71	1,770.7	1.68
N2O	298	41.696	0.278	42	42	12,514.7	11.86
CO2	1	15,047	29,546	15,055	44,600	44,600.0	42.27
Sub-total lifecycle CI before denaturant and lt. vehicle combustion						58,885.5	55.82
Denaturant and lt. vehicle combustion effects factor							0.80
Total Lifecycle CI before ILUC with denaturant and lt. vehicle combustion effects included							56.62
Indirect Land Use Change Factor (ILUC)							30
Total CI of Pathway including Indirect Land Use Change							86.62

Table 2: CA-GREET Model Inputs for the FHR (formerly ABE) Fairmont, NE Pathway

Cell number	Default Pathway Value	FHR (formerly ABE) Fairmont Pathway Value	Units	Description	Comments
L277	36,000	26,790	btu/gal	Corn Ethanol Plant Energy Use, Dry Mill	With modern plant, lower power use
D277	2.72	2.751	gal/bu	Ethanol yield of Corn Ethanol Plant, Dry Mill	With modern plant, optimized yield
C247	10.19%	7.065%	%	Share of process energy for Electricity	With modern plant, lower power use
C254	32,330	24,897	btu/gal	Process fuel	Shown here for reference only. This cell is calculated based on cell L277 in Fuel_Prod_TS and Inputs C247
C258	1.08	0.5547	kwh/gal	Electricity used for ethanol production	Shown here for reference only. This cell is calculated based on cell L277 in Fuel_Prod_TS and Inputs C247

Table 3: Calculation of the Input Values for the FHR (formerly ABE) Fairmont, NE Pathway

Calculation of Input Values for the New Pathway CA-GREET Model: FHR (formerly ABE) Fairmont Ethanol Plant							
	Amount During the Production Period						
	Numerator or 1st Value			Denominator or 2nd Value		Calculated Input Value	
Input Value Description	Amount	units	Operator	Amount	units	Amount	units
Natural Gas HHV to LHV Conversion Factor	1,030	Btu/ft3 HHV	divided by	930	Btu/ft3 LHV	1.1075	none
Convert from HHV to LHV	3,130,777,000,000	btu, HHV	divided by	1.1075	none	2,826,818,067,961	btu, LHV
Fuel use per gallon	2,826,818,067,961	btu	divided by	113,538,663	gallons	24,897	btu/gal
Kwh Power use per gallon	62,976,983	kwh	divided by	113,538,663	gallons	0.5547	kwh/gal
Btu Power use per gallon	0.5547	kwh/gal	multiplied by	3,412.2	btu/kwh	1,892.66	btu/gal
Total energy use per gallon	24,897	btu/gal	added to	1,892.7	btu/gal	26,790	btu/gal
Power as % of total energy	1,892.7	btu/gal	divided by	26,790	btu/gal	7.065%	per cent
Gallons of ethanol per bushel	113,538,663	gallons	divided by	41,265,943	bushels	2.751	gal/bu

The natural gas we use is invoiced by the supplier on the basis of gross or higher heating value (GHV or HHV), while the CA-GREET model performs the GHG emissions calculations based on the plant energy input being on the basis of lower heating value (LHV). To convert from GHV or HHV to LHV, the HHV and LHV physical properties for natural gas in the CA-GREET model have been used to determine the conversion factor. The CA-GREET natural gas HHV and LHV physical properties and the conversion factor are shown in the table above.