November 3, 2010

Ms. Michelle Mapes
Green Plains Renewable Energy, Inc.
9420 Underwood Ave
Suite 100
Omaha, NE 68114

Method 2A Submission for Site Specific Carbon Intensity
Green Plains Holdings II LLC – Lakota Plant Division
Project 59074

Dear Ms. Mapes,

Burns & McDonnell is pleased to present our report for the Lakota facility application to the California Air Resources Board. This report has been completed in accordance with the scope of services included in our Agreement for Professional Consulting Services.

Introduction

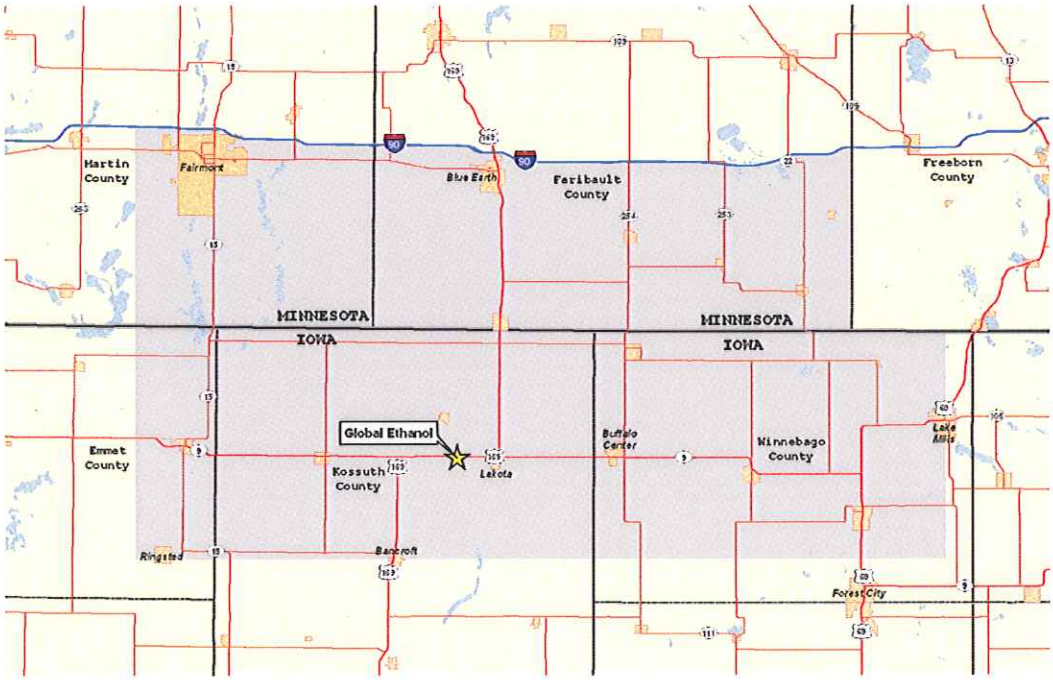
Green Plains Holdings II LLC, Lakota Plant Division (GPHL) operates a dry grind, corn based, ethanol production facility in Lakota, Iowa. The facility is an ICM designed process initially built with a 50 million gallon per year (Mgpy) capacity in 2002. The plant was expanded to 100 Mgpy capacity in 2006. The facility uses only corn grown in the surrounding five counties (three Iowa counties – Emmet, Kossuth, and Winnebago; two Minnesota counties – Martin and Faribault). 78% of the corn is shipped by truck to the GPHL facility from the farm on which it was produced. The remaining 22% of the corn is transported from the farm to local grain elevators and them by truck to the GPHL processing facility. The entire thermal requirement for the plant is generated with natural gas. 75% of the wet distillers grain and solubles are dried. 50% of the ethanol produced at the Lakota facility is shipped to the California market by rail.

GPHL seeks approval, under the Method 2A, of site-specific carbon intensity (CI) for the ethanol it produces at Lakota. The purpose of this document is to present actual data on corn production and plant operations, statistical evaluation of these data, and how these data change the inputs to the California Greenhouse Gases, Regulated Emissions, and Energy Use in Transportation (CaGREET) model. The result of the CaGREET model is a site-specific carbon intensity of 91.6 g CO_2e/MJ.

Corn Production

The GPHL Lakota facility buys all of its corn through the MaxYield Cooperative of West Bend, Iowa. All corn ethanol plants in Iowa receive corn by truck from adjacent counties. This requirement to purchase corn locally is driven by local corn demand from nearby agricultural processing facilities and the cost of transportation. MaxYield procures corn for the Lakota facility from a five county area adjacent to the plant. Figure 1 shows the geographic area from which MaxYield purchases corn for GPHL.

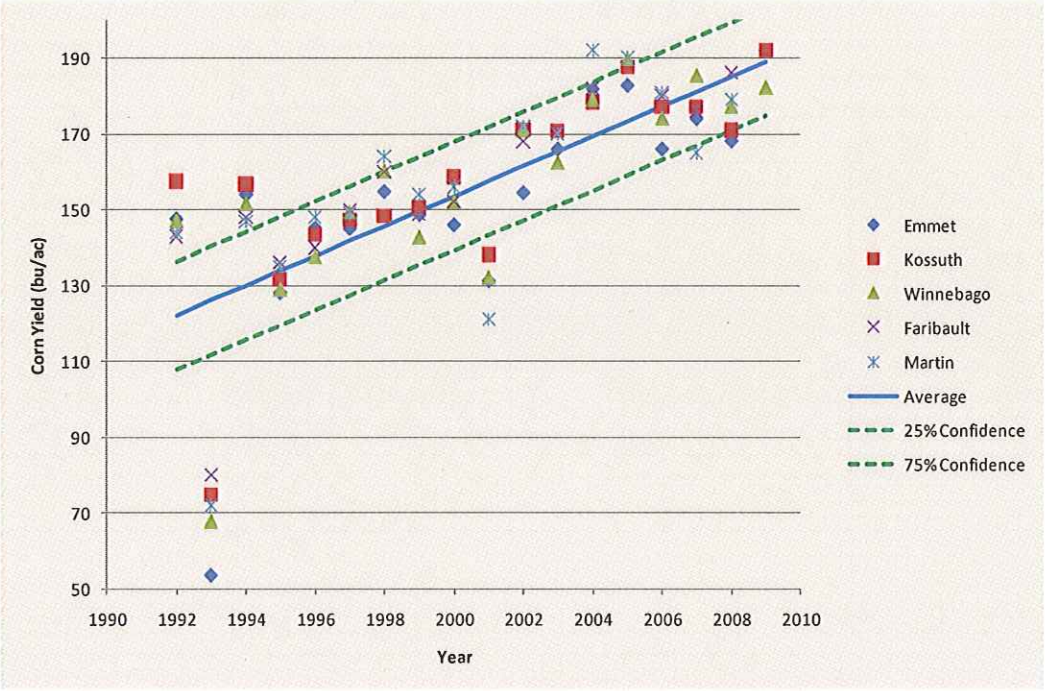
Figure 1
Farming Area of Corn Supply to the GPHL Lakota, IA Facility



The National Agricultural Statistics Service (NASS), a division of the US Department of Agriculture, determines the average corn yield for each county in the Midwest each year. The county level corn yield determination is based on an annual survey of 10% to 20% of the corn producers across each state. These yield numbers are used by insurance companies for the determination of crop loss insurance claims. Therefore, the NASS corn yield data are verifiable. Figure 2 presents the annual corn yield for the five counties from which MaxYield purchases

corn for the Lakota plant. A least-squares linear correlation was determined for the data set for each county. The value of the trend in 2009 was used to calculate an area weighted average yield for the five-county area. This value is 189.9 bu/acre (See Figure 2). This represents a 20% increase in the corn yield from the CaGREET default value of 158 bu/acre. The increasing trend over the last 15 years shows that this 2009 area weighted average yield is not only sustainable, it will likely be exceeded in the future.

Figure 2
Corn Yield Data from Counties Supplying Corn to the GPHL Lakota, IA Facility



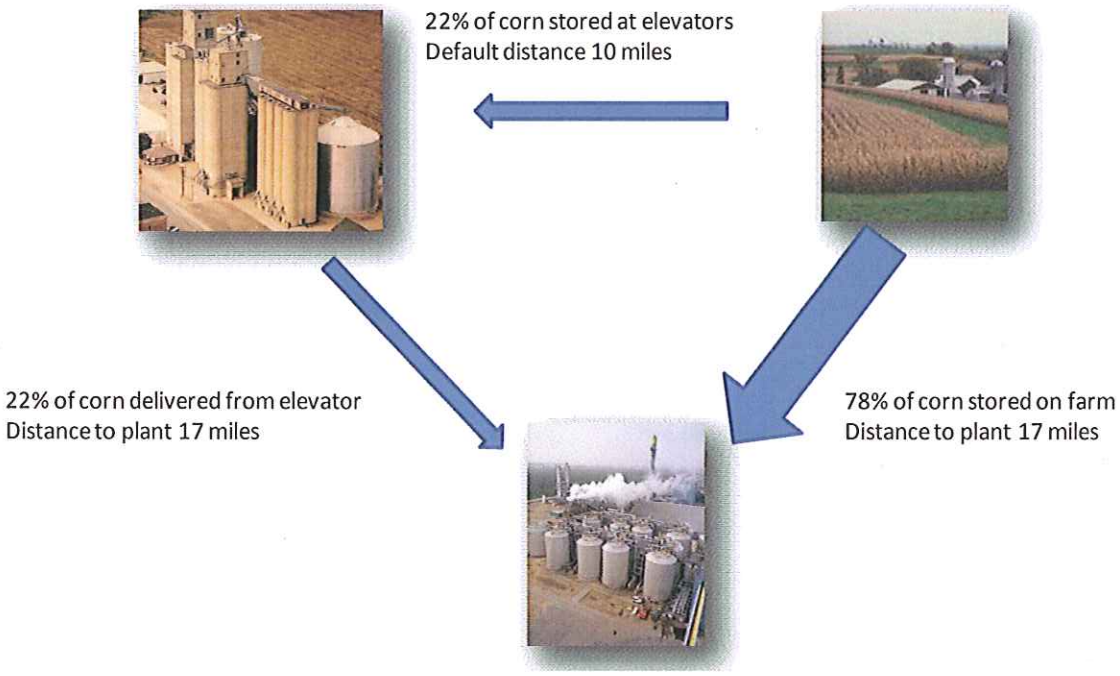
County Area Weighted Average = 189.9 bu/ac

Corn Transportation

MaxYield calculated the weight averaged transportation distance for the 2008 (17.1 miles) and 2009 (16.7 miles) crop years for corn purchased for the Lakota facility. 17 miles was the weight averaged transportation distance for the corn. This includes corn coming from on farm storage (78%) and corn coming from elevator storage (22%). Only 22% of the corn follows the farm to

elevator to plant transportation pathway assumed in the CaGREET model (See Figure 3). In order to account for on farm storage and then direct farm to plant transportation, the farm to elevator distance was revised to 2.2 miles (10 miles x 22%). The elevator/farm to plant was set at 17 miles. All data used by MaxYield for calculating transportation distances came from actual corn sales receipts, truck operational logs, and hauling payments receipts. Therefore, these data are verifiable. Market factors limit the range from which corn is procured. This is supported by these two crop years which show less than a 5% variation in transportation distance. Therefore, these data are sustainable.

Figure 3
Corn Transportation to GPHL Lakota, IA Facility



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Plant Operational Data

Thirty-five months of monthly (June 2007 through March 2010) operational data from the GPHL Lakota, IA facility was used to calculate the average plant operational parameters. Figure 4 presents the ethanol yield (gallons of undenatured ethanol per bushel of corn). It should be noted that all calculated values assume undenatured gallons of ethanol. The average value was XXX gallons per bushel with a variance of less than 10% (See Figure 4). Figure 5 presents the natural gas consumed in the plant. The average value is XXX British thermal units per gallon with a variance of less that 5% (See Figure 5). Figure 6 presents the electricity usage for the plant. The average value is XXX-kilowatt hours per gallon with a variance of less than 10% (See Figure 6).

All operational data presented was generated from purchase or sales receipts. Therefore, these data are verifiable. These data sets have a variance of less than 10% over three years of continuous operation and are therefore sustainable.

Figure 4
Ethanol Conversion Yield for the GPHL Lakota, IA Facility
(Operational Data for the GPHL Lakota, IA Facility June 2007 through March 2010 – removed because it is Business Confidential)

Figure 5
Natural Gas Usage for the GPHL Lakota, IA Facility
(Operational Data for the GPHL Lakota, IA Facility June 2007 through March 2010 – removed because it is Business Confidential)

Figure 6
Electricity Consumption for the GPHL Lakota, IA Facility
(Operational Data for the GPHL Lakota, IA Facility June 2007 through March 2010 – removed because it is Business Confidential)

CaGREET

The calculated values above were input into the CaGREET model. Table 1 shows the value and location within the spreadsheet where that value was placed. The values for ethanol yield and corn transportation were presented in the previous section. Total energy (XXX BTU/gallon) was calculated as the sum of the average natural gas usage (XXX BTU/gallon see Figure 5) and the average electrical usage expressed in BTU/gallon (XXX kWhr/gallon, shown in Figure 6, is equivalent to XXX BTU/gallon). Dry Mill was set to 100% to prevent the CaGREET model from including other types on ethanol mills in the calculation. Electricity was set to XXX % of the total energy which is equivalent to XXX BTU/gallon or XXX

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kWhr/gallon. Natural Gas was set to XXX % of the total energy (i.e., Total Energy – Electrical energy). Finally, Energy Type NG was set to 100% and Energy Type Coal was set to 0 so that the CaGREET model would calculate only the use of natural gas.

Table 2 shows the CaGREET emissions calculations from section 4.1 from the EtOH worksheet of the CaGREET model and the application of the emission factors for the calculation of the CI in grams of carbon dioxide equivalents per mega-joule of fuel energy. The site-specific carbon intensity for the GPHL Lakota, Iowa facility is 91.6 g CO_2e/MJ. Based on the verifiable and sustainable nature of the site-specific data use for this analysis, the CI value should also be considered verifiable and sustainable.

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Table 1
CaGREET Input Data for the
Site Specific CI Calculation for the GPHL Lakota, IA Facility

Sheet	Parameter	Cell	Value	Notes
Fuel_Prod_TS	Ethanol Yield	C271	XXX	Fill in all time series data with this value
	Total Energy	K271	XXX	Fill in all time series data with this value
	Dry Mill	C285	100	Fill in all time series data with this value
T&D_Flowcharts	Corn Transportation	F1309	2	
	Corn Transportation	M1313	17	
Inputs	Electricity	C247	XXX	gives XXX kWhr/gal
	Natural Gas	C246	XXX	
	Energy Type NG	C248	100	
	Energy Type Coal	C249	0	

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Table 2

Site Specific CI Calculation for the GPHL Lakota, IA Facility

Energy (Btu/mmBtu) and Emissions (g/mmBtu) Results					
Pathway Component:	Feedstock	Fuel	WTT	Fuel Com	Full Fuel Cycle
Loss factor		1.001			
Total energy	174,157	1,384,681	1,558,979.5		1,558,979.5
Fossil fuels	169,074	535,995	705,206.2		705,206.2
Coal	25,547	49,446	75,013.8		75,013.8
Natural gas	87,593	450,061	537,724.7		537,724.7
Petroleum	55,933	36,489	92,467.7		92,467.7
VOC	16.280	54.821	71.1		71.1
CO	149.041	25.931	175.1		175.1
NOx	67.848	68.609	136.5		136.5
PM10	7.862	22.651	30.5		30.5
PM2.5	4.059	6.661	10.7		10.7
SOx	33.412	5.596	39.0		39.0
CH4	16.273	63.797	80.1		80.1
N2O	41.569	0.277	41.9		41.9
CO2	14,033	35,069	49,113.1		49,113.1
GHG (g/mmBtu)	27,134.3	36,959.2	64,115.6	0	64,115.6
GHG (g/MJ)	25.7	35.0	60.8	0.00	**60.8**
				ILUC	30.0
				Denaturant	0.8
				TOTAL	**91.6**

Annual Renewal

Granting a site specific carbon intensity value assumes that the GPHL facility continues to perform at or above historical levels. In order to ensure that the ethanol produced at Lakota is less than or equal to this lower CI value, GPHL proposes an annual renewal approach. In the first quarter of the following year, GPHL will submit the previous year's operational data. The operational data will be used, as presented above, to calculate the CI of the ethanol from the Lakota facility to show the CI is at or less than the approved value.

We appreciated the cooperation and assistance given by Andrew Czech to Burns & McDonnell in the preparation of the analysis and this report. We will be available to discuss the report with you at your convenience.

Respectfully submitted,

BURNS & MCDONNELL

Patrick J. Hirl, PE, PhD
Senior Project Manager

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