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Wentworth, SD 57075
605/483-2679

July 28, 2014
Revised December 31, 2014
Contains Confidential Business Information

Re: Method 2A Application - Excluding Confidential Business Information

California Air Resources Board
Stationary Source Division
Criteria Pollutants Branch - 6th Floor
1001 I Street
P.O. BOX 2815
Sacramento, CA 95812

To: The Executive Officer

Herewith, please find our application and supporting documents for two new fuel lifecycle GHG emissions pathways using the Method 2A application process described in "Establishing New Fuel Pathways under the California Low Carbon Fuel Standard Procedures and Guidelines for Regulated Parties" report by ARB (California Air Resources Board) issued on March 25, 2010.

We seek two new pathways for our Dakota Ethanol, LLC ("Dakota Ethanol") ethanol plant located near Wentworth, South Dakota. At our facility, we produce ethanol from locally grown corn. Our facility uses natural gas for its process energy and electricity from the local grid. We simultaneously produce a mix of distillers grains co-products comprised of dry distillers grains solubles (DDGS), modified distillers grains solubles (MDGS), and wet distillers grains solubles (WDGS). We also extract corn oil that is used as animal feed and biodiesel feedstock. The soil used to grow the corn used by us does not require any lime (CaCO3) fertilizer, and as a consequence no lime fertilizer is applied to the soil used to grow the corn we use as feedstock.

We are in the process of modernizing our plant to improve the energy efficiency and expand the production capacity. The project to implement these changes is expected to be completed xxx. This application is for two new pathways, one based on the plant performance of the past 24 months (May12-April14), and the second based on our prospective performance with these efficiency and capacity changes. The prospective performance is based on a combination of historical data and engineering calculations.

The CARB LCFS regulations stipulate that only pathways lower in carbon intensity value than the main pathway they deviate from can use the Method 2A application. Our new pathways are sub-pathways of the Corn Ethanol (Midwest; Dry Mill; Dry DGS, NG) Pathway because, except for the points of deviation summarized below, our pathways are identical to the Corn Ethanol (Midwest; Dry Mill; Dry/Wet DGS, NG) Pathway described in the Detailed California-Modified GREET Pathway for Corn Ethanol Well-to-Wheel (WTW) lifecycle analysis.[1]

We have used the CA-GREET Model 1.8b to calculate the lifecycle greenhouse gas (GHG) emissions for the new pathway. Based on the input changes to the model described in the attachments, the carbon intensity value of our first pathway based on our existing operation is **85.96 gCO2e/MJ** (using 24-months of plant operating data for plant energy efficiency and ethanol yield per bushel), and the carbon intensity of our prospective, second pathway, based on the efficiency and capacity changes underway is **80.21 gCO2e/MJ**. For both these pathways, there is no-lime use for the corn used as feedstock. The following table summarizes the two pathways being requested.

Summary of Requested Dakota Ethanol Pathways in Method 2A Application		
Pathway Number	Decscription	Carbon Intensity Value, gCO2e/MJ
1	Existing Operation based on 24-months of operating data	85.96
2	Prospective Operation with Energy Efficiciency and Yield Improvements	80.21

The new pathway CI value and our production volumes more than meet the "5-10" substantiality rule and the other requirements of a new pathway.

The following sections of this lifecycle analysis provide the details and documentation of our application for new pathways under Method 2A. Portions of the following information are considered confidential business information and each page with "Contains Confidential Information" in the page header should be considered to contain confidential business information. Pages that have been redacted to remove confidential business information have "Non-Confidential, Redacted Version" in the header. Where redaction has occurs in the text, it is marked with one or more "x" symbols. The number of "x" symbols has no meaning. Each electronic file that includes the word "CONFIDENTIAL" in the file name should be considered to contain confidential business information. If the electronic file does not contain any confidential business information the file name includes the word "PUBLIC".

[1] Detailed California-Modified GREET Pathway for Corn Ethanol Well-to-Wheel (WTW) lifecycle analysis, Version 2.1, published February 27, 2009.

We request your approval and would be pleased to answer any questions you may have about our application. Following, please find the names and contact information of the persons who are available to answer any questions about our application. Please note that Houston BioFuels Consultants, LLC is assisting us with the application and may be contacted if you have questions or comments about our application.

Affiliation:	Dakota Ethanol, LLC	Houston BioFuels Consultants, LLC
Name:	Mr. Robbi Buchholtz, CFO	Mr. Logan Caldwell, Consultant
Telephone number:	1-605-483-2679	1-281-360-8515
E-mail address	rbuchholtz@dakotaethanol.com	lc@hbioc.net
Mailing Address	46269 SD Hwy 34 Wentworth, SD 57075	5707 Ridge Vista Drive Kingwood, TX 77345

Respectfully,

SCOTT MUNDT CEO

Attachments

Attachments

Section Number and Contents

I. WTW Diagram of Dakota Ethanol Sub-Pathway of the Corn Ethanol (Midwest; Dry Mill; Dry DGS, NG) Pathway

II. Dakota Ethanol Plant Information

III. Table of CA-GREET Model Inputs for Dakota Ethanol Pathway

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VII. Sustainability of Dakota Ethanol Pathway

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I. WTW Diagram of Dakota Ethanol Sub-Pathway of the Midwest Corn Ethanol Pathway

Figure 1: WTW Components of the Dakota Ethanol Pathway are Identical to the Corn Ethanol (Midwest; Dry/Wet Mill; Dry DGS, NG) Pathway[2]

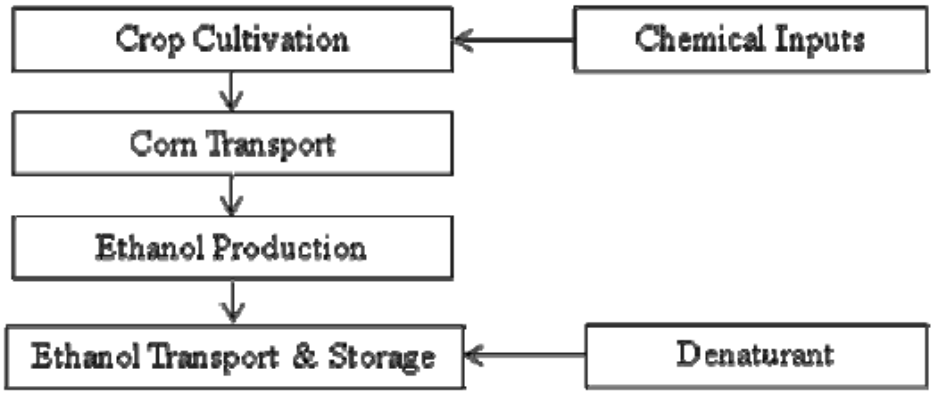

Figure 1. WTT Components for Ethanol Transported to California

[2] Detailed California-Modified GREET Pathway for Corn Ethanol Well-to-Wheel (WTW) lifecycle analysis, Page 4, Version 2.1, published February 27, 2009.

II. Dakota Ethanol Plant Information

1. EPA Facility ID Number - 70083
2. Plant Location – Wentworth, Lake County, South Dakota in the East Central NASS sub-region of South Dakota
3. History – commenced operations in September 2001
4. Capacity – 40 million gallon per year (MGY) of undenatured ethanol is the original nameplate capacity is being expanded to xxx MGY of undenatured ethanol with an increase in permitted capacity from 55 MGY to 75 MGY. [Note that the air permit does not explicitly state an ethanol production limit, but instead is based on parameters other than ethanol production, such as thermal energy use per hour.]
5. Technology – Broin dry mill. In xxx, design changes will be completed to improve the energy efficiency, ethanol yield and increase the production capacity to xxx MGY. xxx
   - xxx
6. Feedstock Type - corn
7. Product – fuel ethanol
8. Co-Products – dried distillers, moderate wet distillers, wet distillers, syrup, corn oil
9. Process fuel – natural gas
10. Power supply – electricity from the grid
11. Process Flow Description – Dakota Ethanol produces ethanol using a dry mill process.

    Locally produced corn is delivered to the facility by truck. The facility is also capable of receiving corn by rail, but the rail unloading system has never been used. The corn is loaded into one of five storage bins. The corn is pulled from storage through the scalper to remove any foreign material (e.g., cobs). From there, the corn is conveyed to the surge bin for the hammermills. The two hammermills grind the kernels into coarse flour referred to as “meal”.

    The meal is then blended with water and enzymes and cooked to prepare the starch for fermentation in four cook tanks. The cook tanks are heated with steam from the three natural gas fired boilers.

Following the cook tanks, the slurry enters one of the four batch fermenters. Corn starch in the mash is converted to ethanol by yeast in the fermentation tanks. Emissions from the cook tanks and fermenters are controlled with a wet scrubber.

Each batch of fermented mash enters the beer well for storage, awaiting distillation in a multi-column distillation process, where additional heat is added. The columns utilize the differences in the boiling points of ethanol and water to boil off and separate the ethanol, resulting in hydrous ethanol (ethanol with 5 percent water by volume). Steam for heating the distillation columns is also provided by the boilers.

The water is removed from the hydrous ethanol as it is passed through a molecular sieve, resulting in anhydrous ethanol. Denaturant is added to the ethanol to make it unfit for human consumption, and it is placed into storage. The denatured ethanol is loaded from the storage tanks into railcars or tank trucks for shipping.

The co-products from this process are syrup, DGS and corn oil. The stillage, the residue from the distillation process, is pumped out from the bottom of the columns into centrifuges. The centrifuges separate the spent grains from the thin stillage. Corn oil is mechanically extracted from the thin stillage following the centrifuge.

After corn oil extraction, four evaporators concentrate the thin stillage to a syrup containing approximately 25 percent solids and 75 percent water. Water from the evaporator is recycled back into the process. Most of the syrup is added to the DGS during the drying process. Two natural gas fired rotary dryers are used for drying DGS. The DGS can be sold as wet (WDGS), dried (DDGS), or modified (MDGS) to agricultural markets as animal feed. WDGS contains approximately 70 percent moisture or more. MDGS contains approximately 50 percent moisture. DDGS contains approximately 10 percent moisture.

12. Process Block Flow Diagram and Energy and Material Balance

For legibility, the energy and material balance for the Dakota Ethanol, LLC ethanol plant is contained in a separate pdf file accompanying the electronic version of this application.

The file name is: *DE xxxMGY Energy Material Balance CONFIDENTIAL 28Jul14.pdf*

13. Latest version of the plant's air permits.

    In a separate document/electronic file accompanying this application due to its size, please find the latest version of the plant's air permit from the state of South Dakota. This permit contains information about the equipment in the plant that generates emissions from the combustion of fuel. Also attached is the Title V construction permit for the revamped facilities

    The file name of the air permit is: *DE Current Air Permit PUBLIC.pdf*

    The file name of the construction permit is: *DE Title V Construction Permit 9Dec13 PUBLIC.pdf*

III. Table of CA-GREET Model Inputs for Dakota Ethanol Pathway

Table 1A: CA-GREET Model Inputs for the Dakota Ethanol Pathway
Existing Operation before Energy Efficiency and Yield Improvements

CA-GREET Model Sheet Name	Cell number	Default Pathway Value	Dakota Ethanol, LLC Existing Configuration Pathway Value	Units	Description	Comments
Regional LT	C2	U.S. Average	Confidential Business Information	n/a	Region for Analysis	Using Midwest corn and Midwest power
Fuel_Prod_TS	L277	36,000	Confidential Business Information	btu/gal	Corn Ethanol Plant Energy Use, Dry Mill	With modern plant, lower power use
Fuel_Prod_TS	D277	2.72	Confidential Business Information	gal/bu	Ethanol yield of Corn Ethanol Plant, Dry Mill	With modern plant, optimized yield
Inputs	C247	10.19%	Confidential Business Information	%	Share of process energy for Electricity	With modern plant, lower power use
Fuel_Prod_TS	T263	1202	Confidential Business Information	CaCO3 grams/bu	Lime fertilizer Used for Corn Farming	No Lime use needed

Table 1B: CA-GREET Model Inputs for the Dakota Ethanol Pathway
Prospective Pathway with Energy Efficiency and Yield Improvements

CA-GREET Model Sheet Name	Cell number	Default Pathway Value	Dakota Ethanol, LLC Prospective Pathway Value	Units	Description	Comments
Regional LT	C2	U.S. Average	Confidential Business Information	n/a	Region for Analysis	Using Midwest corn and Midwest power
Fuel_Prod_TS	L277	36,000	Confidential Business Information	btu/gal	Corn Ethanol Plant Energy Use, Dry Mill	With modern plant, lower power use
Fuel_Prod_TS	D277	2.72	Confidential Business Information	gal/bu	Ethanol yield of Corn Ethanol Plant, Dry Mill	With modern plant, optimized yield
Inputs	C247	10.19%	Confidential Business Information	%	Share of process energy for Electricity	With modern plant, lower power use
Fuel_Prod_TS	T263	1202	Confidential Business Information	CaCO3 grams/bu	Lime fertilizer Used for Corn Farming	No Lime use needed

IV. Basis for the Input Values - Confidential Business Information

The input values presented in this application are based on the period from May 2012 through April 2014, the "Reference Production Period," and on the engineering calculations of xxx, an engineering company, who is assisting Dakota Ethanol with the facility revamp.

xxx

Table 2: Calculation of Prospective Pathway Electrical Energy Consumption, kwh/gal

This table is considered Confidential Business Information and is not included in this non-confidential, redacted version of the application.

xxx

Table 3: Fuel Use in Existing Configuration (most recent 24 months) Pathway and Prospective Pathway with Revamped Operation

This table is considered Confidential Business Information and is not included in this non-confidential, redacted version of the application.

Table 4A: Calculation of the Input Values for the **Existing Configuration** Pathway

This table is considered Confidential Business Information and is not included in this non-confidential, redacted version of the application.

Table 4B: Calculation of the Input Values for the **Prospective Configuration** Pathway

This table is considered Confidential Business Information and is not included in this non-confidential, redacted version of the application.

xxx

xxx

V. CA-GREET Model Output and Analysis of Results

The Dakota Ethanol pathway carbon intensity value is a sub-pathway of the Midwest, Dry-Mill, 100% DDGS Co-product, 100% natural gas fuel ethanol plant pathway. The carbon intensity value of the reference default pathway is 98.4 gCO2e/MJ. The carbon intensity value of the Dakota Ethanol plant ethanol existing configuration pathway is **85.96 gCO2e/MJ** and the carbon intensity of the Dakota Ethanol prospective pathway is **80.21 gCO2e/MJ** before accounting for soil carbon sequestration.

Table 5: CI of Existing Midwest Dry Mill, 100% DDGS, 100% Natural Gas Fuel Pathway

CARB Lookup Table Reference Pathway: Midwest Dry Mill Ethanol Plant, 100% DDGS, 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	100% DDGS	Corn w/loss	Total corn + EtOH		
Total energy		187,247	1,469,428	187,342	1,656,770		
VOC		16.768	55.519	17	72		
CO		151.276	31.385	151	183		
CH4	25	17.400	73.663	17	91	2,276.8	2.16
N2O	298	41.743	0.400	42	42	12,564.9	11.91
CO2	1	15,064	41,354	15,071	56,426	56,425.9	53.48
Sub-total lifecycle CI before denaturant and lt. vehicle combustion						71,267.6	67.55
Denaturant and lt. vehicle combustion effects factor							0.80
Total Lifecycle CI before ILUC with denaturant and lt. vehicle combustion effects included							68.35
Indirect Land Use Change Factor (ILUC)							30
Total CI of Pathway including Indirect Land Use Change							98.35

Note: The calculated result of this pathway prior to making the input changes for the Dakota Ethanol, LLC ethanol plant is 67.55 gCO2e/MJ. This matches the Corn Ethanol WTW Analysis result of 67.6 gCO2e/MJ (Table B. GHG Emissions Summary for Dry and Wet Mill Corn Ethanol, page 5) before the denaturant and light vehicle combustion factor of 0.8 gCO2e/MJ is added.

Table 6A: Dakota Ethanol, Wentworth, South Dakota Ethanol Plant CI Calculation based on the CA-GREET Model Output for the **Existing Configuration** Pathway

Dakota Ethanol, LLC Ethanol Plant Existing Configuation Pathway, based on May12 - Apr14 Data, No Lime Use							
		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	Midwest	Corn w/ loss	Total Corn + EtOH		
Total energy		156,085	1,345,210	156,164	1,501,375		
VOC		16.445	54.550	16	71		
CO		149.140	25.513	149	175		
CH4	25	14.199	59.147	14	73	1,833.8	1.74
N2O	298	41.717	0.316	42	42	12,531.9	11.88
CO2	1	10,842	32,985	10,847	43,832	43,832.0	41.55
Sub-total lifecycle CI before denaturant and lt. vehicle combustion						58,197.8	55.16
Denaturant and lt. vehicle combustion effects factor							0.80
Total Lifecycle CI before ILUC with denaturant and lt. vehicle combustion effects included							55.96
Indirect Land Use Change Factor (ILUC)							30
Total CI of Pathway including Indirect Land Use Change							85.96

For reference see CA-GREET 1.8b file:
DE CA GREET Model of Existing Configuration Pathway CONFIDENTIAL 30Dec14.xls

Table 6B: Dakota Ethanol, Wentworth, South Dakota Ethanol Plant CI Calculation based on the CA-GREET Model Output for the **Prospective Configuration** Pathway

Dakota Ethanol, LLC Ethanol Plant Sub-Pathway of the Midwest Dry Mill Ethanol Plant: Rvamp Case xxx MGY - No Lime Use							
		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	xxx MGY Revamp Case	Corn w/ loss	Total Corn + EtOH		
Total energy		155,877	1,248,293	155,955	1,404,248		
VOC		16.423	53.801	16	70		
CO		148.941	22.455	149	171		
CH4	25	14.180	47.366	14	62	1,538.8	1.46
N2O	298	41.661	0.282	42	42	12,505.3	11.85
CO2	1	10,827	27,255	10,833	38,088	38,087.8	36.10
Sub-total lifecycle CI before denaturant and lt. vehicle combustion						52,131.9	49.41
Denaturant and lt. vehicle combustion effects factor							0.80
Total Lifecycle CI before ILUC with denaturant and lt. vehicle combustion effects included							50.21
Indirect Land Use Change Factor (ILUC)							30
Total CI of Pathway including Indirect Land Use Change							80.21

For reference see CA-GREET 1.8b file:
GREET model DE Revamp xxx MGY with No Lime Use CONFIDENTIAL 27Jul14.xls

VI. Production Range of Dakota Ethanol Pathway

The new pathways should be applicable to the Dakota Ethanol facilities for production rates from 40,000,000 gallons to 75,000,000 gallons per year.

VII. Sustainability of Dakota Ethanol Pathway

The Dakota Ethanol facility was designed and constructed using well-established modern designs and equipment and is managed by professional staff well-qualified to assure that over time the energy efficiency of and emissions from the facility do not deteriorate. Any deterioration would result in a less profitable business. Thus the sustainability of the plant is well aligned with the business objectives of the owners.

VIII. Impact on Land Use

There is negligible difference between the land use of this sub-pathway and that of the Corn Ethanol (Midwest; Dry Mill; Dry DGS, NG) Pathway described in the Detailed California-Modified GREET Pathway for Corn Ethanol Well-to-Wheel (WTW) lifecycle analysis.[3].

[3] Detailed California-Modified GREET Pathway for Corn Ethanol Well-to-Wheel (WTW) lifecycle analysis, Version 2.1, published February 27, 2009.

IX. Documentation of Annual Quantities of Feedstock, Utilities and Production

Table 7: Summary of Inputs and Outputs during 24 Month Reference Production Period

This table is considered Confidential Business Information and is not included in this non-confidential, redacted version of the application.

The utilities quantities in the preceding table showing the actual monthly utility use are documented by the utility invoices with the files named:

- *DE NG invoices May12-Apr14 CONFIDENTIAL.pdf*
- *DE electricity invoices May12-Apr14 CONFIDENTIAL.pdf*

The accuracy and authenticity of all the data in this new pathway application are attested to in a letter from Mr. Scott Mundt, C.E.O. and general manager of Dakota Ethanol, LLC in an accompanying file named:

- *Transmittal Letter Attesting to Accuracy of Data PUBLIC 28Jul14.pdf.*