ADVANCED BIOENERGY

8000 Norman Center Drive
Suite 610
Bloomington, MN 55437
P: 763.226.2701
F: 763.226.2725
TF: 866.794.5424

Note: Flint Hills Resources acquired Fairmont Plant on December 7, 2012 from Advanced BioEnergy

August 19, 2011

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 a fuel lifecycle GHG emissions pathway 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 a pathway for our ABE Fairmont, LLC ("ABE Fairmont") ethanol plant located near Fairmont, Nebraska. At our facility, we produce ethanol from locally grown corn. Our facility is a modern, ICM designed corn ethanol dry mill and uses natural gas for its process energy and electricity from the local grid. Approximately 91% of our distillers grains co-product is dried distillers grains solubles (DDGS) and the remainder is modified distillers grains solubles (WDGS) with approximately 50% water by weight.

The CARB LCFS regulations stipulate that only pathways lower in carbon intensity value than the main pathway that they deviate from can use the Method 2A application. Our pathway is a sub-pathway of the Corn Ethanol (Midwest; Dry Mill; Dry DGS, NG) Pathway because, except for the points of deviation summarized below, our pathway is 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]

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

We have used the CA-GREET Model 1.8b to calculate the lifecycle greenhouse gas emissions from this sub-pathway. Based on the input changes to the model described in the attachments, the carbon intensity value of this new pathway is 88.84 gCO2e/MJ. This CI intensity value and our production volumes more than meet the "5-10" substantiality rule and the other requirements of a new pathway.

The following sections to this application provide the details and documentation of our application for a new pathway under Method 2A. Portions of the following information that we consider Confidential Business Information have been clearly marked as such, *but are not included in this non-confidential version of the application. In this version of the application, the points where elements of Confidential Business Information have been removed from the text or accompanying tables are indicated so as to inform the public that the complete application to the ARB contained additional information to support this application, but that such information is considered by us to be Confidential Business Information.*

We request your approval and would be glad 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 are assisting us with the application and may be contacted if you have questions or comments about our application

Affiliation:	Advanced BioEnergy, LLC	Houston BioFuels Consultants, LLC
Name:	Ty Weisendanger	Mr. Logan Caldwell, Consultant
Telephone number:	1-763-226-2701	1-281-360-8515
e-mail address	ty.weisendanger@advancedbioenergy.com	lc@hbioc.net
Mailing Address	8000 Norman Center Drive Suite 600, Bloomington, MN 55437	5707 Ridge Vista Drive Kingwood, TX 77345

ABE FAIRMONT, LLC
By: Advanced BioEnergy, LLC
Its: Member

By: Richard Peterson
Title: CEO

Attachments

Attachments

Section Number and Contents

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

II. Advanced BioEnergy Fairmont Plant Information

III. Table of CA-GREET Model Inputs for Advanced BioEnergy Fairmont Pathway

IV. Basis for the Input Values

V. CA-GREET Model Output and Analysis of Results

VI. Production Range of Advanced BioEnergy Fairmont Pathway

VII. Sustainability of Advanced BioEnergy Fairmont Pathway

VIII. Impact on Land Use

IX. Documents supporting Annual Quantities of Corn, DGS, Ethanol, Natural Gas and Power

I. WTW Diagram of Advanced BioEnergy Fairmont Sub-Pathway of the Midwest Corn Ethanol Pathway

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

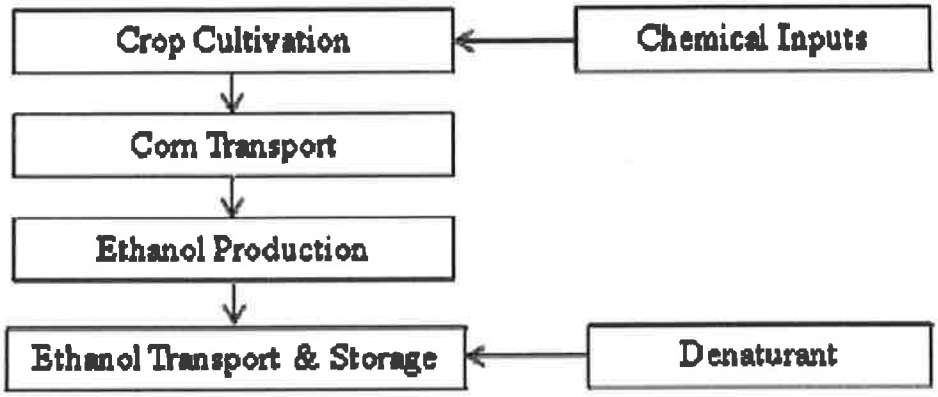


Figure 1. WTT Components for Ethanol Transported to California

[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. Advanced BioEnergy Fairmont Plant Information -

Advanced BioEnergy Fairmont Plant Info

1. EPA Facility ID Number -70103
2. Plant Location – Fairmont, Nebraska
3. History – Startup Date October, 2007
4. Capacity Notes – 100,000,000 gallons of undenatured ethanol nameplate capacity/yr.
5. Technology - ICM
6. Feedstock Type - Corn
7. Product – Denatured Ethanol
8. Co-Products – DDGS, MDGS, Corn Oil
9. Process fuel – Natural Gas
10. Power supply – Local Electric Grid
11. Process Flow Description – please refer to the following diagram. – The following description and diagram of the dry mill process is from the ICM Inc. web site.

Delivery/Storage
Grain is delivered by truck or rail to the ethanol plant where it's loaded in storage bins designed to hold enough grain to supply the plant for 6-8 days.

Milling
The grain is screened to remove debris and ground into course flour.

Cooking (Hot Slurry, Primary Liquefaction, and Secondary Liquefaction)
During the cook process, the starch in the flour is physically and chemically prepared for fermentation.

Hot Slurry
The milled grain is mixed with process water, the pH is adjusted to about 5.8, and an alpha-amylase enzyme is added. The slurry is heated to 180–190°F for 30–45 minutes to reduce viscosity.

Primary Liquefaction
The slurry is then pumped through a pressurized jet cooker at 221°F and held for 5 minutes. The mixture is then cooled by an atmospheric or vacuum flash condenser.

Secondary Liquefaction
After the flash condensation cooling, the mixture is held for 1–2 hours at 180–190°F to give the alpha-

amylase enzyme time to break down the starch into short chain dextrins. After pH and temperature adjustment, a second enzyme, glucoamylase, is added as the mixture is pumped into the fermentation tanks.

Simultaneous Saccharification Fermentation
Once inside the fermentation tanks, the mixture is referred to as mash. The glucoamylase enzyme breaks down the dextrins to form simple sugars. Yeast is added to convert the sugar to ethanol and carbon dioxide. The mash is then allowed to ferment for 40-50 hours, resulting in a mixture that contains about 15% ethanol as well as the solids from the grain and added yeast.

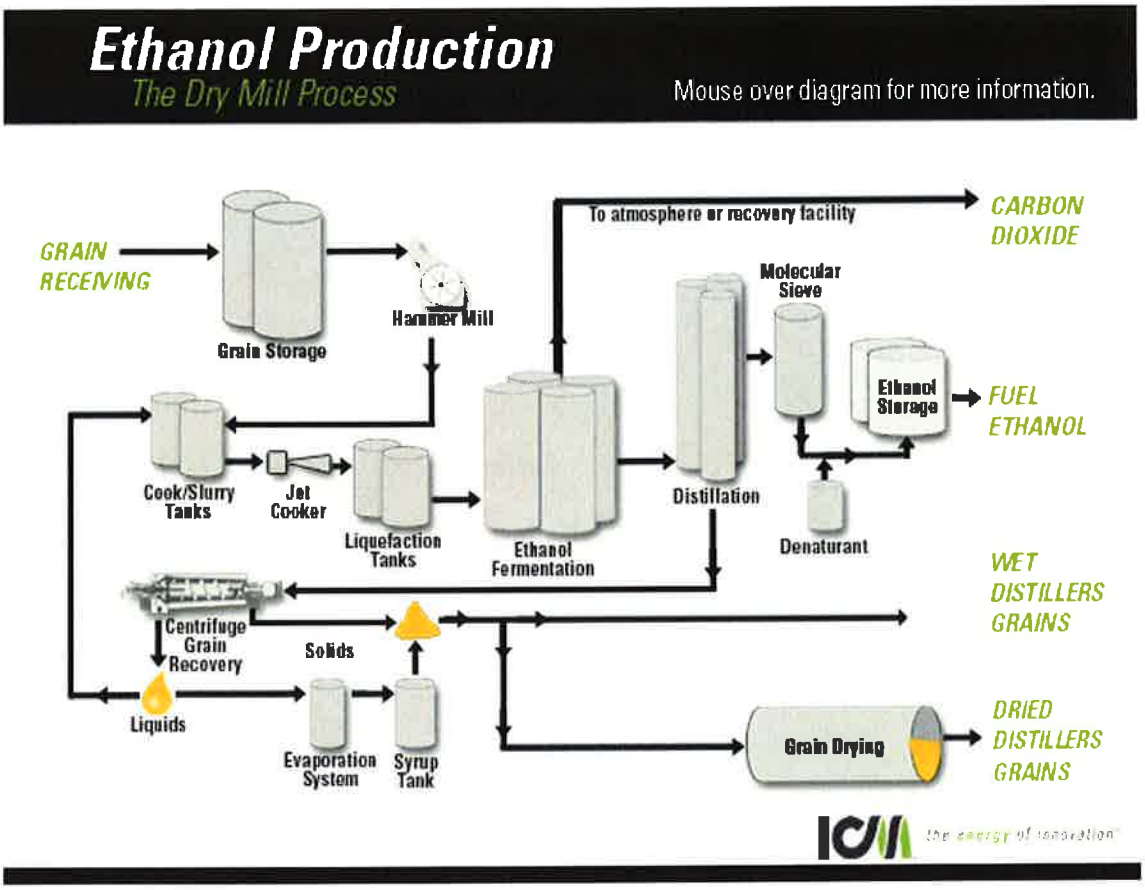
Distillation
The fermented mash is pumped into a multi-column distillation system where additional heat is added. The columns utilize the differences in the boiling points of ethanol and water to boil off and separate the ethanol. By the time the product stream is ready to leave the distillation columns, it contains about 95% ethanol by volume (190-proof). The residue from this process, called stillage, contains non-fermentable solids and water and is pumped out from the bottom of the columns into the centrifuges.

Dehydration
The 190-proof ethanol still contains about 5% water. It's passed through a molecular sieve to physically separate the remaining water from the ethanol based on the different sizes of the molecules. This step produces 200-proof anhydrous (waterless) ethanol.

Ethanol Storage
Before the ethanol is sent to storage tanks, a small amount of denaturant is added, making it unfit for human consumption. Most ethanol plants' storage tanks are sized to allow storage of 7–10 days' production capacity.

12. Process Block Flow Diagram

Source: ICM Inc.



13. Energy and Material Balance - **Confidential Business Information**

For legibility, the material and energy balance for the ABE Fairmont ethanol plant is contained in a separate pdf file accompanying the electronic version of this application and is a separated document in the printed, hard copy version of this application. **However, because it contains Confidential Business Information, it is not included in this non-confidential version of the application.**

14. In a separate document/electronic file accompanying this application due to its size, please find the latest version of the plant's air permits. These permits contain information about the equipment in the plant that generates emissions from the combustion of fuel.

III. Table of CA-GREET Model Inputs for Advanced BioEnergy Fairmont Pathway - Confidential Business Information

Table 1: CA-GREET Model Inputs for the Advanced BioEnergy Fairmont Pathway

CA-GREET Model Sheet Name	Cell number	Default Pathway Value	ABE Fairmont Pathway Value	Units	Description	Comments
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
Inputs	C254	32,330	Confidential Business Information	btu/gal	Process fuel	Shown here for reference only. This cell is calculated based on cell L277 in Fuel_Prod_TS and Inputs C247
Inputs	C258	1.08	Confidential Business Information	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

IV. Basis for the Input Values - Confidential Business Information

The input values presented in this application are based on the period from July 2010 through June 2011, the "Production Period".

Table 2: Calculation of the Input Values

Table 2 is considered Confidential Business Information and is not included in this non-confidential version of the application.

V. CA-GREET Model Output and Analysis of Results

The Advanced BioEnergy Fairmont 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 base pathway is 98.4 gCO2e/MJ. The carbon intensity value of the Advanced BioEnergy Fairmont ethanol plant ethanol is 88.84 gCO2e/MJ.

Table 3: 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		16.8	55.5	17	72		
CO		151.3	31.4	151	183		
CH4	25	17.4	73.7	17	91	2,276.8	2.16
N2O	298	41.7	0.4	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 ABE Fairmont 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 4: ABE Fairmont, Nebraska Ethanol Plant CI Calculation based on the CA-GREET Model Output

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	1,333,372	187,131	1,520,503		
VOC		16.749	54.454	17	71		
CO		151.106	24.167	151	175		
CH4	25	17.380	57.999	17	75	1,884.7	1.79
N2O	298	41.696	0.292	42	42	12,518.7	11.87
CO2	1	15,047	31,774	15,055	46,828	46,828.4	44.39
Sub-total lifecycle CI before denaturant and lt. vehicle combustion						61,231.8	58.04
Denaturant and lt. vehicle combustion effects factor							0.80
Total Lifecycle CI before ILUC with denaturant and lt. vehicle combustion effects included							58.84
Indirect Land Use Change Factor (ILUC)							30
Total CI of Pathway including Indirect Land Use Change							88.84

VI. Production Range of Advanced BioEnergy Fairmont Pathway -

The new pathway should be applicable to the Advanced BioEnergy Fairmont facilities for at least 80% (80,000,000 gallons/year to126% (126,000,000 gallons/year) of Nameplate Capacity.

Discussion

ADVANCED BIOENERGY

August 19, 2011

Re: Method 2A Application/Production Range

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

This new pathway application submitted is valid to the ABE – Fairmont, LLC's facility for at least 80% (80 mm gallons) to 126% (126 mm gallons) of denatured nameplate capacity. The energy consumption per gallon produced will be equal to or less than the values in this pathway over the specified range.

Grant H. Johanson

VP – of Operations
Advanced BioEnergy, LLC

VII. Sustainability of Advanced BioEnergy Fairmont Pathway

The Advanced BioEnergy Fairmont 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. Documents supporting Annual Quantities of Ethanol, Natural Gas and Power – Confidential Business Information

Table 5: Summary of Inputs and Outputs during Production Period and the 12 months prior to the Production Period

Table 5 is considered Confidential Business Information and is not included in this non-confidential version of the application.

Table 6: Summary of the Monthly Natural Gas Invoices

Table 6 is considered Confidential Business Information and is not included in this non-confidential version of the application.

Documents authenticating the amounts shown in the tables above are included on the following pages. **Because these documents contain confidential business information, they are not shown in this non-confidential version of the application support document.**

ADVANCED BIOENERGY

8000 Norman Center Drive
Suite 610
Bloomington, MN 55437
P: 763.226.2701
F: 763.226.2725
TF: 866.794.5424

August 10, 2011

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

Re: ABE Fairmont, LLC Ethanol Plant Method 2A New Pathway Application – Accuracy of Data in New Pathway Application

This is to certify that the quantities of corn, undenatured ethanol, distillers grains solubles, corn oil and utilities summarized in the ABE Fairmont, LLC ethanol plant application for a new pathway are true and accurate. These quantities represent the true and accurate production, feedstock use, and utility consumption of our plant located at 1214 Road G, Fairmont, Nebraska, and owned by ABE Fairmont, LLC.

Regards,

Richard Peterson
Advanced BioEnergy, LLC
CEO