

December 8, 2010



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 Hawkeye Renewables, LLC ethanol plant located in Iowa Falls, Iowa. At our facility, we produce approximately 95 million gallons per year of ethanol (undenatured basis) from #2 yellow dent corn using ICM’s dry-mill technology. Our facility also produces dry 94% dried distillers grains solubles (DDGS) at nominal 10%wt. moisture and 6% modified distillers grains solubles MMDGS) at a nominal 50%wt moisture content. Our facility uses natural gas for its process energy and electricity from the local grid. The corn is sourced locally from north-east and north-central Iowa.

**Hawkeye Renewables, LLC**

P.O. Box 2523 • 224 S. Bell Ave • Ames, IA 50010-2523 • Office (515) 233-5577 • Toll Free (866) 681-5577 • Fax (515) 233-5902  
www.hawkrenew.com

The CARB LCFS regulations stipulate that only pathways lower in carbon intensity value than 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 DGS, NG) Pathway described in the Detailed California-Modified GREET Pathway for Corn Ethanol Well-to-Wheel (WTW) lifecycle analysis.<sup>1</sup>

Our sub-pathway is different from the Corn Ethanol (Midwest; Dry Mill; Dry DGS, NG) Pathway. Our corn to ethanol production process is more energy efficient than the standard pathway based on actual performance during the 12 month production period.

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 91.56 gCO<sub>2</sub>e/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 attachments to this application support document 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 on each page. Pages in the attachment with 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

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

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:	Hawkeye Renewables, LLC	Houston BioFuels Consultants LLC
Name:	Mr. Michael Sticklen	Mr. Logan Caldwell, Consultant
Telephone number:	1-515-233 5831	1-281-360-8515
e-mail address	<a href="mailto:msticklen@hawkeye-energy.com">msticklen@hawkeye-energy.com</a>	<a href="mailto:lc@hbioc.net">lc@hbioc.net</a>

Mailing Address	224 South Bell Ave Ames, IA 50010	5707 Ridge Vista Drive Kingwood, TX 77345
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Michael J. Sticklen  
SVP Technology & Engineering  
Hawkeye Renewables, LLC  
224 South Bell Ave.,  
Ames, IA 50010  
515-233 5577

Attachments

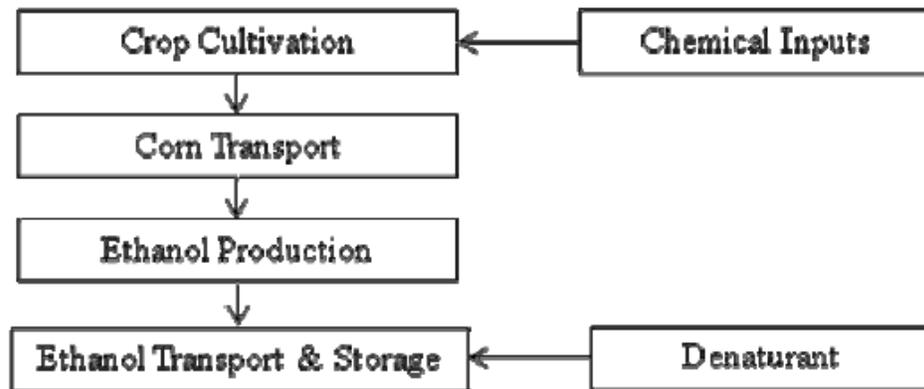
## **Attachments**

### Section Number and Contents

- I. WTW Diagram of Company Sub-Pathway of the Corn Ethanol (Midwest; Dry Mill; Dry DGS, NG) Pathway
- II. Company Plant Information
- III. Table of CA-GREET Model Inputs for Company Pathway
- IV. Basis for the Input Values
- V. CA-GREET Model Output and Analysis of Results
- VI. Production Range of Company Pathway
- VII. Sustainability of Company Pathway
- VIII. Impact on Land Use
- IX. Inputs and Outputs during the Production Period and Documents supporting the Monthly and Annual Quantities

## I. WTW Diagram of Hawkeye Iowa Falls Ethanol Plant Sub-Pathway of the Midwest Corn Ethanol Pathway

Figure 1: WTW Components of the Hawkeye Iowa Falls Ethanol Plant Pathway are Identical to the Corn Ethanol (Midwest; Dry Mill; Dry DGS, NG) Pathway<sup>2</sup>



*Figure 1. WTW Components for Ethanol Transported to California*

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

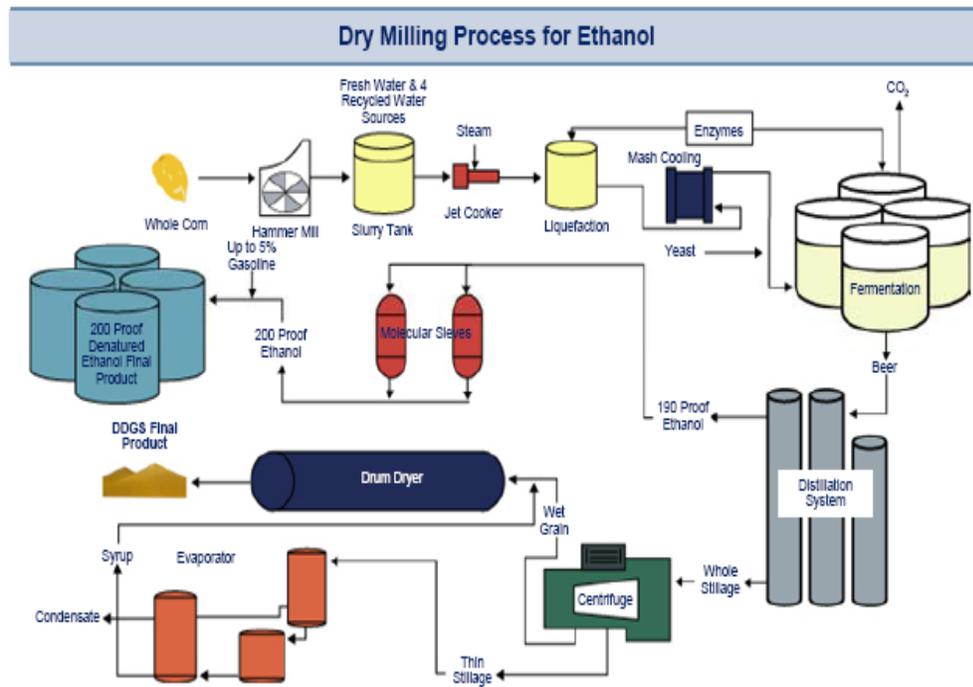
## II. Hawkeye Iowa Falls Ethanol Plant Information

### Hawkeye Iowa Falls Ethanol Plant Info

1. EPA Facility ID Number - FRS ID: 110017648982 RFS2 Company ID: 5131 RFS2 Facility ID: 70628
2. Plant Location – Iowa Falls, Iowa
3. History – start-up of first 40 million gallon per year nameplate capacity train took place Nov, 2004. A second 40 million gallon per year nameplate capacity train start-up occurred in April, 2006.
4. Capacity Notes – The nameplate capacity of the entire facility is 80 MGY. The effective plant capacity since May, 2006 has been approximately 100 MGY.
5. Technology – ICM dry-mill ethanol
6. Feedstock Type - #2 yellow dent corn
7. Product – Denatured ethanol
8. Co-Product Mix - 94% Dry distillers' grains with solubles with 10% moisture (DDGS) and 6% Modified Distillers Grains with solubles with 50% moisture (MDGS) (the percentage is on a dry-matter basis for both co-products)
9. Process fuel – 100% Natural gas
10. Power supply – Corn Belt Power Co-Operative and Midland Rural Electric Co-Operative
11. Process Flow Description

To produce ethanol, corn is first transported to the plant sites by truck. The corn is milled, cooked and treated with enzymes to convert the starch in the corn to simple sugars. The sugars are then fermented in batch fermentation tanks to produce 13% w/v ethanol. The ethanol water mixture is distilled to become 190 proof ethanol. The ethanol is then further dehydrated to 199 proof using molecular sieves. Natural gasoline is added as a denaturant (making it unfit for human consumption) and then >99% is shipped using railcars. The water-solids that are left over from the distillation process are treated in decanter centrifuges to remove as much water as possible. 100% of the water is recycled back to the cook process and to evaporation to produce syrup which is added to the distillers grains as solubles. The wet solids cake is then dried using 4 x 42 million BTU per hour natural gas fired rotary drum dryers to either 50% moisture modified distillers' grains with solubles or 10% moisture dry distillers' grains with solubles. The drum dryers have a 2 x 110 million BTU per hour natural gas fired thermal oxidizer units on the outlet gases to control air emissions. Thermal energy from the thermal oxidizer outlet is used to generate steam for distillation and evaporation, to preheat cook-water and to preheat boiler feed-water. Over 95% of the waste heat is recovered.

## 12. Process Block Flow Diagram



13. Latest version of the plant's air permits: The current Iowa Department of Natural Resources permits are to be considered part of this application support document. In the electronic version of this application support document these permits are attached as separate files.

## 14. Energy and Material Balance **Confidential Business Information**

The material and energy balance for the Iowa Falls ethanol plant is shown on the following page. **However, because it contains Confidential Business Information, it is not included in this non-confidential version of the application.**

### III. Table of CA-GREET Model Inputs for Hawkeye Iowa Falls Ethanol Plant Pathway

Table 1: CA-GREET Model Inputs for the Hawkeye Iowa Falls Ethanol Plant Pathway

CA-GREET Model Sheet Name	Cell number	Default Pathway Value	Hawkeye Iowa Falls Pathway Value	Units	Description	Comments
Regional LT	C2	U.S. Average	Midwest	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
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

The input values presented in this application are based on the total natural gas and power consumed by the Hawkeye Iowa Falls ethanol plant from October 1, 2009 through September 30, 2010, (the “Production Period”). Since the input values are in terms of per gallon of anhydrous ethanol, the total of each utility value has been divided by the total gallons of anhydrous ethanol produced during 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 Hawkeye Iowa Falls Ethanol Plant 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 gCO<sub>2</sub>e/MJ. The carbon intensity value of the Hawkeye Iowa Falls ethanol plant ethanol is 91.6 gCO<sub>2</sub>e/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							
IPPC factors	CA-GREET Model Output		Calculations to convert Output to g/CO <sub>2</sub> e/MJ				
	gCO <sub>2</sub> e/g	Corn	Ethanol	Btu or Grams per mmbtu of Fuel Throughput		gCO <sub>2</sub> e/mmbtu	gCO <sub>2</sub> e/MJ
		US Avg Corn	100% DDGS	Corn w/loss	Total corn + EtOH		
Total energy		187,247	1,469,428	187,434	1,656,863		
VOC		16.8	55.5	17	72		
CO		151.3	31.4	151	183		
CH <sub>4</sub>	25	17.4	73.7	17	91	2,277.0	2.16
N <sub>2</sub> O	298	41.7	0.4	42	42	12,571.0	11.92
CO <sub>2</sub>	1	15,064	41,354	15,079	56,433	56,433.4	53.49
<b>Sub-total lifecycle CI before denaturant and lt. vehicle combustion</b>						71,281.4	67.57
Denaturant and lt. vehicle combustion effects factor							0.80
<b>Total Lifecycle CI before ILUC with denaturant and lt. vehicle combustion effects included</b>							68.37
Indirect Land Use Change Factor (ILUC)							30
<b>Total CI of Pathway including Indirect Land Use Change</b>							98.37
Note: The calculated result of this pathway prior to making the input changes for the Hawkeye ethanol plant is 67.57 gCO <sub>2</sub> e/MJ. This matches the Corn Ethanol WTW Analysis result of 67.6 gCO <sub>2</sub> e/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 gCO <sub>2</sub> e/MJ is added.							

Table 4: Hawkeye Iowa Falls Ethanol Plant CI Calculation based on the CA-GREET Model Output

Hawkeye Iowa Falls Ethanol Plant Sub-Pathway of the Midwest Dry Mill Ethanol Plant, 94% DDGS/6% MDGS, NG Fuel Pathway							
IPPC factors	CA-GREET Model Output		Calculations to convert Output to g/CO <sub>2</sub> e/MJ				
	gCO <sub>2</sub> e/g	Corn	Ethanol	Btu or Grams per mmbtu of Fuel Throughput		gCO <sub>2</sub> e/mmbtu	gCO <sub>2</sub> e/MJ
		Midwest Corn	94% DDGS/6% MDGS	Corn w/ loss	Total Corn + EtOH		
Total energy		192,453	1,370,503	192,645	1,563,148		
VOC		16.835	54.742	17	72		
CO		151.757	25.623	152	178		
CH <sub>4</sub>	25	18.174	62.427	18	81	2,015.5	1.91
N <sub>2</sub> O	298	41.797	0.310	42	42	12,560.5	11.91
CO <sub>2</sub>	1	15,391	34,118	15,407	49,525	49,524.8	46.94
<b>Sub-total lifecycle CI before denaturant and lt. vehicle combustion</b>						64,100.8	60.76
Denaturant and lt. vehicle combustion effects factor							0.80
<b>Total Lifecycle CI before ILUC with denaturant and lt. vehicle combustion effects included</b>							61.56
Indirect Land Use Change Factor (ILUC)							30
<b>Total CI of Pathway including Indirect Land Use Change</b>							91.56

## **VI. Production Range of Hawkeye Iowa Falls Ethanol Plant Pathway**

The new pathway should be applicable to the Hawkeye Iowa Falls Ethanol Plant for at least 119% to 144% (95 MGY to 115 MGY) of Nameplate Capacity.

*Please see the letter from Mr. Donovan Prinsloo, Plant Manager, Hawkeye Renewables, LLC, Iowa Falls ethanol plant. This is the version of the letter that does not contain confidential business information. Another version containing confidential business information was submitted with the confidential version of this application support document.*



December 6, 2010

To Whom It May Concern,

I am currently Plant Manager of the Hawkeye Renewables, LLC ethanol plant that is located in Iowa Falls, Iowa. I have been responsible for operating this plant since start-up in November 2004 as the Plant Manager and as the Director of Process Improvement with responsibility for monitoring and improving the Iowa Falls plant performance.

The Iowa Falls ethanol plant should be able to consistently perform at the energy efficiency levels for both natural gas and electrical power that are stated in the New Pathway Application and based on the most recent 12 months (October, 2009 through September, 2010) performance, provided that the plant continues to operate between 95 million gallons per year and 115 million gallons per year of denatured ethanol production.

I also certify that the amounts, shown in the New Pathway Application and that are not documented by invoices are correct (corn consumption, ethanol production, distillers grains with solubles production) and are consistent with the third party audited accounting records of the plant.

Sincerely,

A handwritten signature in black ink, appearing to read "Donovan Prinsloo", written in a cursive style.

Donovan Prinsloo  
Plant Manager  
Hawkeye Renewables, LLC  
Iowa Falls Plant  
641-648 8913  
[dprinsloo@hawkrenew.com](mailto:dprinsloo@hawkrenew.com)

## **VII. Sustainability of Hawkeye Iowa Falls Ethanol Plant Pathway**

The Hawkeye Iowa Falls Ethanol Plant 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.

*Please refer to the letter from Mr. Prinsloo in Section VI.*

## **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.<sup>3</sup>

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

## **IX. Inputs and Outputs during the Production Period and Documents supporting the Monthly and Annual Quantities**

Table 5: Summary of Inputs and Outputs during “Production Period”

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

*Please refer to the letter from Mr. Prinsloo in Section VI regarding verification of the above data.*

The monthly utility bills authenticating the amounts of natural gas and electricity shown in the table above are on the following pages. . **The pages showing the utility bills are not included in this non-confidential version of the application.**