UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

AUG 15 2017

OFFICE OF
AIR AND RADIATION

Mr. Randall Doyal
CEO
Al-Corn Clean Fuel
797 5th Street
Claremont, Minnesota 55924

Dear Mr. Doyal:

You submitted an *Efficient Producer* petition to the Agency on behalf of Al-Corn Clean Fuel (ACF) to approve a pathway for the generation of renewable fuel (D-code 6) Renewable Identification Numbers (RINs) under the renewable fuel standard (RFS) program for the production of non-grandfathered ethanol. The ethanol is produced through a dry mill process at your production facility located in Claremont, Minnesota using corn starch as feedstock (the "ACF Claremont Process").

Through the petition process described under 40 CFR 80.1416, ACF submitted data to the U.S. Environmental Protection Agency to perform a lifecycle greenhouse gas (GHG) emissions analysis of the fuel produced through the ACF Claremont Process. This analysis involved a straightforward application of the same methodology and much of the same modeling used for the final rule published on March 26, 2010 (75 FR 14670)(the "March 2010 RFS rule"). The difference between this analysis and the analyses completed for the March 2010 RFS rule was the evaluation of a more efficient fuel production process.

The attached document "Al-Corn Clean Fuel Fuel Pathway Determination under the RFS Program" describes the data submitted by ACF, the analysis conducted by the EPA, and our determination of the lifecycle greenhouse gas emissions associated with the fuel production pathway described in the ACF petition.

Based on our assessment, fuel produced through the ACF Claremont Process qualifies under the Clean Air Act (CAA) for renewable fuel (D-code 6) RINs, assuming the fuel meets the conditions and associated regulatory provisions discussed in the attached document, and the other definitional criteria for renewable fuel (e.g., production from renewable biomass, and used to reduce or replace petroleum-based transportation fuel, heating oil or jet fuel) specified in the CAA and EPA implementing regulations.

This approval applies specifically to the ACF Claremont facility, and to the process, materials used, fuel produced, and process energy sources as outlined and described in the petition request submitted by ACF.

The OTAQ Reg: Fuels Programs Registration and OTAQ EMTS: OTAQ EMTS Application will be modified to allow ACF to register and generate RINs for the production of non-grandfathered ethanol from corn starch feedstock using a production process of "ACF Claremont Process."

Sincerely,

Christopher Grundler, Director
Office of Transportation and Air Quality

Enclosure

Al-Corn Clean Fuel Fuel Pathway Determination under the RFS Program

Office of Transportation and Air Quality

Summary: Al-Corn Clean Fuel (ACF) submitted an *Efficient Producer* petition (the "ACF petition"), dated July 5, 2017 to the Agency to approve their generation of renewable fuel (D-code 6) Renewable Identification Numbers (RINs) under the Renewable Fuel Standard (RFS) program for non-grandfathered ethanol produced through a dry mill process[1] at their production facility located in Claremont, Minnesota using corn starch as feedstock (the "ACF Claremont Process").

Although ACF intends to document on an ongoing basis that the non-grandfathered ethanol it produces at its Claremont, Minnesota facility meets the appropriate greenhouse gas (GHG) emissions reduction requirements, EPA has performed a threshold lifecycle GHG emissions analysis based on the information in the ACF petition to determine if it appears that ethanol produced at the facility may achieve the required GHG reductions, if certain conditions are met. This lifecycle analysis, the results of which are explained in this document, involved a straightforward application of the same methodology and modeling used for the final rule published on March 26, 2010 (75 FR 14670)(the "March 2010 RFS rule"). The difference between this analysis and the analyses completed for the March 2010 RFS rule was the evaluation of a more efficient fuel production process, in terms of the amount of feedstocks and amount/type of energy used to produce a certain quantity of ethanol. Based on the data provided in the ACF petition, our analysis found that non-grandfathered corn starch ethanol produced through the ACF Claremont Process may be able to qualify as renewable fuel if ACF satisfies all of the conditions specified in this document to demonstrate that such ethanol meets the minimum 20% lifecycle GHG reduction requirement of the Clean Air Act (CAA).[2]

In this determination EPA is specifying certain conditions designed to ensure that RINs are only assigned to volumes of non-grandfathered ethanol produced through the ACF Claremont Process if the fuel satisfies the corresponding GHG reduction requirements. The EPA is specifying the condition that to generate renewable fuel (D-code 6) RINs for non-grandfathered corn starch ethanol produced through the ACF Claremont Process, ACF must demonstrate that all ethanol produced during an averaging period (defined as the prior 365 days or the number of days since EPA activated the D-code 6 pathway associated with the ACF Claremont Process, whichever is less)[3] meets the 20% GHG reduction requirement. To make these demonstrations, ACF must keep records on the feedstocks used and the lifecycle GHG emissions associated with all ethanol produced by ACF Claremont, based on the monitoring requirements, emissions factors and lifecycle analysis methodology and other requirements specified in this document.

This document is organized as follows:

[1] For purposes of this decision document a "dry mill process" is a process as defined in section I.C. of this document.

[2] Per the RFS regulations at 40 CFR 80.1401, ethanol derived from corn starch does not qualify as advanced biofuel.

[3] The full definition of the "averaging time period" is specified in section IV of this document.

- *Section I. Required Information and Criteria for Petition Requests*: This section contains information on the background and purpose of the petition process, the criteria EPA uses to evaluate the petitions and the information that is required to be provided under the petition process as outlined in 40 CFR 80.1416 for *Efficient Producer* petitions. This section is not specific to the request submitted by ACF.
- *Section II. Available Information*: This section contains background information on ACF and describes the information that ACF provided and how it complies with the petition requirements outlined in section I.
- *Section III. Analysis and Discussion*: This section describes the lifecycle analysis done for the non-grandfathered corn starch ethanol produced through the ACF Claremont Process and identifies how the analysis conducted differs from the analysis done for the March 2010 RFS rule. This section also describes how we have applied the lifecycle results to determine the appropriate D-code for non-grandfathered ethanol produced through the ACF Claremont Process.
- *Section IV. Conditions and Associated Regulatory Provisions*: This section describes the conditions and associated regulatory provisions that must be satisfied to generate RINs for non-grandfathered ethanol produced through the ACF Claremont Process.
- *Section V. Public Participation*: This section describes our administrative process to consider the ACF petition and explains how this petition analysis is an extension of the analysis done as part of the March 2010 RFS rule.
- *Section VI. Conclusion*: This section summarizes our conclusions regarding the ACF petition, including the D-code ACF may use in generating RINs for non-grandfathered ethanol produced through the ACF Claremont Process.

I. Required Information and Criteria for Petition Requests

A. Background and Purpose of Petition Process

As a result of changes to the RFS program in Clean Air Act section 211(o), as amended by the Energy Independence and Security Act of 2007 (EISA), EPA adopted new regulations, published at 40 CFR Part 80 Subpart M. The RFS regulations specify the types of renewable fuels eligible to participate in the RFS program and the procedures by which renewable fuel producers and importers may generate Renewable Identification Numbers (RINs) for the qualifying renewable fuels they produce through approved fuel pathways.[4]

Pursuant to 40 CFR 80.1426(f)(1):

[4] See EPA's website for information about the RFS regulations and associated rulemakings: http://www2.epa.gov/renewable-fuel-standard-program/statutes-and-regulations-under-renewable-fuel-standard-program

Applicable pathways. D-codes shall be used in RINs generated by producers or importers of renewable fuel according to the pathways listed in Table 1 to this section, subparagraph 6 of this section, or as approved by the Administrator.

Table 1 to 40 CFR 80.1426 lists the three critical components of a fuel pathway: (1) fuel type; (2) feedstock; and (3) production process. Each specific combination of the three components, or fuel pathway, is assigned a D-code. EPA may also independently approve additional fuel pathways not currently listed in Table 1 for participation in the RFS program, or a party may petition for EPA to evaluate a new fuel pathway in accordance with 40 CFR 80.1416. In addition, producers of facilities identified in 40 CFR 80.1403(c) and (d) that are exempt from the 20% GHG emissions reduction requirement of the Act may generate RINs with a D-code of 6 pursuant to 40 CFR 80.1426(f)(6) for a specified baseline volume of fuel ("grandfathered fuel"[5]) assuming all other requirements are satisfied.

The petition process under 40 CFR 80.1416 allows parties to request that EPA evaluate a new fuel pathway's lifecycle GHG reduction and provide a determination of the D-code for which the new pathway may be eligible.

On September 30, 2014, EPA announced a new expedited *Efficient Producer* petition process for corn starch and grain sorghum ethanol producers using a dry mill process that can demonstrate superior process efficiency through reduced onsite energy consumption, increased fuel output and/or use of biomass or biogas from certain sources to reduce process energy greenhouse gas emissions. For example, this *Efficient Producer* process, intended to cover a subset of the petitions received pursuant to 40 CFR 80.1416, would provide a streamlined, facility-specific review for certain ethanol producers petitioning to generate RINs for the production of ethanol beyond their grandfathered volume. EPA considers *Efficient Producer* petitions to be those seeking EPA evaluation of fuel pathways involving certain fuel types, feedstocks and fuel production technologies that EPA has evaluated previously. Petitions that seek EPA evaluation of new/creative fuel production technologies will require additional analysis, and therefore will not be able to use this expedited review process.

Corn and sorghum ethanol producers who seek a new pathway approval on terms substantially different than are specified herein may petition the Agency pursuant to 40 CFR 80.1416 and request different treatment. However, such petitions will not be eligible for the expedited *Efficient Producer* petition process, and therefore may take significantly longer to review. The review time will depend on the number and type of other higher priority petitions under review by the EPA.[6]

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[5] "Grandfathered fuel" refers to a baseline volume of renewable fuel produced from facilities that commenced construction before December 19, 2007 and which completed construction within 36 months without an 18 month hiatus in construction and is thereby exempt from the minimum 20% GHG reduction requirement that applies to general renewable fuel. A baseline volume of ethanol from facilities that commenced construction after December 19, 2007, but prior to December 31, 2009, qualifies for the same exemption if construction is completed within 36 months without an 18 months hiatus in construction and the facility is fired with natural gas, biomass, or any combination thereof.

[6] The prioritization criteria are explained on EPA's website: http://www2.epa.gov/renewable-fuel-standard-program/renewable-fuel-petition-review-process#step3

B. Information to be Provided in Petitions

As specified in 40 CFR 80.1416(b)(1), petitions are to include all of the following information, and should also include, as appropriate, supporting documents such as independent studies, engineering estimates, industry survey data, and reports or other documents supporting any claims:

- The information specified under 40 CFR 80.76 (registration of refiners, importers or oxygenate blenders).
- A technical justification that includes a description of the renewable fuel, feedstock(s), and production process. The justification must include process modeling flow charts.
- A mass balance for the pathway, including feedstocks, fuels produced, co-products, and waste materials production.
- Information on co-products, including their expected use and market value.
- An energy balance for the pathway, including a list of any energy and process heat inputs and outputs used in the pathway, including such sources produced off site or by another entity.
- Any other relevant information, including information pertaining to energy saving technologies or other process improvements.
- Other additional information as requested by the Administrator to complete the lifecycle greenhouse gas assessment of the new fuel pathway.

C. Information Needed for Efficient Producer Petitions

Since *Efficient Producer* petitions are for a dry mill process with standard co-products, EPA does not need detailed information on the production process or co-products. The focus of an *Efficient Producer* petition is on efficient energy use and/or high ethanol yield per bushel of feedstock. Therefore for these petitions the regulatory requirements for a mass balance (which demonstrates fuel yield) and an energy balance (which demonstrates energy use), are particularly important. In the context of an *Efficient Producer* petition, the regulatory requirements for information on the production process and co-products can be satisfied by submission of the following certifications:

- Certification by the petitioner that the production process for the requested pathway is an ethanol production process where corn feedstock is ground into a coarse flour, also known as "meal"; the meal is cooked into a hot slurry with the addition of enzymes to produce a mixture commonly known as "mash"; the mash is fermented with the addition of yeast to produce ethanol, carbon dioxide and solids from the grain and yeast, known as "fermented mash"; the fermented mash is distilled to produce a mixture of ethanol and water, and a residue of non-fermentable solids, also known as "stillage"; the mixture of ethanol and

water is dehydrated to produce 200-proof ethanol; and co-products produced include distillers grains, but may also include carbon dioxide, solubles syrup and vegetable oil (a "dry mill process").

- Certification by the petitioner that the co-product distillers grains are intended for use as animal feed.
- Certification by the petitioner that the dry mill process for the requested pathway uses one or a combination of the following sources for all of its process energy: electricity from the grid, natural gas, coal, biogas or biomass, and that any biomass used as process energy meets the RFS regulatory definition for crop residue at 40 CFR 80.1401.
- Certification by the petitioner that the ethanol production facility uses only corn starch, only grain sorghum or only corn starch and grain sorghum as feedstocks to produce ethanol.
- Certification by the petitioner that all of the information provided in the petition is accurate and complete.

II. Available Information

A. Background on the Petitioner

ACF submitted an *Efficient Producer* petition, requesting approval for their generation of RINs for non-grandfathered ethanol produced by a dry mill process from corn starch feedstock at their Claremont, Minnesota facility. A petition is required because the pathway associated with the ACF Claremont Process is not included in Table 1 to 40 CFR 80.1426, and has not otherwise been approved by EPA. Table 1 (relevant portions of which are reproduced below) includes pathways for ethanol from corn starch, but provides only three options for fuel producers using a dry mill process and natural gas, biomass or biogas for process energy: (1) use two advanced technologies from Table 2 to 40 CFR 80.1426, (2) dry no more than 50% of the distillers grains with solubles (DGS) that they produce, or (3) dry no more than 65% of the DGS they produce and use one of the advanced technologies listed in Table 2 to 40 CFR 80.1426. The ACF Claremont Process does not match any of the pathways in Table 1 to 40 CFR 80.1426 because it dries more than 65% of the DGS it markets annually and does not use two of the advanced technologies in Table 2 to 40 CFR 80.1426.

Table 1: Relevant Existing Fuel Pathways from 40 CFR 80.1426

Row	Fuel Type	Feedstock	Production Process Requirements	D-Code
A	Ethanol	Corn Starch	All of the following: Dry mill process, using natural gas, biomass, or biogas for process energy and at least two advanced technologies from Table 2 to this section	6 (Renewable Fuel)
B	Ethanol	Corn Starch	All of the following: Dry mill process, using natural gas, biomass, or biogas for process energy and at least one of the advanced technologies from Table 2 to this section plus drying no more than 65% of the distillers grains with solubles it markets annually	6 (Renewable Fuel)
C	Ethanol	Corn Starch	All of the following: Dry mill process, using natural gas, biomass, or biogas for process energy and drying no more than 50% of the distillers grains with solubles it markets annually	6 (Renewable Fuel)

B. Information Submitted by Al-Corn Clean Fuel

ACF provided all of the required information in the petition, including all of the data needed for EPA to perform a threshold determination of the potential for ethanol produced through the ACF Claremont Process to satisfy the 20% lifecycle GHG reduction requirement applicable to non-grandfathered renewable fuel if all conditions in this document are satisfied. ACF included information on their process yield (bushels of feedstock per gallons of fuel) and the energy used. In addition, ACF certified that their requested fuel pathway involves the use of corn starch feedstock, a dry mill process, ethanol fuel, distillers grain co-products, and the types of process energy that EPA previously modeled for the March 2010 RFS rule.

C. Information Available Through Existing Modeling

For the pathway addressed in their petition, ACF would use a feedstock (corn starch) that has already been analyzed as part of the March 2010 RFS rule, as noted in Table 1. As a result, no new

feedstock modeling was required to evaluate the ACF petition, as modeling for corn starch was already done as part of the March 2010 RFS rule. Similarly, no new emissions impact modeling of using ethanol as a transportation fuel was required as that was already done as part of the March 2010 RFS rule. This petition only requires EPA to evaluate a modified fuel production process for an existing fuel type.

The same analytical approach that was used to evaluate the lifecycle GHG emissions of the existing corn starch ethanol pathways noted above was used to analyze the pathway described in the ACF petition. The preamble to the March 2010 RFS rule describes the modeling approach used to estimate lifecycle GHG emissions from corn starch ethanol. The preamble describes the models and data used as well as the input and output streams from those models to calculate the emissions for each of the lifecycle stages. To modify the corn starch analysis to reflect the process described in the ACF petition, the only change required was replacing the production process data with the ACF Claremont Process data. This resulted in the following changes to the modeling (described in more detail in the following sections):

- Amount of corn used in the fuel production process was modified to reflect the ACF Claremont process yield in terms of bushels of feedstock input per gallons of ethanol produced; and
- Amount of energy used by the fuel production process was changed to reflect data provided in the ACF Claremont energy balance.

This was a straightforward analysis based on existing modeling done for the March 2010 RFS rule and substituting the ACF Claremont process data, which only altered the amounts of certain inputs and outputs of the fuel production process.

III. Analysis and Discussion

A. Lifecycle Analysis

Determining a fuel pathway's compliance with the lifecycle GHG reduction thresholds specified in the CAA for different types of renewable fuel requires a comprehensive evaluation of the renewable fuel, as compared to the gasoline or diesel fuel that it replaces, on the basis of its lifecycle GHG emissions. As mandated by the CAA, the GHG emissions assessments must evaluate the aggregate quantity of GHG emissions (including direct emissions and significant indirect emissions such as significant emissions from land use changes) related to the fuel's full lifecycle, including all stages of fuel and feedstock production, distribution, and use by the ultimate consumer.

In examining the full lifecycle GHG impacts of renewable fuels for the RFS program, EPA considers the following:

- Feedstock production – based on agricultural sector models that include direct and indirect impacts of feedstock production.
- Fuel production – including process energy requirements, impacts of any raw materials used in the process, and benefits from co-products produced.
- Fuel and feedstock distribution – including impacts of transporting feedstock from production to use, and transport of the final fuel to the consumer.
- Use of the fuel – including combustion emissions from use of the fuel in a vehicle.

EPA's evaluation of the lifecycle GHG emissions for the pathway described in the ACF petition is consistent with the CAA's applicable requirements, including the definition of lifecycle GHG emissions and threshold evaluation requirements. It was based on information provided in the petition, including mass and energy balance data for the pathways associated with the ACF Claremont Process.

The lifecycle GHG emissions of fuel produced using the pathway associated with the ACF Claremont Process were determined as follows:

Feedstock production and transport (upstream emissions) – ACF uses corn starch as feedstock for the production of ethanol. As previously noted, corn starch is a feedstock already listed in Table 1 to 40 CFR 80.1426 of the RFS regulations. Since corn starch has already been evaluated by EPA, no new feedstock production modeling was required. ACF has certified through its petition submissions that it uses a dry mill production process that is consistent with the definition of "dry mill process" specified in section I.C. of this decision document. Therefore, the ACF Claremont Process is the same type of dry mill process as that modeled for the March 2010 RFS rule, and the existing agricultural sector modeling analyses for corn as feedstock remains valid for use in estimating the lifecycle impact of renewable fuel produced using the ACF Claremont Process.

The Forest and Agricultural Sector Optimization Model (FASOM) and Food and Agricultural Policy Research Institute (FAPRI) models were used to analyze the GHG impacts of the feedstock production portion of the ethanol lifecycle. The same FASOM and FAPRI results representing the emissions from an increase in corn production that were generated as part of the March 2010 RFS rule analysis of the corn ethanol pathways were used in our analysis of the corn ethanol production process described in the ACF petition.

In the corn ethanol analysis for the March 2010 RFS rule, we projected approximately 960 million bushels of corn (assuming 56 pounds per bushel at 15.5 percent moisture) used to produce 2.6 billion additional gallons of ethanol compared to a baseline scenario (based on a yield of 2.71 gallons per bushel), and we calculated GHG emissions from feedstock production for that amount of corn. The FASOM and FAPRI agricultural sector GHG results were divided by the total energy value of fuel

produced to get emissions per mmBtu of ethanol.[7] For the modeled scenario we estimated lifecycle GHG emissions of 9.73 $kgCO_2e$ per bushel of corn used to make ethanol. This includes the upstream emissions associated with producing the corn feedstock and transporting it to the ethanol production facility, and also includes significant direct and indirect emissions (such as emissions from land use change). Therefore, to estimate the lifecycle GHG emissions from the corn feedstock used to make ethanol in the ACF Claremont Process, the bushels of corn used as feedstock provided in the ACF petition were multiplied by the emissions factor of 9.73 $kgCO_2e$ per bushel. In the same manner as described in section IV.D. of this document, these emissions were then normalized by the mmBtu of ethanol produced from the same amount of bushels of corn.

Fuel production (process emissions) – The fuel production method used by ACF Claremont involves the production of ethanol from corn starch in a dry mill process. However, the process described in the ACF petition is more efficient in terms of energy use than the average dry mill ethanol production technologies analyzed for the March 2010 RFS rule.

To analyze the GHG impacts of the fuel production process used by ACF Claremont, EPA utilized the same approach that was used to determine the impacts of processes in the corn starch ethanol pathways analyzed in the March 2010 RFS rule, taking into account differences in the types and amounts of process energy used.

ACF submitted average annual mass and energy balance data for operations at ACF Claremont, including all of the process energy used from the point of delivery of the feedstock through feedstock processing, and fuel and co-product production, to the point of final storage of the end product fuel and co-products at the fuel production facility. This includes the energy used to produce all of the ethanol (regardless of regulatory characterization as grandfathered, non-grandfathered, or fuel for which no RINs are generated) produced by ACF Claremont.

The lifecycle GHG emissions factors used for process energy were the same emissions factors used in the modeling for the March 2010 RFS rule:

- Natural gas = $6.86*10^{-5}$ $kgCO_2e$/Btu
- Coal = $1.12*10^{-4}$ $kgCO_2e$/Btu
- Biogas CH_4 = $3.64*10^{-7}$ $kgCO_2e$/Btu
- U.S. average grid electricity = 0.750 $kgCO_2e$/kWh
- Crop residue biomass used onsite for process energy upstream emissions = $5.40*10^{-3}$ kgCO2e per dry pound (based on the corn stover lifecycle analysis for the March 2010 RFS rule)

[7] For the purposes of this determination document, Btus are expressed on a lower heating value (LHV) basis, gallons of ethanol are expressed on an undenatured (neat) basis, and bushels of corn are expressed in terms of 15.5% moisture content unless otherwise specified.

Fuel distribution and use (downstream emissions) – The fuel type, ethanol, and hence the fuel distribution and use for ethanol, was already considered as part of the March 2010 RFS rule. Therefore, we applied the existing fuel distribution and use lifecycle GHG impacts for corn starch ethanol to our analysis of the ACF petition. The emissions factor for ethanol distribution and use, otherwise known as downstream emissions, is 2.1 $kgCO_2e$ per mmBtu of ethanol.

Lifecycle GHG emissions – ACF Claremont's fuel LCA emissions were then compared to the baseline lifecycle GHG emissions, using the same value for baseline gasoline as in the March 2010 RFS rule analysis. Based on the data submitted by ACF, our analysis indicates that ethanol produced using the ACF Claremont Process would result in at least a 20 percent GHG emissions reduction compared to the baseline lifecycle GHG emissions.

Table 2 below breaks down by stage the lifecycle GHG emissions for corn starch ethanol produced using the ACF Claremont Process, compared to such emissions for a corn starch ethanol pathway analyzed as part of the March 2010 RFS rule that does not use any of the advanced technologies specified in the RFS regulations and dries all of its co-product DGS, and the 2005 gasoline baseline. This table demonstrates the contribution of each stage in the fuel pathway and its relative significance in terms of GHG emissions.

In the table, upstream emissions include the lifecycle GHG emissions associated with producing the corn feedstock and transporting it to the fuel production facility. Process emissions include the lifecycle GHG emissions associated with the fuel production process. Downstream emissions include the lifecycle GHG emissions associated with distributing and using the finished fuel. Table 2 provides EPA's mean estimate of GHG emissions for each of these stages of the lifecycle.

Table 2: Lifecycle GHG Emissions for Corn Ethanol Produced through the ACF Claremont Process (kgCO2e/mmBtu)[8]

	Corn Starch Ethanol, Natural Gas Fired Dry Mill, 100% Dry DGS, No Advanced Technologies	Corn Starch Ethanol Produced Through the ACF Claremont Process	Baseline Lifecycle GHG Emissions for Gasoline
Upstream Emissions	47.6	44.5	*
Process Emissions	32.4	29.6	19.2
Downstream Emissions	2.1	2.1	79.0
Lifecycle Emissions	81.7	76.2	98.2
Percent Reduction	16.8%	22.4%	--

* Emissions included in Process Emissions stage.

B. Application of the Criteria for Petition Approval

Based on the information provided in the ACF petition, and the requirements specified in section IV limiting RIN generation for non-grandfathered fuel to ethanol for which ongoing monitoring and assessment allow documentation of compliance with appropriate lifecycle greenhouse gas reduction requirements, EPA is approving this petition request. Specifically, we have determined that ethanol produced pursuant to the ACF Claremont Process using corn starch feedstock satisfies the minimum 20% greenhouse gas reduction threshold required in the CAA for non-grandfathered renewable fuel if the ethanol is produced in accordance with the fuel yield and energy use information specified in the ACF petition. As detailed in section IV, EPA is specifying certain conditions that must be satisfied for ethanol produced through the approved pathway to be eligible for RIN generation. Where all the conditions are satisfied, EPA is authorizing the generation of renewable fuel (D-code 6) RINs for non-grandfathered ethanol produced through the ACF Claremont Process from corn starch, provided that the fuel meets the other criteria for renewable fuel specified in the CAA and EPA implementing regulations.

IV. Conditions and Associated Regulatory Provisions

The authority for ACF to generate RINs for non-grandfathered ethanol produced pursuant to the ACF Claremont Process is expressly conditioned on ACF satisfying all of the following conditions as detailed in this section, in addition to other applicable requirements for renewable fuel producers set forth in the RFS regulations. These conditions are enforceable under the CAA. They are established

[8] Net emissions may not be the sum of the rows due to rounding.

pursuant to the informal adjudication reflected in this decision document, and also pursuant to regulations cited below and 40 CFR 80.1416(b)(1)(vii), 80.1450(i), and 80.1451(b)(1)(ii)(W). In addition or in the alternative to bringing an enforcement action under the CAA, EPA may revoke this pathway approval if it determines that ACF has failed to comply with any of the conditions specified herein.[9]

The pathways for corn ethanol approved in this document are in addition to the existing pathways for corn ethanol listed in rows A, B, C and D of Table 1 to 40 CFR 80.1426. ACF may also generate RINs under 40 CFR 80.1426(f)(6) for fuel that qualifies for the "grandfathering" exemption under 40 CFR 80.1403. This document does not impact the ability of ACF to generate RINs for volumes of fuel pursuant to 40 CFR 80.1426(f)(6) or the approved pathways in Table 1 to 40 CFR 80.1426.

This section details the registration, compliance monitoring, lifecycle GHG computation, recordkeeping, reporting, attest engagement and other requirements that apply to the non-grandfathered ethanol pathway associated with the ACF Claremont Process and it is organized as follows:

- *Sub-section A*: definitions
- *Sub-section B*: registration requirements
- *Sub-section C*: compliance monitoring
- *Sub-section D*: lifecycle GHG conditions and associated computational requirements
- *Sub-section E*: recordkeeping requirements
- *Sub-section F*: reporting requirements
- *Sub-section G*: additional requirements

As described in the following sections, one condition for ACF to generate RINs for non-grandfathered ethanol produced through the ACF Claremont Process during a specified averaging period (typically 365 days) is documentation by ACF that RINs are only generated if, on average, all ethanol produced during the specified averaging period satisfies the 20% lifecycle GHG reduction requirement. The 365-day (or shorter in certain circumstances) rolling average is calculated based on the daily data monitored and collected by ACF and the formula specified in section IV.D.

A. Definitions

For the purposes of this petition approval, the following terms are defined as follows:

[9] As with all pathway determinations, this approval does not convey any property rights of any sort, or any exclusive privilege.

a. *365-day rolling average lifecycle GHG emissions* means the average lifecycle GHG emissions for the corn starch ethanol produced by ACF Claremont during the averaging time period, calculated as specified in section IV.D. based on the daily data collected and recorded by ACF through continuous monitoring.[10]

b. *Averaging time period* means the 365 calendar days prior to the day that ACF wishes to generate RINs for fuel produced during the averaging period through the ACF Claremont Process, or the number of days prior to the day that ACF wishes to generate RINs since EPA activated the pathway,[11] whichever is less.[12] To clarify, ACF may not generate RINs for non-grandfathered ethanol produced through the ACF Claremont Process on the same day that such ethanol is produced.

c. *Continuous monitoring* means the collection and use of measurement data and other information to record the data inputs required to calculate the 365-day rolling average lifecycle GHG emissions, in accordance with the compliance monitoring plan described in section IV.C.

d. *Energy used for feedstock, fuel and co-product operations* means energy used in all buildings or other areas that are used in any part for the storage and/or processing of feedstock, the production and/or storage of fuel intermediates, the production and/or storage of finished fuel or co-products, and the handling of feedstocks, fuel, co-products and wastes. It includes any energy used offsite for these purposes, including for example energy used offsite to dry the co-product distiller's grains produced by ACF Claremont before it is sold to the ultimate consumer.

e. *Period of missing data* includes each day for which ACF does not have valid data collected through continuous monitoring for any of the daily data inputs required to calculate the 365-day rolling average lifecycle GHG emissions, as specified section IV.D.

B. Registration

ACF Claremont must comply with all registration provisions in 40 CFR Part 80, Subpart M that apply to renewable fuel producers to register for the production of non-grandfathered ethanol through

[10] The EPA has provided spreadsheets on its website to help ethanol producers understand the correct calculation of 365-day rolling average lifecycle GHG emissions.
[11] "Activated" refers to the day that the pathway is allowed to be used in EMTS, i.e., the date of activation of ACF's registration for the new pathway described in this document.
[12] This expedited *Efficient Producer* petition process is intended for facilities that consistently use efficient production methods (i.e., who meet the applicable lifecycle GHG reduction thresholds) throughout the year. Parties who only use efficient methods during part of the year, and wish approval for such partial-year production, may submit a standard petition.

the ACF Claremont Process. The description of the ACF Claremont production process that is required for registration pursuant to 40 CFR 80.1450(b)(1)(ii) shall contain the following:[13]

a. A Compliance Monitoring Plan including technical specifications detailing how ACF will accurately and reliably measure and record all of the daily data required in section IV.D. and calculate and record the 365-day rolling average lifecycle GHG emissions.

b. A process flow diagram showing all of the following:

    1. The supply and continuous monitoring of all energy used for feedstock, fuel and co-product operations.

    2. The continuous monitoring of bushels of corn used in fuel production processes for all of the ethanol produced by ACF Claremont, including non-grandfathered ethanol for which RINs are generated, ethanol for which RINs are not generated and ethanol that is exempt from the 20% GHG reduction requirement per 40 CFR 80.1403.

    3. The continuous monitoring of volume and temperature[14] for all of the ethanol produced by ACF Claremont, including non-grandfathered ethanol for which RINs are generated, ethanol for which RINs are not generated and ethanol for which RINs are generated that is exempt from the 20% GHG reduction requirement per 40 CFR 80.1403.

    4. Information for each of the continuous monitoring systems (e.g., scales, fuel flow meters and electricity meters) shown in the process flow diagram including the name of the manufacturer, the manufacture date and all relevant serial numbers.

c. A certification signed by a Responsible Corporate Officer containing the following statement: "I hereby certify that: (1) I have reviewed and understand the process flow diagram submitted with this application for registration as required pursuant to section IV.B.b of the petition approval document for the pathway associated with the ACF Claremont Process; (2) To the best of my knowledge the process flow diagram is accurate and complete; (3) All monitoring devices specified in the process flow diagram will be calibrated and maintained according to the manufacturer specifications or more frequently (if the manufacturer does not provide calibration or maintenance records then the company must meet standards for similar monitoring devices); and (4) All of the monitoring devices included in the process flow diagram monitor all of the information specified in sections IV.B.b.1, 2 and 3 of the petition approval document for the pathway associated with the ACF Claremont Process."

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[13] All of the registration materials required by 80.1450(b)(1), including those specifically described in this document, must be reviewed and verified pursuant to the independent third party engineering review required in 80.1450(b)(2).

[14] Temperature readings must take place at the same time the volume is measured.

d. If ACF wishes to exclude any amount of energy used at ACF Claremont when calculating the 365-day rolling average lifecycle GHG emissions, the description of the facility's production process must include all of the following:

    1. An explanation of why such energy should not be included.

    2. A plan showing how the energy that will not be included in the calculation of the 365-day rolling average lifecycle GHG emissions will be kept completely segregated, separately metered and recorded.[15]

e. If ACF wishes to take credit for exported electricity in calculating GHG_P pursuant to section IV.D, ACF must include a certification signed by a Responsible Corporate Officer stating that any exported electricity would be the result of combined heat and power technology as defined in the RFS regulations at 40 CFR 80.1401.

C. Compliance Monitoring

ACF must implement the Compliance Monitoring Plan, and must use data obtained and recorded in accordance with this plan to calculate the 365-day rolling average lifecycle GHG emissions.

D. Corn Ethanol Lifecycle GHG Emissions

ACF may not generate RINs for non-grandfathered corn ethanol produced pursuant to the ACF Claremont Process unless it can demonstrate through records produced in accordance with 40 CFR 80.1454(b)(3) that are available as of the date of RIN generation and maintained by ACF for a minimum of five years from the date of RIN generation that all of the ethanol produced during the averaging period at the ACF Claremont facility (including non-grandfathered volume, grandfathered volume and ethanol for which RINs are not generated) meets all of the following requirements:

a. The ethanol was produced by a dry mill process, using only corn starch as feedstock, during the averaging time period.

[15] There are only two valid reasons for excluding any amount of energy used by ACF Claremont when calculating the 365-day rolling average lifecycle GHG emissions. The first is that the energy is used in a stand-alone and separately-metered building that is used solely for administrative purposes. The second is that the energy is used in a stand-alone and separately-metered tower grain dryer to dry the corn kernel feedstock prior to grinding. The lifecycle GHG emissions from energy used at such a tower grain dryer may be excluded because they have been taken into account as part of the feedstock production stage of the EPA's lifecycle assessment of corn starch ethanol as modeled for the March 2010 RFS rule.

b. The 365-day rolling average lifecycle GHG emissions are calculated using the following formula, and do not exceed 78.56 kgCO2e/mmBtu of ethanol:[16]

$$LC_{GHGc} = GHG_{Uc} + GHG_P + GHG_D$$

Where:

LC_{GHGc} = Lifecycle GHG emissions, in $kgCO_2e$/mmBtu, of the volume of all corn starch ethanol produced at the facility during the averaging time period.

GHG_{Uc} = Upstream GHG emissions, in $kgCO_2e$/mmBtu, related to the production and transport of the volume of feedstock used to produce all corn starch ethanol produced at the facility during the averaging time period, calculated per section IV.D.c.

GHG_P = Process GHG emissions, in $kgCO_2e$/mmBtu, related to the processes used for conversion of corn starch into ethanol during the averaging period, including energy used for feedstock, fuel and co-product operations; calculated per section IV.D.d.

GHG_D = Downstream GHG emissions, in $kgCO_2e$/mmBtu, related to the distribution and use of all ethanol produced during the averaging period, calculated per section IV.D.e.

c. For the purposes of the formula in section IV.D.b, GHG_{Uc} is calculated according to the following formula:

$$GHG_{Uc} = 9.73 * B_C / (V_S * 0.076)$$

Where:

9.73 = Upstream emissions factor for corn, in $kgCO_2e$ per bushel, based on the lifecycle GHG modeling done by EPA for the March 2010 RFS rule.

B_C = Bushels of corn used by ACF Claremont as feedstock to produce ethanol during the averaging time period in terms of a standard bushel at 15.5% moisture.

For the purposes of this paragraph, B_C, shall be calculated according to the following formula:

$$B_C = B_{C_m} * \left(\frac{1 - m_c}{1 - 0.155}\right)$$

B_{Cm} = Bushels of corn used by ACF Claremont as feedstock to produce ethanol during the averaging time period based on measurements recorded by ACF Claremont.

[16] The statutory petroleum gasoline baseline estimated for the March 2010 RFS final rule was 98.2 $kgCO_2e$/mmBtu. Fuel meeting the twenty percent lifecycle GHG reduction threshold produces 78.56 $kgCO_2e$/mmBtu or less.

m_c = Average moisture content of corn, in mass percent, for the corn delivered to ACF Claremont for use as feedstock to produce ethanol during the averaging time period. The moisture content tests performed by ACF shall sample corn that, based on good engineering judgment, is representative of each delivery of corn feedstock to ACF Claremont. ACF shall test the moisture content of the corn delivered in each and every truck load, train load, or other delivery of corn to ACF Claremont, and for any given delivery must measure the corn moisture content no less frequently than once for every 10,000 bushels. For moisture content, ACF shall use a DICKEY-john GAC 2500UGMA or Perten AM 5200-A moisture meter, as certified by the National Type Evaluation Program, and follow the device's operating instructions, or use alternative test methods as specified by ACF in their Compliance Monitoring Plan accepted by EPA. ACF shall calculate the average moisture content as a weighted average, by summing the products of the mass and corresponding moisture content of each corn delivery, and then dividing by the total mass of corn feedstock delivered to ACF Claremont during the averaging time period.

0.155 = Moisture content of a standard bushel of corn at 56 pounds per bushel.

V_S = Standardized volume of all ethanol produced at the ACF Claremont facility during the averaging time period, in gallons of undenatured ethanol. In determining the standardized volume, the actual volumes of ethanol shall be adjusted to a standard temperature of 60 degrees Fahrenheit using the following formula:

$$V_S = V_A * \left(1 - \left(0.00114 * \left(\left[\{T + 459.67\} * \frac{5}{9}\right] - \left[\{60 + 459.67\} * \frac{5}{9}\right]\right)\right)\right)$$

Where:

V_A = Actual volume of undenatured ethanol, in gallons.

T = Actual temperature of ethanol, in degrees Farenheit, measured at the same time that V_A is measured.

0.00114 = Coefficient to standardize volumes of undenatured ethanol.

60 = Standard temperature, in degrees Fahrenheit, for volumes of ethanol.

459.67 and 5/9 = Conversion factors for Fahrenheit to Kelvin

0.076 = Energy content of ethanol, in mmBtu/gallon (lower heating value).

d. For the purposes of the formula in section IV.D.b, GHG_P is calculated according to the following formula:

$$GHG_P = \frac{\sum_{p=1}^{3}(PE_p * LHV_{PE,p} * EF_{PE,p}) + BIO * EF_{bio} + ELEC * EF_{elec}}{V_S * 0.076}$$

Where:

p = Type of fuel used.

PE_p = a measure of the amount of fuel p used as energy used for feedstock, fuel and co-product operations, as follows:

PE_{p1} = Standard cubic feet (scf) of natural gas used in feedstock, fuel and co-product operations, as measured by ACF by continuous monitoring.

PE_{p2} = scf of biogas CH_4 from landfills, waste treatment plants and/or waste digesters used as energy used for feedstock, fuel and co-product operations, as measured by ACF by continuous monitoring.[17]

PE_{p3} = Tons of coal, used as energy used for feedstock, fuel and co-product operations, as measured by ACF by continuous monitoring.

BIO = Dry pounds (0% moisture) of biomass used as energy used for feedstock, fuel and co-product operations, as measured by ACF by continuous monitoring.

ELEC = kWh of Grid electricity used as energy used for feedstock, fuel and co-product operations, as measured by ACF by continuous monitoring.

$LHV_{PE,p}$ = Lower Heating Value factor for fuel type p, as follows:

$LHV_{PE,p1}$ = 983 Btu per scf of natural gas.

$LHV_{PE,p2}$ = 983 Btu per scf of biogas CH_4.

$LHV_{PE,p3}$ = 19,546,300 Btu per ton of coal.

$EF_{PE,p}$ = Lifecycle GHG emissions factor for fuel type p, (based on lower heating value) as follows:

$EF_{PE,p1} = 6.86 * 10^{-5}$ $kgCO_2e$ per Btu of natural gas.

$EF_{PE,p2} = 3.64 * 10^{-7}$ $kgCO_2e$ per Btu of biogas CH_4.

[17] This shall only represent the methane in the biogas used. If the amount of methane present in the biogas is not metered directly, ACF shall determine the amount of methane present in the biogas used by ACF Claremont, using the monitoring protocols and test procedures specified in the Compliance Monitoring Plan submitted by ACF as part of their registration materials for the ACF Claremont Process.

$EF_{PE,p3}$ = 1.12 * 10^{-4} $kgCO_2e$ per Btu of coal.

EF_{bio} = 5.40*10^{-3} $kgCO_2e$ per dry lbs of crop residue biomass.

EF_{elec} = 0.750 $kgCO_2e$ per kWh of grid electricity, based on the United States grid average.

e. For the purposes of the formula in section IV.D.b, GHG_D is calculated to be 2.1 kgCO2e per mmBtu of ethanol.

f. For the purposes of section IV.D., for all ethanol produced by ACF during a day where ACF has missing data on any of the factors described in this section, ACF shall assess the fuel produced on all such days as having lifecycle GHG emissions of 98.2 kgCO2e per mmBtu,[18] and use this value in their calculation of the 365-day rolling average lifecycle GHG emissions.

E. Recordkeeping

In addition to the specific recordkeeping requirements stated at 40 CFR 80.1454(b)(3)(i)-(xii), the following records related to the generation and assignment of RINs must be produced and maintained pursuant to 40 CFR 80.1454(b)(3) when ACF generates RINs for non-grandfathered ethanol produced through the ACF Claremont Process.

a. Records documenting the data required to calculate lifecycle GHG emissions per the requirements specified in section IV.D., and which are collected in accordance with the compliance monitoring plan described in section IV.B.a. This includes comprehensive and reliable information with respect to the amount of feedstock and energy used and the amount of fuel produced, such as meter readings and energy bills that span the entire averaging time period for each instance that RINs are generated for non-grandfathered ethanol produced through the ACF Claremont Process.

b. Records presenting accurate calculations verifying compliance with the applicable lifecycle GHG reduction threshold on a 365-day rolling average basis in accordance with section IV.D. that are prepared on each day that RINs are generated for non-grandfathered ethanol produced through the ACF Claremont Process. The information must include identifiable unique references to all documents and metering data used in the calculations.[19]

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[18] The value of 98.2 kgCO2e/mmBtu was selected because it is the value for baseline lifecycle GHG emissions from gasoline, as evaluated by EPA for the March 2010 RFS rule. We recognize this is a conservative approach for substituting missing data, and we believe a conservative approach is necessary to eliminate any incentive for parties to fail to collect and document accurate data.

[19] The EPA has provided spreadsheets on its website to help ethanol producers understand the correct calculation of 365-day rolling average lifecycle GHG emissions. These spreadsheets can also be used for recordkeeping.

F. Reporting

As part of the quarterly RIN generation reports required under 40 CFR 80.1451(b), ACF shall submit to EPA the information identified in section IV.E.b of this document that was prepared during the relevant quarter.[20]

G. Additional Conditions

The authority for ACF to generate RINs for non-grandfathered ethanol produced pursuant to the ACF Claremont Process is expressly conditioned on ACF satisfying all of the following additional conditions:

a. For any biogas energy used for feedstock, fuel and co-product operations, ACF must satisfy the requirements specified at 40 CFR 80.1426(f)(12) of the RFS regulations.

b. All of the biomass used onsite as process energy used for feedstock, fuel and co-product operations must be one or any combination of the types of biomass that is a crop residue, as defined at 40 CFR 80.1401 in the RFS regulations.[21]

ACF may not generate RINs for non-grandfathered ethanol produced through the ACF Claremont Process if ACF fails to comply with any of the conditions in this section IV. However, this does not prevent ACF from generating RINs for fuel produced pursuant to any of the pathways specified in Table 1 to 40 CFR 80.1426, or pursuant to 40 CFR 80.1426(f)(6), to the extent that ACF is authorized to do so under applicable regulations.

If ACF chooses to generate grandfathered RINs pursuant to 40 CFR 80.1426(f)(6), and generate RINs for non-grandfathered ethanol produced pursuant to the ACF Claremont Process during any calendar year, ACF may only generate RINs for non-grandfathered ethanol after it generates RINs for all of its grandfathered baseline volume. In other words, ACF must first produce and generate RINs for its grandfathered volume before generating RINs under the pathway being approved in this document.[22]

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[20] Since the information prepared pursuant to section IV.E. must be included in the ACF quarterly RIN generation reports to EPA, it follows that this information is subject to attest engagement requirements pursuant to 80.1464(b).

[21] See the July 2014 RFS rule (79 FR 42128) for more details on what EPA considers to be residue.

[22] There are several reasons for the inclusion of this condition. There are data reliability benefits associated with requiring the generation of grandfathered RINs first. Since ACF will be required to start tracking energy use once this pathway is activated in EMTS, they will have a more robust set of data that contributes to their 365-day rolling average, compared to having just one data point on the first day of approval. In addition, this condition will help to reduce the Agency's administrative burden related to enforcement and compliance. If ACF were able to switch back and forth between generating grandfathered and non-grandfathered RINs, auditing their records would require EPA to do a more complex review of historical data. Furthermore, alternating between the grandfathered and non-grandfathered RIN generation creates more opportunities for errors in the calculations required to meet the GHG emission reduction threshold, and also

EPA may modify the conditions specified above, as it deems necessary and appropriate to ensure that non-grandfathered fuel produced pursuant to the ACF Claremont Process achieves the required lifecycle GHG reductions, including to make the conditions align with any future changes to the RFS regulations. If EPA makes any changes to the conditions noted in this document for non-grandfathered fuel produced pursuant to the ACF Claremont Process, the Agency will explain such changes in a public determination letter, similar to this one, and specify in that letter the effective date for any such changes.

V. Public Participation

As part of the March 2010 RFS rule, we took public comment on our lifecycle assessment of the corn starch ethanol pathways listed in Table 1 to 40 CFR 80.1426, including all models used and all modeling inputs and evaluative approaches. In the March 2010 RFS rule, we also acknowledged that it was unlikely that our final regulations would address all possible qualifying fuel production pathways, and we took comment on allowing the generation of RINs using a temporary D-code in certain circumstances while EPA was evaluating such new pathways and updating its regulations. After considering comments, we finalized the current petition process, where we allow for EPA approval of certain petitions without going through additional notice and public comment if we can do so as a reasonably straightforward extension of prior analyses, whereas notice and public comment would be conducted to respond to petitions requiring significant new analysis and/or modeling. *See* 75 FR 14797 (March 26, 2010).

In responding to the petition submitted by ACF, we have relied on the corn starch ethanol modeling that we conducted for the March 2010 RFS rule, and have simply adjusted the analysis to account for the specific production process used by ACF Claremont. We relied on the same agricultural sector modeling (FASOM and FAPRI results) that was conducted and commented on as part of the March 2010 RFS rule to represent feedstock production. This also includes use of the same emission factors and types of emission sources that were used in the March 2010 RFS rule analysis. Thus, the fundamental analyses relied on for this decision have already been made available for public comment as part of the March 2010 RFS rule. Our approach today is also consistent with our description of the petition process in the preamble to the March 2010 RFS rule. Our evaluation in response to the petition is a logical extension of analyses already conducted for the March 2010 RFS rule.

VI. Conclusion

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provides more opportunities for errors when generating RINs in EMTS. EPA has approved pathway petitions in the past with conditions allowing parties to switch back and forth between the production of grandfathered and non-grandfathered volume during a calendar year. However, for the reasons described above, we have decided not to grant additional petitions allowing such an approach.

This document specifies conditions designed to ensure that D-code 6 RINs are generated for non-grandfathered ethanol produced pursuant to the ACF Claremont Process only if the ethanol satisfies the 20% lifecycle GHG reduction requirements specified in the CAA for renewable fuel. The fuel must also meet other applicable requirements specified in the CAA and EPA implementing regulations to qualify for RIN generation, including being produced from renewable biomass, and for use as transportation fuel, heating oil or jet fuel.

This approval applies specifically to the ACF Claremont facility and to the process, materials used, fuel and co-products produced, and process energy sources as outlined and described in the ACF petition. This approval is effective as of signature date. RINs may only be generated for non-grandfathered ethanol produced pursuant to the ACF Claremont Process that is produced after the date of activation of ACF's registration for this pathway.

The OTAQ Reg: Fuels Programs Registration and OTAQ EMTS: OTAQ EMTS Application will be modified to allow ACF to register and generate RINs for the production of non-grandfathered ethanol from corn starch feedstock using a production process of "ACF Claremont Process." This document has no impact on the ability of ACF to use the OTAQ Reg: Fuels Programs Registration and OTAQ EMTS: OTAQ EMTS Application to register and generate RINs for the facility's baseline volume of grandfathered ethanol fuel or to register and generate RINs for ethanol produced using any of the pathways specified in Table 1 to 40 CFR 80.1426.