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

AUG 12 2014

OFFICE OF
AIR AND RADIATION

Rebecca Boudreaux, Ph.D.
President
Oberon Fuels, Inc.
2223 Avenida de la Playa
Suite 205
La Jolla, California 92037

Dear Dr. Boudreaux:

You petitioned the Agency on behalf of Oberon Fuels, Inc. ("Oberon") to approve a pathway for the generation of cellulosic and/or advanced biofuel fuel RINs under the renewable fuel standard ("RFS") program for the production a renewable diesel substitute, dimethyl ether ("DME"), made from waste-derived biogas. Oberon's biogas-to-DME process uses electricity purchased from the grid and available onsite waste-derived biogas for process energy and approved waste-derived biogas from onsite and offsite sources as the feedstock to produce DME using a novel three-step production process (the "Oberon process").

Through the petition process described under 40 CFR 80.1416, Oberon submitted data to the EPA to perform a lifecycle GHG analysis of the Oberon pathways. This analysis involved a straightforward application of the same methodology and much of the same modeling used for the March 2010 RFS rule (75 FR 14670) and the July 2014 RFS rule (79 FR 42128). The difference between this analysis and the modeling completed for previous rules is the evaluation of a different fuel production process and type of renewable fuel.

The attached document "Oberon Fuels Request for Fuel Pathway Determination under the RFS Program" describes the data submitted by Oberon, the analysis conducted by the EPA, and our determination of the lifecycle greenhouse gas emissions associated with the fuel production pathways described in Oberon's petition.

Based on our assessment, renewable DME produced using biogas from landfills, municipal wastewater treatment facility digesters, agricultural digesters, and separated MSW digesters, and biogas from the cellulosic components of biomass processed in other waste digesters through the Oberon pathways qualifies under the Clean Air Act for cellulosic biofuel (D-code 3) RINs. Renewable DME produced from biogas from waste digesters processing renewable biomass that is assumed non-cellulosic through the Oberon pathways qualifies for advanced biofuel (D-code 5) RINs. To be eligible for RINs, the fuel must meet the definitional requirements associated with cellulosic biofuel or advanced biofuel, as appropriate, be made from renewable biomass as defined in EPA regulations, and be demonstrated pursuant to 80.1426(f)(10(ii) and (11)(ii) to be used as a transportation fuel.

This approval applies specifically to Oberon Fuels, and to the Oberon process, materials used, fuels produced, and process energy sources as outlined and described in the petition request submitted by Oberon. This approval is effective as of signature date, or 30 days after publication of the July 18, 2014 RFS Rule, whichever is later.

The OTAQ Reg: Fuels Programs Registration and OTAQEMTS: OTAQ EMTS Application will be modified to allow Oberon to register and generate RINs for renewable DME produced from biogas feedstock through the Oberon pathways using a production process of "Oberon Process."

Sincerely,

Christopher Grundler, Director
Office of Transportation and Air Quality

Enclosure

# Oberon Fuels Request for Fuel Pathway Determination under the RFS Program

Office of Transportation and Air Quality

**Summary:** Oberon Fuels Inc. ("Oberon") petitioned the Agency under the Renewable Fuel Standard ("RFS") program to generate D3 (cellulosic) and/or D5 (advanced) RINs for a renewable diesel substitute, dimethyl ether ("DME"), made from waste-derived biogas. Oberon's biogas-to-DME process uses electricity purchased from the grid and available onsite waste-derived biogas for process energy and approved waste-derived biogas from onsite and offsite sources as the feedstock to produce DME using a novel three-step production process: 1) syngas production via steam methane reforming 2) methanol synthesis via a catalyzed adiabatic equilibrium limited reaction, and 3) simultaneous DME synthesis and separation via reactive distillation (the "Oberon process"). EPA previously evaluated biogas production from landfills in the final rule published on March 26, 2010 (75 FR 14670) (the "March 2010 RFS rule") and modeled in more detail the use of biogas from landfills, separated MSW digesters, wastewater treatment digesters, agricultural digesters, and other waste digesters ("waste-derived biogas") as a feedstock for biofuel production in the final rule published on July 18, 2014 (79 FR 42128) (the "July 2014 RFS rule"). Based on the data submitted by Oberon, the evaluation of waste-derived biogas in the July 2014 RFS rule and the Oberon biogas-to-DME process modeling, EPA conducted a lifecycle assessment estimating that renewable DME produced using the Oberon process reduces lifecycle greenhouse gas ("GHG") emissions compared to the statutory diesel baseline by 68%. Based on the results of our lifecycle GHG assessment, DME produced using the Oberon process qualifies for either cellulosic (D-code 3) or advanced biofuel (D-code 5) RINs depending on the biogas source (the "Oberon pathways"). Based on our assessment, renewable DME produced using biogas from landfills, municipal wastewater treatment facility digesters, agricultural digesters, and separated MSW digesters, and biogas from the cellulosic components of biomass processed in other waste digesters through the Oberon pathways qualifies under the CAA for cellulosic biofuel (D-code 3) RINs. Renewable DME produced from biogas from waste digesters processing renewable biomass that is assumed non-cellulosic through the Oberon pathways qualifies for advanced biofuel (D-code 5) RINs.

Through the petition process described under 40 CFR 80.1416, Oberon submitted data to EPA to perform a lifecycle GHG analysis of the Oberon pathways. This analysis involved a straightforward application of the same methodology and much of the same modeling used for the March 2010 and the July 2014 RFS rules. The difference between this analysis and the modeling completed for previous rules is the evaluation of a different fuel production process and type of renewable fuel.

This document is organized as follows:

- *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. This section is not specific to Oberon's request and applies to all petitions submitted pursuant to 40 CFR 80.1416.

- *Section II. Available Information*: This section contains background information on Oberon and describes the information that Oberon 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 today's determination and identifies how it was unique compared to analyses performed for previous RFS rules. This section also describes how we have applied the lifecycle results to determine the appropriate D-code for fuel produced pursuant to the Oberon pathways.
- *Section IV. Conditions and Associated Regulatory Provisions:* This section describes the regulatory provisions associated with this petition.
- *Section V. Public Participation*: This section describes how this petition is an extension of the analysis done as part of the March 2010 and July 2014 RFS rules.
- *Section VI. Conclusion*: This section summarizes our conclusions regarding Oberon's petition, including the D-codes Oberon may use in generating RINs for fuel produced using the Oberon pathways.

## I. Required Information and Criteria for Petition Requests

### A. Background and Purpose of Petition Process

As a result of changes to the Renewable Fuel Standard program in Clean Air Act ("CAA") Section 211(o) required by the Energy Independence and Security Act of 2007 ("EISA"), EPA adopted new regulations, published at 40 CFR 80.1400 et. seq. that 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. See 75 FR 14670 (March 26, 2010); 75 FR 26026 (May 10, 2010); 75 FR 37733 (June 30, 2010); 75 FR 59622 (September 28, 2010); 75 FR 76790 (December 9, 2010); 75 FR 79964 (December 21, 2010); 77 FR 1320 (January 9, 2012); 77 FR 74592 (December 17, 2012); 78 FR 14190 (March 5, 2013); 78 FR 41703 (July 11, 2013);78 FR 62462 (October 22, 2013); and 79 FR 42128 (July 18, 2014).

Pursuant to § 80.1426(f) (1) of the regulations:

*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 § 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 third party may petition for EPA to evaluate a new fuel pathway in accordance with § 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 § 80.1426(f)(6) for a specified baseline volume of fuel.

The petition process under § 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.

### B. Required Information in Petitions

As specified in 40 CFR 80.1416(b)(1), petitions must 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 § 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.

In addition to the requirements stated above, parties who use a feedstock not previously evaluated by EPA must also include the following, and should also include as appropriate supporting information such as state, county, or regional crop data, commodity reports, independent studies, industry or farm survey data, and reports or other documents supporting any claims:

- Type of feedstock and description of how it meets the definition of renewable biomass.
- Market value of the feedstock.
- List of other uses for the feedstock.
- List of chemical inputs needed to produce the renewable biomass source of the feedstock and prepare the renewable biomass for processing into feedstock.

- Energy needed to obtain the feedstock and deliver it to the facility. If applicable, identify energy needed to plant and harvest the source of the feedstock and modify the source to create the feedstock.
- Current and projected yields of the feedstock that will be used to produce the fuels.
- Other additional information as requested by the Administrator to complete the lifecycle greenhouse gas assessment of the new fuel pathway.

## II. Available Information

### A. Background on Oberon Fuels

Oberon petitioned the Agency under the RFS program to generate RINs for DME made from biogas feedstocks through a three-step combined reactive distillation biogas-to-DME process. A petition was required because the Oberon pathways differ from those EPA has modeled previously in that they involve a different type of production process and type of renewable fuel.

### B. Information Available Through Existing Modeling

A fuel pathway under the RFS regulations is defined by three components: (1) fuel type, (2) feedstock, and (3) production process. The pathways addressed in Oberon's petition would produce renewable DME using feedstocks that have already been evaluated as part of the March 2010 and July 2014 RFS rules (see Table 1 to § 80.1426). Therefore, no new feedstock modeling was required. The physical properties of DME corresponding to this chemical's use as a transportation fuel in engines and as a blendstock have been assessed and reported in an ASTM standard.[1]

This petition also required EPA to evaluate Oberon's specific fuel production process. In the July 2014 RFS rule, EPA analyzed and approved several pathways for renewable biofuel generation using biogas feedstocks. In the March 2010 and July 2014 RFS rules EPA conducted detailed analysis of CNG/LNG and electricity pathways from biogas feedstocks. Our analysis of the Oberon petition used the same fundamental modeling approach that was used to evaluate the lifecycle GHG emissions associated with the approved pathways using biogas feedstocks. To do this assessment, the existing biogas generation modeling framework was adjusted to account for the amount of energy use and associated emissions based on the data submitted by Oberon. This was a straightforward analysis based on existing modeling done for the March 2010 RFS rule and the July 2014 RFS rule and substituting Oberon's process data, which only altered the conversion process emissions and fuel product.

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[1] "Standard Specification for Dimethyl Ether for Fuel Purposes". ASTM Customer: U.S. Environmental Protection Agency (EPA). Designation: D7901-14a. July 31, 2014.

### C. Information Submitted by Oberon Fuels

Oberon has supplied all the information as required in 40 CFR 80.1416 that EPA needs to analyze the lifecycle GHG emissions associated with the Oberon pathways. The information submitted includes a technical justification that has a description of the fuel, feedstocks used, and Oberon's proprietary production process with modeling flow charts, a detailed mass and energy balance of the process with information on co-products as applicable, and other additional information as needed to complete the lifecycle GHG assessment.

## III. Analysis and Discussion

### A. Lifecycle Analysis

Determining a fuel pathway's compliance with the lifecycle GHG reduction thresholds specified in the CAA 211(o) for different types of renewable fuel requires a comprehensive evaluation of the renewable fuel, as compared to the gasoline or diesel that it replaces, on the basis of its lifecycle GHG emissions. 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 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 modeling that includes 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 related to the Oberon pathways under this petition request is consistent with the CAA's applicable requirements, including the definition of lifecycle GHG emissions and threshold evaluation requirements. It was based principally on previous lifecycle analysis modeling that EPA completed for the March 2010 and July 2014 RFS rules as well as information related to the pathways submitted by Oberon under a claim of confidential business information (CBI) in August 2013. The components of EPA's lifecycle GHG analysis of Oberon's fuel pathways are described below.

**Feedstock Production** – Oberon provided, as part of the information claimed as CBI, their process yields in terms of pounds of feedstock used per pound of finished DME fuel product. Oberon intends to use biogas obtained from dairy manure digesters (i.e., agricultural digesters) as feedstock.

However, the lifecycle analysis would be the same for waste-derive biogas from any of the sources evaluated as part of the July 2014 RFS final rule, and this approval would allow Oberon to use biogas from any of those sources. As discussed in the July 2014 RFS rule, the lifecycle analysis performed by EPA applies to biogas from landfills, separated MSW digesters, agricultural digesters, wastewater treatment facility digesters, and other waste digesters. Based on the July 2014 RFS rule Oberon will be able generate the appropriate corresponding type of RIN for DME produced from any of the approved biogas sources. For all biogas sources, including agricultural digesters, EPA used a flaring baseline as the alternative fate of the biogas feedstock. Therefore, for each unit of biogas used by Oberon as biofuel feedstock we evaluated the lifecycle GHG emissions associated with capturing the biogas for use in Oberon's process, and compared that to the lifecycle GHG emissions associated with flaring the same amount of biogas in the baseline scenario. Based on this difference, and using the methodology described in the July 2014 RFS rule, we estimated lifecycle GHG emissions associated with upstream biogas generation to be approximately 2.3 $kgCO_2e/mmBtu$ of DME produced through the Oberon pathways. Inefficiencies in biogas flaring were considered in the fuel use stage of the lifecycle (explained below). Should Oberon use biogas derived from waste digesters processing renewable biomass that is assumed non-cellulosic (e.g., separated food waste), the lifecycle assessment of the resulting fuel would not differ. However, as described in the 2014 RFS final rule, the resulting fuel would qualify for advanced biofuel RINs rather than cellulosic biofuel RINs.

**Feedstock Transport** – Oberon's petition specifies that biofuel production typically occurs at biogas generation sites and does not require feedstock transportation. The Oberon process is modular, is designed to convert biogas from a variety of sources to DME, and can be configured and sized to accommodate different biogas sources and volumes onsite. In some cases Oberon may use biogas generated offsite to maintain its reactors operational efficiency. Based on this information, GHG emissions associated with feedstock biogas transport were assumed to be insignificant. Moreover, inclusion of biogas feedstock transport emissions would not substantially alter the pathway's overall GHG emissions, or prevent the pathway from meeting its required GHG emission reductions specified by the RFS.

**Fuel Production** – Oberon's biogas-to-DME fuel production process consists of three major steps: syngas production, methanol synthesis, and simultaneous DME synthesis and separation via reactive distillation. The first two processes are commonly used industrial production processes and have been adapted by Oberon to scale to various system configurations. The third process, reactive distillation for DME synthesis and separation, is being commercialized on this scale for the first time by Oberon. The overall DME production route is represented by the following reactions:

*Syngas generation*

$$CH_4 + H_2O \rightarrow CO + 3H_2$$

$$H_2O + CO \leftrightarrow CO_2 + H_2$$

$$CH_4 + CO_2 \rightarrow 2CO + 2H_2$$

*Methanol synthesis*

$$CO + 2H_2 \leftrightarrow CH_3OH$$

$$CO_2 + 3H_2 \leftrightarrow CH_3OH + H_2O$$

*DME synthesis*

$$2CH_3OH \rightarrow CH_3OCH_3 + H_2O$$

In the first methanol synthesis reaction carbon monoxide (CO) reacts with hydrogen (H) to form methanol, and in the second reaction $CO_2$ and hydrogen react to form methanol and water. The carbon source for CO in the first methanol synthesis reaction is exclusively from biogas methane ($CH_4$) that was converted to CO during syngas production. Therefore, methanol formed by the first methanol synthesis reaction is derived from $CH_4$. However, the source of carbon for the methanol produced by the second methanol reaction is biogas $CO_2$.

The only inputs to the DME process are biogas and water. The lifecycle GHG emissions for the fuel production stage of the Oberon pathways can be attributed to the use of grid electricity and the use of biogas for process energy. The emissions factor for grid electricity (220 kg$CO_2$e/mmBtu) represents the U.S. grid average and was the same factor used in the March 2010 RFS rule. The emissions factor for biogas used as process energy is 0.000364 g$CO_2$e/Btu and was the same factor used in the July 2014 RFS rule. Based on Oberon's reported process parameters and data, the total lifecycle GHG emissions for the fuel production stage are 32 kg $CO_2$e/mmBtu of DME.

**Fuel Distribution** – As part of the March 2010 RFS rule EPA estimated the lifecycle GHG emissions associated with the petroleum gasoline and diesel baselines, including the lifecycle GHG emissions associated with transporting the finished petroleum products from domestic refineries to bulk storage terminals, and then distributing the products from the terminals to consumers. For a drop-in type of fuel or blended fuel-type, a conservative approach would assume the same modes of transport and distances as the petroleum gasoline and diesel baselines evaluated in the March 2010 RFS rule. However, this assumption would be too conservative and unrepresentative of the associated fuel distribution emissions from biogas derived DME because Oberon will produce DME in very close or direct proximity to the unique DME fueling infrastructure required for its use. Oberon plans to use DME as a diesel fuel replacement. According to Oberon, the DME they produce can be used directly in diesel engines with modest modifications to the fuel system (e.g., fuel storage tank, fuel injectors, fuel pump, and fuel control software), and is well suited for fleets of heavy duty vehicles that make local and regional hauls. Since DME is a gas under ambient conditions, it would require a unique distribution infrastructure that is not presently available, but would resemble that used for propane.

Eventually a national infrastructure could service long hauls, but fuel distribution distances would likely remain relatively short. Based on this information and the lack of specific data on a currently non-existent DME distribution infrastructure, EPA is currently assuming that GHG emissions associated with this fuel's distribution are insignificant. However, applying the same estimated fuel distribution emissions associated with the petroleum baselines as a conservative estimate (1 kg $CO_2$eq/mmBtu) would not substantially alter the GHG lifecycle emissions for the Oberon pathways and the resulting DME fuel would still meet the required GHG reduction threshold of 60% to be eligible to generate cellulosic RINs were it applied.

**Fuel Use** –The lifecycle GHG emissions associated with using renewable DME in engines or as a LPG blendstock were evaluated by assuming complete combustion and using chemical reaction stoichiometry. The resulting GHG emissions ($CO_2$ produced from assumed fuel combustion) were normalized to the fuel's energy content (lower heating value) as reported in the DME fuel ASTM standard. The calculated emissions resulting from DME combustion were found to be 70 kg $CO_2$e/mmBtu, which was applied in our lifecycle GHG analysis of DME produced through the Oberon pathways. However, in the baseline scenario the biogas used to power portions of the DME fuel process and serve as feedstock material for the DME fuel would have been flared and released a roughly equivalent amount of $CO_2$ emissions.[2] Accounting for flaring inefficiencies assumed in the baseline, combustion of the corresponding amount of biogas to generate the normalized volume of DME would have resulted in emissions of 73 kg $CO_2$e/mmBtu. Thus, the DME tailpipe emissions are more than cancelled-out when the estimated baseline scenario's emissions are subtracted from them (see Table 1). Compared to CNG and LNG, DME is a more highly refined fuel product, and would have fewer non-$CO_2$ GHG emissions. However, applying the same emission factors for CNG/LNG to DME would not substantially impact the overall emissions assessed for the Oberon pathways.

**Lifecycle GHG Results** – Based on our analysis of the full fuel lifecycle for the Oberon pathways, described above, we estimated the lifecycle GHG emissions associated with DME produced through the Oberon pathways. Table 1 shows the lifecycle GHG emissions of DME produced by the Oberon pathways compared to the 2005 diesel baseline, because renewable DME is a diesel replacement.

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[2] The flaring baseline was established and discussed in the July 2014 RFS rulemaking.

**Table 1: Lifecycle GHG Emissions of DME from the Oberon Process (kgCO2e/mmBtu)[3]**

| | Lifecycle GHG Emissions | |
|---|---|---|
| Lifecycle Stage | Oberon DME (kg $CO_2$eq/mmBtu-DME) | 2005 Diesel Baseline (kg $CO_2$eq/mmBtu-diesel) |
| Upstream biogas recovery | 2 | 0 |
| Fuel production | 32 | 18 |
| Tailpipe emissions | 70 | 79 |
| Avoided flaring emissions | -73 | 0 |
| Total emissions | 29 | 97 |
| **Change from diesel baseline** | **68%** | |

### B. Application of the Criteria for Petition Approval

Oberon provided all of the necessary information required for this type of petition request including information about the fuel production process and ASTM information about the resulting DME fuel.

Based on the data submitted and information already available through analyses conducted for previous RFS rulemakings, EPA conducted a lifecycle assessment and determined that renewable DME produced pursuant to the Oberon pathways meets the 60% lifecycle GHG threshold requirement for cellulosic biofuel. Fuel produced pursuant to the Oberon pathways would be eligible for cellulosic biofuel RINs (D-Code 3) when produced from biogas from landfills, municipal wastewater treatment facility digesters, agricultural digesters, separated MSW digesters, and the cellulosic components of renewable biomass processed in other waste digesters. In addition, the DME produced pursuant to the Oberon pathways meets the 50% lifecycle GHG threshold requirement for advanced biofuel RINs (D-Code 5) when produced from the non-cellulosic components of renewable biomass processed in other waste digesters.

[3] Lifecycle GHG emissions are normalized per mmBtu of RIN-generating fuel produced. Totals may not be the sum of the rows due to rounding.

## IV. Conditions and Associated Regulatory Provisions

For DME produced pursuant to the Oberon Pathways, Oberon must comply with the same regulatory requirements as apply to CNG/LNG in §§ 80.1426(f)(10)(ii) and (11)(ii), as relevant depending on the manner in which DME is distributed. In addition, as part of the registration process associated with Oberon's use of the Oberon pathways, Oberon must comply for its DME product with the same regulatory requirements in § 80.1450(b)(2)(f) that apply to CNG/LNG[4]. EPA is also specifying that 77,000 Btu (lower heating value) of DME shall represent one gallon of renewable fuel with an equivalence value (EV) of 1.0. If Oberon fails to produce fuel in accordance with the elements of the Oberon pathways described in this approval for any amount of fuel for which it generates RINs through the Oberon pathways, all such RINs shall be considered improperly generated under 40 CFR 80.1431(a). EPA may modify the conditions and associated regulatory provisions specified above, as necessary, to make them align with any future changes to the RFS regulations, including but not limited to registration, recordkeeping and reporting requirements. If EPA makes any changes to the conditions and associated regulatory provisions for the Oberon pathways, 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

The definition of advanced biofuel in CAA 211(o)(1) specifies that the term means renewable fuel that has " lifecycle greenhouse gas emissions, as determined by the Administrator, after notice and opportunity for comment, that are at least 50 percent less than the baseline lifecycle greenhouse gas emissions..." In our June 14, 2013 Notice of Proposed Rulemaking, we took public comment on our lifecycle assessment of pathways involving the production of renewable fuels from biogas, including gas-to-liquid (GTL) processes that are similar to Oberon's DME production process (see 78 FR 36042). We did not receive any adverse comments or comments questioning the viability of the proposed GTL pathways that are relevant to this company-specific determination. While we have not yet finalized a generalized GTL pathway for inclusion in the RFS regulations, the above described Notice provided an opportunity for public comment on a pathway analysis very similar to the analysis of the Oberon process described in this document.

In addition, in responding to this petition, we have relied to a considerable extent on the same modeling that we conducted for the March 2010 and July 2014 RFS rules, and have simply adjusted the analysis to account for Oberon's process data and an analysis of DME combustion-related emissions. Thus, the fundamental analyses relied on for these decisions have been made available for public comment as part of previous rulemakings, consistent with the reference to notice and comment in the statutory definitions of "advanced biofuel." Our approach today is also consistent with our

[4] Regulatory citations in this paragraph are to the regulations as revised in the July 2014 RFS rule.

description of the petition process in the preamble to the March 2010 RFS final rule, as our work in responding to the petition was a logical extension of analyses already conducted.

## VI. Conclusion

Based on our assessment, renewable DME produced using biogas from landfills, municipal wastewater treatment facility digesters, agricultural digesters, and separated MSW digesters, and biogas from the cellulosic components of biomass processed in other waste digesters through the Oberon pathways qualifies under the CAA for cellulosic biofuel (D-code 3) RINs. Renewable DME produced from biogas from waste digesters processing renewable biomass that is assumed non-cellulosic through the Oberon pathways qualifies for advanced biofuel (D-code 5) RINs. To be eligible for RINs, the fuel must meet the definitional requirements associated with cellulosic biofuel or advanced biofuel, as appropriate, be made from renewable biomass as defined in EPA regulations, and be demonstrated pursuant to 80.1426(f)(10(ii) and (11)(ii) to be used as a transportation fuel.[5]

This approval applies specifically to Oberon Fuels, and to the Oberon process, materials used, fuels produced, and process energy sources as outlined and described in the petition request submitted by Oberon. This approval is effective as of signature date, or 30 days after publication of the July 18, 2014 RFS Rule, whichever is later. EPA will consider extending a similar approval to new petitioners for other biogas-to-DME processes upon verification that the greenhouse gas reduction requirements and all other requirements are met.

Fuel produced pursuant to the Oberon pathways does not meet the requirements for delayed RINs outlined in 80.1426(g) because the complete petition was not received by EPA by January 31, 2011, as required by 80.1426(g)(1)(i)(A).

The OTAQ Reg: Fuels Programs Registration and OTAQEMTS: OTAQ EMTS Application will be modified to allow Oberon to register and generate RINs for renewable DME produced from biogas feedstock through the Oberon pathways using a production process of "Oberon Process."

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[5] As discussed in the July 2014 RFS rule, biogas from landfills, municipal wastewater treatment facility digesters, agricultural digesters (such as dairy manure digesters), and separated MSW digesters is considered cellulosic feedstock. Producers using biogas from waste digesters that process materials other than those appropriately treated in the above-listed waste digesters will need to demonstrate what portion of the feedstock is derived from renewable biomass and what portion may be considered cellulosic, in order to use the formulas in 40 CFR 80.1426(f)(3)(vi) and (f)(4).