CALIFORNIA AIR RESOURCES BOARD

Low Carbon Fuel Standard
Tier 2 Pathway Application

Application No. B0620

Updated: 11/21/2024 (See Underlined Text)

Staff Summary

Artesia Renewable Diesel Company, LLC (1646)
Renewable Diesel from Imported Soybean Oil, and N.A. Canola Oil

Fuel Production Facility
Renewable Diesel Unit (RDU) / Pre-Treatment Unit (PTU) (82381)
Artesia, New Mexico

Deemed Complete Date: 4/25/2024
Posted for Comment Date: 10/28/2024
CI Certified Date: 11/21/2024
CI Start Date: 7/1/2024

Pathway Summary

The Artesia Renewable Diesel Company, LLC (Artesia RDC) seeks provisional certification of two Tier 2 pathways for Renewable Diesel derived from imported Soybean Oil extracted from U.S.-sourced soybeans in Monterrey, Mexico, and North American (N.A.) Canola Oil processed at their renewable diesel fuel production facility in Artesia, New Mexico.

This bio-refinery is co-located with a crude oil processing petroleum refinery (Navajo Refining); owned and operated by parent company HF Sinclair Corporation. Artesia RDC commenced renewable diesel production in mid-2022. Additionally, there is a pre-treatment unit (Artesia PTU) on-site for the feedstock oils used in renewable diesel production. The pre-treatment process at Artesia PTU involves bleaching and removal of phosphorous from the feedstock oils and uses a higher emissions factor (EF) to account for the GHG emissions impact from the use of pre-treatment chemicals (citric acid), regional electricity, and natural gas. Standard oil extraction or rendering EFs otherwise apply to the two feedstocks. The first feedstock Canola Oil is sourced from U.S. and Canadian producers and transported by rail to Artesia PTU over a distance of 2,220 miles. The second feedstock Soybean is sourced directly from producers in the U.S. and are transported by railcar over a distance of 1,700 miles to the crushing facility in Monterrey, Mexico. Extracted Soy Oil transported by rail to Artesia RDU over a distance of 1,235 miles. Hydrogen is also needed for renewable diesel production and this is obtained from the co-located Navajo Refinery where it is produced by steam methane reformation (SMR) using

natural gas, steam, and electricity. Other energy inputs for the renewable diesel production process include natural gas, and electricity.

Co-Products in the form of renewable naphtha (RN), and light fuel gases are also produced. These co-product gases are consumed by the petroleum refinery as process fuel, or used for the production of hydrogen. The co-products are verified to displace the use of natural gas. The finished renewable diesel fuel produced at Artesia RDC is transported to California by railcar.

Carbon Intensity of Fuel Type Pathways

The CIs for the proposed fuel pathways are determined from life cycle analysis conducted using a modified version of the Board-approved Tier 1 Simplified CI Calculator for Biodiesel and Renewable Diesel.[1]

The table below lists the proposed Carbon Intensities (CIs), using three (3) months of operational data, for the proposed pathways. These pathways will accordingly be classified as provisional until 24 months of operational data become available.

Proposed Pathway CI				
Pathway Number	**Fuel & Feedstock**	**Pathway FPC**	**Pathway Description**	**Carbon Intensity (gCO_2e/MJ)**
B062001	Renewable Diesel from Pre-Treated Canola Oil	RND006B 06200100	U.S and Canada sourced Canola Oil transported by Rail and pre-treated at the Renewable Diesel plant in Artesia, New Mexico; Natural Gas, and Grid Electricity; finished fuel transported to California by Rail.	55.07

[1] The Tier 1 Simplified CI Calculator for Biodiesel and Renewable Diesel (August 13, 2018), incorporated by reference in the LCFS Regulation, section 95488.3(b).

Proposed Pathway CI				
B062002	Renewable Diesel from imported Soybean Oil extracted in Mexico from U.S.-sourced Soybeans.	RND005B06200200	U.S. sourced Soybeans transported by Rail to Monterrey, Mexico; Extracted Soybean Oil transported back to the pre-treatment unit (PTU) in Artesia, New Mexico; Natural Gas, and Grid Electricity; finished fuel transported to California by Rail.	59.69

Operating Conditions

The certified CI values in the above table may be used to report and generate credits for fuel quantities that are produced at the facility in the manner described in the applicant's Life Cycle Analysis (LCA) report, and dispensed for transportation use in California, subject to the following requirements and conditions:

1. Fuel pathway holders are subject to the requirements of the California Air Resources Board's (CARB) Low Carbon Fuel Standard (LCFS) regulation, which appears at sections 95480 to 95503 of title 17, California Code of Regulations. Requirements include ongoing monitoring, reporting, recordkeeping, and third-party verification of operational CI and a controlled process for providing product transfer documents or other similar records to counterparties or CARB.
   All specified source feedstocks reported in the fuel production process must meet chain-of-custody requirements specified in section 95488.8(g)(1)(B).

2. The following Operating Condition (OC) is applicable to user-defined input values for co-products in Field 2.17.a: "Energy Density of Other Co-Products (LHV, Btu/gal)" (Cell K57 of the RD-Production Tab in the Tier 1 Simplified CI Calculator). The input values shall be determined by Gas Chromatography (GC) analyses or other CARB approved method (e.g., correlation between LHV and specific gravity of renewable naphtha), and shall be reported as a Representative Value, or a Conservative Value with the following constraints, respectively:

   The Representative Value of Energy Density shall be based upon CARB's approved sampling and analysis plan used to determine the user-defined input value for the Energy Density of Co-Product renewable naphtha co-produced and exported for sale under this fuel pathway. The applicant's proposed sampling and

analysis plan shall take into account the variability of the facility-specific material attribute in selecting the sampling method, frequency of analysis or measurements, and the calculation method used to determine the composite, representative, user-defined input value. Results derived on a higher heating value (HHV) basis shall be converted to a lower heating value (LHV) basis using a factor approved by CARB. Inputs must be site-specific; results from one facility's co-product analysis may not be reported in applications or Annual Fuel Pathway Reports for any other facility's pathways.

The Conservative Value for Energy Density is the lowest result of GC analyses or other CARB approved method reduced by a conservative margin of 5 percent. Lower values for co-product energy density reduce co-product credit and correspond to higher, more conservative, CI values. The value may be determined from analysis of an initial subset of facility-specific results provided to CARB at the time of application. The applicant must demonstrate that the selected value is conservative, relative to analyses of the facility's specific material and peer reviewed literature values for the material. The fuel pathway will be certified with an operating condition requiring a minimum sampling and analysis frequency, to be determined during the certification process on the basis of the initial subset of results provided with the application package. If any analysis results in a lower value than the approved conservative value, the user-defined input value must be updated in the subsequent Annual Fuel Pathway Report. A fuel pathway holder may transition from a conservative value to a representative value for the subsequent Annual Fuel Pathway Report if approved by CARB prior to the report due date.

Sampling and Analysis Plan

The applicant shall develop a sampling and analysis plan for each fuel production facility, to demonstrate to CARB the validity of composited values used for all relevant user-defined inputs. At a minimum, the proposed sampling and analysis plan shall include the following:

i. Description of the material attribute(s) specified for all relevant user defined inputs (e.g., Energy Density LHV (Btu/lb) of the co-product streams.

ii. The properties (e.g., composition, vapor pressure, density etc.) of the co-product streams.

iii. The proposed sampling frequency, given as a number of samples per time period and per unit of fuel produced (e.g., every 100,000 gallons), to monitor the material attribute and its variability. The applicant must indicate the method of compositing collected samples with due consideration to changes in production cycles (batch runs, or continuous), changes in type of feedstock, seasonal availability of feedstocks, and disruptions to the production process (startup and shutdown).

iv. Documentation of analytical results must identify the samples by date, type, location, and fuel production batch.

3. The test methods employed (standard or industry recognized) shall be described for all analytical measurements to support the use of a composited value for a user defined input.

4. Individual GC test results shall be averaged per the stated frequency (i.e., time period) in the Sampling and Analysis plan. Averages and variance shall be provided for each time period reviewed, and individual GC test reports shall be provided as requested by the verification body or CARB.

5. To be eligible and demonstrate continued eligibility for the associated displacement credit for Light Hydrocarbon Production (Field 2.16 of the RD Production tab of the Simplified CI Calculator), the applicant must provide evidence that renewable light hydrocarbon/fuel gas displaces natural gas as part of the initial validation and subsequent annual verifications. The displacement credit is limited to renewable light hydrocarbon/fuel gas used outside of the fuel pathway system boundary. If any quantity of renewable light hydrocarbon/fuel gas is used as process fuel or energy for the Renewable Diesel Unit (RDU) / Pre-Treatment Unit (PTU), that quantity will not be eligible for a co-product credit or displacement credit, and its use must be reported in Field 2.14: Alternate Fuel/ Credit for Co-product Use.

6. The Field 2.16.a Conversion Factor from HHV to LHV for cell J56 of the RD Production tab of the Simplified CI Calculator instructs the applicant to consult CARB Staff for a value. The initial value may be proposed by the applicant as the weighted average conversion factor of component fuel gases (as determined by the inline GC composition) reported monthly in Field 2.16 Light Hydrocarbon Production. The HHV to LHV conversion factors of component fuel gases can be found in the "Fuel_Specs" tab of the Simplified CI Calculator. A composite weighted average conversion factor should be reported in Cell J56 based upon the monthly conversion factors calculated above, and is subject to verification.

   For Example, if the composition of the light hydrocarbons for Month 1 is 60 percent propane, and 40 percent methane, then the calculated monthly HHV to LHV conversion factor is determined as follows:

   = (60% x 0.922 Conv Factor for Propane) + (40% x 0.903 Conv Factor for Methane)

   = 0.914

   A weighted average composite of all monthly calculated conversion factors should be reported in Cell J56 of the RD Production tab.

7. The soybean crushing facility labeled "Ragassa Monterrey" and located in Nuevo Leon, Mexico is considered an Intermediate Fuel Production facility, and all

energy inputs, and chemicals employed to extract soybean oil are subject to third-party verification.

The following Operating Condition is applicable to the User-Defined "Field 2.5 Standard Oil Extraction GHG Emissions Factor" of the "Ragassa Soy" tab of the Tier 1 Simplified CI Calculator for Renewable Diesel. This value is listed in the yellow cell G11 (gCO_2e/lb oil extracted) and encompasses feedstock procurement, chemical and energy use for soy oil extraction, transport of the extracted oil to the RD production facility, and any pre-treatment of the feedstock (Ragassa Soy Oil) that occurs prior to RD production. Its value must be corroborated by adding additional worksheets in the Simplified CI Calculator that show its derivation from chemical use, energy consumption, utility invoices (natural gas and electricity), meter and sub-meter readings (natural gas, steam, and electricity), calculated weighted average feedstock transport distances, and the GHG impact of chemicals and energy consumed in pre-treatment.
All supporting primary data used in the EF determination is also subject to third-party verification and must be demonstrated in an externally added worksheet/tab to the Simplified CI Calculator labeled "Ragassa Soy Oil Extraction and Pre-treatment."

8. The following Operating Condition is applicable to the User-Defined "Field 2.6 Standard Oil Extraction GHG Emissions Factor" of the "Canola Oil" tab of the Tier 1 Simplified CI Calculator for Renewable Diesel. This value is listed in the yellow cell G11 (gCO_2e/lb oil extracted) and encompasses feedstock procurement and oil extraction, transport to the RD production facility, and any pre-treatment of the feedstock that occurs prior to RD production. Its value must be corroborated by adding additional worksheets in the Simplified CI Calculator that show its derivation from energy consumption, utility invoices (natural gas and electricity), meter and sub-meter readings (natural gas, steam, and electricity), calculated weighted average feedstock transport distances, and the GHG impact of chemicals and energy consumed in pre-treatment. All supporting primary data used in the EF determination is subject to third-party verification and must be demonstrated in an externally added worksheet/tab to the Simplified CI Calculator labeled "Canola Oil Pre-treatment."

9. Moisture content of feedstocks used for renewable diesel fuel production is subject to monitoring, reporting, and verification. Either the representative method or the conservative method may be used. The representative method calculates monthly values for weighted average moisture content from financial transaction records or internal measurements by the fuel producer.
The conservative method assumes feedstock moisture content is zero, based on the lower value of the range for allowable moisture content.

10. The net Hydrogen consumption for RDU is based on multiple streams; the calculation and invoicing methodology must be described in the monitoring plan and used as the basis for annual fuel pathway reporting. The applicant must

include monthly average mass flow and inline GC tests from the inlet and outlet hydrogen streams in order to determine hydrogen consumption.

11. All light hydrocarbons extracted from the RD production process at RDU and used for production of hydrogen at the refinery is given a displacement credit. The total quantities of light hydrocarbons reported for displacement credit are subject to third-party verification. This credit is reflected in the Simplified CI Calculator. The reported volumes of the total produced hydrocarbons in the calculator should not include hydrogen.Watermark

These operating conditions shall be presented to the Verification Body prior to scheduling an inspection/site-visit. CARB Staff should be contacted should clarification on CARB proposed operating conditions or LCFS requirements be required.

Staff Analysis and Recommendation

Staff has reviewed the provisional application and has replicated, using the Tier 2 modified version of the Simplified CI Calculator, the CI values calculated by the applicant. The Verification Body Turner, Mason and Company (H3-20-020) has submitted a positive validation statement. Staff recommends this application be certified on a provisional basis after all the comments received during the 10-day public comment period are addressed by the applicant and deemed satisfactory by the California Air Resources Board. The certification is subject to the operating conditions set forth in this document.

Comments and Certification

These pathways did not receive public comments during the 10-day comment period. CARB certified the pathways.