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December 5, 2019

Mr. Anil Prabhu
Manager, Fuels Evaluation Section
California Air Resources Board
P.O. Box 2815
Sacramento, CA 95812

Re: Proposed BP Products Tier 2 Co-Processing Pathway Application (No. B0018)

Dear Mr. Prabhu:

Thank you for the opportunity to comment on this proposed pathway. The National Biodiesel Board (NBB) continues to appreciate the tremendous job you and CARB staff do on behalf of the clean fuels industry and all Californians. It has been a pleasure to work with you over the years.

Biodiesel and renewable diesel continue to perform well under the Low Carbon Fuel Standard (LCFS). Biomass-based diesel volumes have increased from 16 million gallons in 2011 to 630 million gallons in 2018 and are expected to reach 1 billion gallons in 2020. Similarly, biodiesel and renewable diesel have transitioned from modest credit generators to mainstays of the program, accounting for 46% of LCFS credit generation in 2018.

On this and the following pages, we have briefly detailed comments on the pathway application. Thank you for considering our views on these matters.

Overview

Our comments highlight significant procedural as well as substantive defects in the application and the process by which staff has been analyzing the application. These defects have the cumulative effect of providing the applicant with an unfair advantage relative to standalone renewable diesel production facilities. Moreover, the defects result in a pathway which, if approved as written, will not realistically reflect true values for several pathway inputs, resulting in a scientifically inaccurate and indefensible pathway. This, in turn, would weaken the integrity of the LCFS program by allowing the applicant to generate more credits than its process would merit under a more rigorous and publicly vetted analysis that meets Administrative Procedure Act requirements.

Procedural Deficiencies

As an initial matter, we are raising concerns about the staff's analytical framework for reviewing this application being based on an underground regulation. Specifically, we note that the Staff Summary explicitly states that the well-to-wheel GHG emissions are modeled "using a combination of the co-processing template developed by staff and modifications to the Tier 1 Simplified CI Calculator for Biodiesel and Renewable Diesel." Cited as one of two references for this statement is Co-Processing of Low Carbon Feedstocks in Petroleum Refineries (Draft Discussion Paper), which is dated May 30, 2017 (Staff Summary at 1). There is no record that we can find of CARB ever finalizing and adopting this draft discussion paper as part of the 2018 rulemaking. Further, there is no evidence this paper or its analytical framework was adopted as part of the narrowly focused LCFS rulemaking that the Board approved in November 2019. Thus, CARB staff's heavy reliance on this two-year old, unadopted draft discussion document raises significant issues concerning the use of an underground regulation, particularly since NBB and other parties raised substantive concerns about the analytical framework in the draft discussion paper that do not appear to have ever been addressed by CARB's rulemaking.

Substantive Deficiencies

Ongoing Deficiencies in the Analytical Framework

We understand CARB's desire to facilitate the near-term ability of obligated parties to generate LCFS credits. However, as we commented during the 2018 rulemaking, due to the immense scale of refining operations and their astonishing level of complexity, we continue to believe more time is needed to study this subject before carbon intensity pathways are issued. This is particularly relevant given the procedural issues raised above. Specifically, we recommend that CARB restart its Co-processing Workgroup to help ensure pathways are promulgated in a manner that is 100% accurate for each refinery project and carried out in a manner fully consistent with the long-term goals of the LCFS program. We further believe that no pathways should be approved until the Co-processing Workgroup has reviewed key issues and developed a set of recommendations.

Accordingly, we continue to suggest the following areas for further consideration by CARB and/or the Co-processing Workgroup:

- Lifecycle models. CARB suggests that "Evaluating co-processing pathways using a Tier 2 framework is consistent with the goal of streamlining the pathway application and certification process."[1] At this point in time, we disagree that this is an appropriate approach because models for each respective refinery technology do not exist—they still need to be developed by CARB. And since the Tier 2 framework is usually masked in

[1] https://www.arb.ca.gov/regact/2018/lcfs18/isor.pdf, page III-72.

redacted statements, that process alone will not afford the level of public review necessary to provide confidence to stakeholders that carbon intensity values are accurate.

- Public information. Refineries should be required to provide the same level of operational detail that has been made available by and for other industries. If co-processing is allowed to generate LCFS credits, the technology must go through a public process that provides sufficient information for the public to validate the accuracy of carbon intensity pathways. In addition, data marked as "confidential business information" submitted on Tier 2 applications should be reviewed by CARB legal staff to ensure it meets the criteria set forth under California law.
- Verification of renewable content. It is believed that a very small fraction of renewable feedstock inputs become renewable diesel fuel through co-processing. Therefore, it is critical that renewable content in finished fuel be measured via C14 radiocarbon dating rather than a mass-balance approach, which would overestimate renewable content. ASTM test method D6866 has been approved for this analysis.
- Limitation on co-processing. If co-processing is allowed under the LCFS, boundaries for this type of credit generation should be considered. We recommend the Refinery Investment Credit Pilot Program (RICPP) as a sensible model. Under RICPP, projects are of limited duration, refiners are not allowed to generate more than 20% of their obligation through the program, and credits cannot be traded. Given the incredible complexity and scope of refinery operations—and the corresponding potential for outsized errors—we believe moving forward in a methodical way is justified.
- Additional processing. Carbon intensity pathways should account for energy used when (and if) refineries isomerize co-processed fuels to improve cold flow performance.
- Emissions. We have not been able to find published literature regarding emissions and public health impacts for co-processed fuels. Since the technological process is the same as that which creates CARB diesel and the finished product is chemically indistinguishable from CARB diesel, we are not convinced that the environmental and public health impacts of co-processing should be assumed to be positive.
- Technical properties. Potential concerns about cold-flow performance, stability, and incomplete refining could require additional test parameters and limits to be included.
- Indirect effects. When bio-based feedstocks are comingled with fossil feedstocks, refiners should supply CARB with enough verifiable information to enable a full assessment of the indirect effects of co-processing on other refinery operations. This information should be made available in the same manner that Tier I framework biofuels have made information publicly available.
- Alternative Diesel Fuel (ADF) regulation. Co-processed renewable diesel is a new fuel that should go through the ADF process like biodiesel has—and other renewable diesel replacement fuels will in the future. This step would ensure that emissions, public health, and operability data is available to CARB and the public for evaluation.

Specific Material Deficiencies with this Application

Feedstock

The feedstock carbon footprint in the application is lower than it typically is for US sourced feedstock. The reduction appears to be the result of the Canadian electricity mix as it is stated that default values are used.

The feedstock transportation distance used is also a very low number and is a function of the marine shipment of tallow a very short distance (~70 miles) from Canada (Vancouver) to the refinery.

There are two issues with the values;

1. The renderer who is supplying the feedstock (the only one in close proximity to the refinery) has a network of rendering operations in British Columbia, Alberta, and Saskatchewan and has publicly stated that these facilities all ship tallow to the Vancouver facility for sale to export markets. The Vancouver facility only renders fish and poultry wastes and it can refine tallow received from the Alberta and Saskatchewan rendering plants. Transportation of tallow from the Alberta and Saskatchewan facilities is not included in the CI calculation for this application.
2. Canada has twelve different electricity grids with very limited interconnections and thus the use of a single value for Canada is not appropriate. While the Canadian electricity mix is too high for the BC rendering operations (the BC grid is mostly hydroelectric) it is far too low for the Alberta and Saskatchewan grids which are each over 50% coal and dominated by thermal generation. Animal fats from those locations will have a higher CI than is used in the application and higher transportation emissions than used in the application.

There is no mention in the application that there has been any mass balancing undertaken to use only the lowest CI animal fats from the supplier. Since the lowest CI animal fats will be produced from fish and poultry there is no confirmation that these products will meet the specification that BP has established for the feedstock. The CI for the feedstock in the BP application is not representative of the tallow received and processed at the refinery.

Processing

The overall CI for this pathway is also lower than any of the tallow renewable diesel pathways for standalone renewable diesel plants that CARB has so far certified (the range is from 30 g/MJ up to over 50 g/MJ). There can be many reasons for this including lower CI feedstock and short transportation distances as discussed above but some of the difference is likely due to the processing emissions.

The CI for the processing stage of the lifecycle is stated by BP to be 8.7 g/MJ and CARB has awarded a lower total CI than BP requested so the processing emissions could be even lower than this. This value is not isolated in any of the published information for tallow renewable diesel, but this value is significantly lower than the value that is in CA GREET 3.0 (11.34 g/MJ). How is this lower value achieved? The lack of product isomerization and the quantity of saturated fatty acids in the feedstock will lower the CI slightly but it is not clear from the information presented that this is the sole reason for the lower CI of the renewable diesel.

The processing CI is composed of emissions related to electricity consumption, thermal energy use (Natural gas) and hydrogen. Hydrogen contributes most of the emissions.

The chemistry involved in co-processing should be very similar to the chemistry in a standalone system, although most standalone systems will include an isomerization step which this process apparently doesn't. This could result in a slightly lower hydrogen consumption. Therefore, any differences in the CI might be the result of inconsistent system boundaries, or an unstable baseline.

The co-processing calculator that CARB developed, and BP uses, only considers the hydrotreater as shown in this figure from the calculator.

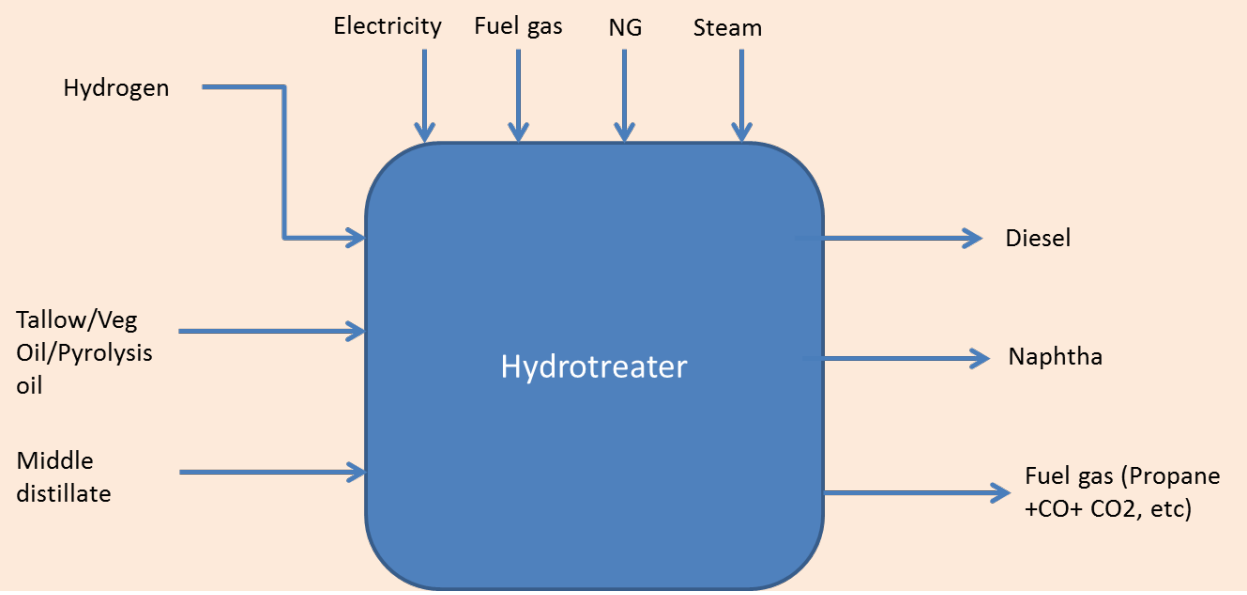


Figure: System boundary for co-processing in hydrotreater.

Any energy expended outside of these system boundaries is not included in the co-processing analysis. This excluded energy could include:

1. Electricity for feedstock receiving and shipping tanks.
2. Heat tracing for feedstock tanks.
3. Any energy used for emission control systems and effluent treatment.

It would appear that the system boundaries for co-processing are narrower than the system boundaries for standalone plants and provide an unwarranted CI advantage to co-processing operations.

CARB, in the application summary, states that BP supplied 12 months of aggregated baseline operational data for the petroleum-feedstock baseline scenario preceding co-processing operation. Data included quantity of gas oil and hydrogen (H_2), process energy (fuel gas, natural gas, and electricity) used and quantity of finished products (diesel and fuel gas). The applicant also provided data to facilitate a mass balance for the hydrotreater.

What is not mentioned in the CARB summary or the BP application is anything with respect to the quality of the gas oil processed. The hydrogen demand of the hydrotreater will be a function of the level of desulfurization (and to a lesser degree, the removal of nitrogen compounds) that is performed in the unit. Mass balancing for co-processing is only feasible if there is a stable baseline. Was the sulfur content of the gas oil exactly the same during the baseline runs as when co-processing was undertaken? If not, that would impact the biogenic hydrogen demand and the mass balance calculation would return incorrect values for the renewable diesel portion.

CARB Operating Conditions

CARB has proposed two operating conditions, one related to hydrogen demand and the other related to yield.

The hydrogen makeup must be maintained between 0.009 and 0.014 lbs of hydrogen per pound of total feed. The hydrogen makeup will primarily be a function of the proportion of biogenic feed, which has a much higher hydrogen demand, and the sulfur content of the gas oil. Values at the high end of the range will have a higher CI. An operator could maintain the ratio by adjusting the biogenic feed rate which will not control the CI of the renewable diesel. Does this condition serve any purpose?

The other operating condition is that volumetric yield of renewable diesel should be between 0.9 and 1.1. The same range on a mass basis is about 0.76 to 0.93. Since the feedstock contains about 11% wt. oxygen and there are some light ends (C1 to C4) also produced the high end of the range should not be possible and should be revised downward.

Recommendations

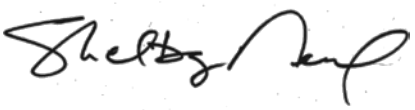
1. CARB should subject the analytical framework and/or the draft discussion paper containing that framework to the same administrative vetting procedure that it uses to properly adopt all other regulations and the materials underpinning such regulations. To do otherwise would be to rely impermissibly on an underground regulation.
2. CARB should ensure that the rendering and rendering oil emissions accurately cover the actual source of the feedstock for the refinery.

3. CARB should add some emissions to account for the energy that is consumed by the process that is outside of the system boundaries of the CARB co-processing calculator so that the system boundary is the same as a standalone renewable diesel plant.
4. CARB should add some very tight conditions for the sulfur and nitrogen contents of the VGO when co-processing to the sulfur and nitrogen content of the VGO baseline.
5. CARB should require the applicant to revise all other process inputs and values identified in the comments above as problematic, inaccurate, or otherwise unrealistic.

Conclusion

Thank you for considering our views. Our members have greatly enjoyed the opportunity to partner with CARB to help meet shared climate goals and we look forward to continuing this collaboration for years to come. If Board members or staff have any questions, please feel free to contact us at any time.

Sincerely,



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