



Kern Oil & Refining Co.

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VIA E-MAIL (LCFSWORKSHOP@ARB.CA.GOV)

Anil Prabhu, Manager, Fuels Evaluation Section
California Air Resources Board

Re: Comments on June 2, 2017 Workshop – Co-processing in Petroleum Refineries: 3rd Work Group Meeting

Dear Mr. Prabhu:

Kern Oil & Refining Co. (Kern) is providing comments on the California Air Resources Board's (ARB) June 2, 2017, workshop, regarding co-processing in petroleum refineries. ARB's presentation highlighted the draft discussion paper regarding co-processing of low carbon feedstocks in petroleum refineries.

Specifically, Kern is providing comments to sections regarding the: (1) Co-processed Fuel Pathway Certification; (2) Approaches to Low Carbon Fuel Quantification; (3) Framework for Estimating Refinery Carbon Intensities of Co-processed Fuels; (4) Incremental Allocation for Co-processing in Hydrotreaters; and (5) Future Monitoring and Verification Processes.

Co-processed Fuel Pathway Certification (Page 3, Section 3)

Kern is concerned with ARB's blanket approach to treating all co-processed fuel pathways as Tier 2 fuel pathways. Kern has been co-processing petroleum and renewable feedstocks for approximately 8-years using the previous existing Method 1 renewable diesel fuel pathway RNWD003. The tiered approach to pathway applications was specifically in recognition of fuel producers in commercial operation, producing fuels under previously approved pathways, using conventional methods, as a way to simplify the application process and recognize their established operation. ARB's sweeping approach to call all co-processed fuel pathways Tier 2 negates this premise and overlooks any facility's operation that otherwise meets the definition of Tier 1 found in paragraph 95488(b)(1).

Kern's pathway application should be considered a Tier 1 pathway based on this definition. The points below demonstrate the ways in which Kern's operation aligns with the specific components of Tier 1 in the regulation.

- Kern has been in full commercial production for greater than three years.
- Kern uses electricity and natural gas as its primary process energy. Kern's process also utilizes refinery fuel gas as a source of process energy. However, the properties of

refinery fuel gas are well defined, established, and used broadly throughout numerous environmental and fuel related regulatory programs.

- Co-processing has long been accepted by ARB and the U.S. EPA, is not an innovative method described in Section 94588(b)(2)(F), and therefore should be considered “conventionally-produced.”
- Tier 1 includes renewable diesel produced from conventional feedstocks including tallow and related animal wastes.

The last sentence of Section 3 in the discussion paper states “...applicants shall be required to adhere to operating conditions listed by ARB staff for each co-processed fuel pathway to ensure that process is operating in the manner described in the fuel pathway applications.” Kern reads this statement to mean that ARB’s approval and certification of a fuel pathway will come with a series of permit-type conditions for which the producer must adhere to an ongoing basis. Please confirm what is meant by “adhere to operating conditions” and provide additional detail and/or examples of what conditions ARB intends to stipulate.

Approaches to Low Carbon Fuel Quantification (Page 3, Section 4)

In working through the CI re-certification pathway process Kern has determined yield many different ways. Some of these methods are described in this draft report, such as mass balance approach based on observed yields, carbon balance method, and stoichiometric/theoretical modeling.

Mass balance based on observed differential yield method is highly uncertain and has issues with verification. This method should not be the only approach for determining yield. This method estimates the amount of low carbon fuel produced by observing changes in total yields when co-processing versus not co-processing (100% petroleum feed). Using this method would mean an active co-processing commercial refinery would need to stop co-processing for an extended amount of time to obtain baseline data. This is unrealistic and has negative economic impacts to the refinery making this method unfeasible.

This method also assumes that the difference in yield is significant enough to outweigh any errors in accuracy for meters commonly found in commercial refineries. A very good meter found in a commercial refinery setting will have a +/- 2% error, which is much too large for proper yield determination by this method¹. This method could be used in laboratory settings or possible pilot projects, but is unrealistic and unfeasible for a commercial refinery setting. Also, the yield data on pure petroleum feedstock depends on the composition of the petroleum feed. Furthermore the determination of bio renewable fuel depends on the difference between two large numbers with inherent uncertainties.

¹ Consider 1000 bbl/day of petroleum feed with an uncertainty of +/- 20 bbl/day of product. With 900 bbl/day petroleum feed and 100 bbl/day of bio renewable feed, the uncertainty in the differential yield is as large as 40 bbl/day for 100 bbl/day of renewable feed.

A carbon balance method which determines yield based on the amount of CO and CO₂ produced in the off gas is an option which lends itself to verification. Tallow, oils, and fats are the only source of CO and CO₂, which enables the determination of yield with a simple carbon balance.

Kern along with the help of Life Cycle Associates (LCA) has determined that the use of the CO, CO₂ mass balance method is proven to be an accurate and efficient method to determine yield. Kern would also like CARB staff to consider this method to determine yield for future verification requirements. The carbon oxides mass balance is attractive because refineries can measure their gas compositions and flow rates along with tallow consumption and the determination of yield does not depend on uncertain and expensive measurements of baseline data.

Framework for Estimating Refinery Carbon Intensities of Co-processed Fuels (Page 9, Section 5.1).

Staff is suggesting an incremental use of allocation method for energy and material balance specific to the hydrotreater unit. Typically commercial refineries do not monitor the electricity used by each specific unit nor do they maintain high-degree precision metering of flow rates for intermediate products. Instead commercial refineries monitor the entire refinery energy inputs through fuel metering and purchased natural gas and electrical receipts. Commercial refineries also keep good sales records of their final products, which can easily be verified through the reporting to a variety of regulatory bodies, including ARB. Kern suggests CARB to allow electricity use to be distributed to all products produced from the refinery, instead of allocating energy used to produce intermediate products by each specific unit. This would allow for more accurate readily available data for refineries going through the LCFS pathway application process and to help verify an existing fuel's Carbon Intensity (CI) value.

Incremental Allocation for Co-processing in Hydrotreaters (Page 15, Section 5.3)

Staff claims that one drawback to the energy content-based allocation for co-processing is that there is potential to underestimate the energy used and emissions produced when a unit is co-processing. Industry research has shown that co-processing consumes more hydrogen than running straight petroleum. On the other hand it has not been determined at a commercial producing refinery if there are additional energy uses or emissions produced with co-processing when compared to straight petroleum. Furthermore, the energy uses for hydrotreating include feed heat and stripper heat. Hydrotreating itself is exothermic. Also, it is not determined if the energy use or emissions are significant enough to be measured by existing common refinery equipment. A good meter installed at a refinery and operating under typical commercial refinery conditions could have +/- 2% error. Similarly, ARB's Mandatory Reporting Regulation (MRR) calls for +/- 5% accuracy demonstrations. Therefore, it is unwarranted to add an overestimation of refinery emissions for commercial refineries engaging in co-processing.

Staff goes on to suggest that emissions attributable to low carbon fuels should not be underestimated and should always be accounted for. This includes if no incremental emissions have been observed while co-processing when compared to processing straight petroleum or baseline conditions. Kern staff feels it is premature to add a safety factor to increase emissions

prior to any determination of higher emissions while co-processing and therefore, this factor is unwarranted and should be disregarded.

Monitoring and Verification (Page 19, Section 7)

Kern would like to suggest how existing reporting requirements already submitted to CARB can and should be utilized as part of the verification process in hopes to limit duplicity of verification components. For example, consider verification of components that are already verified and submitted through either MRR or other regulatory programs. Product volumes are already verified through MRR annually because of covered product emissions and fuel supplier MRR reporting requirements. It would also be practical for CARB to consider the incorporation of meter accuracy and calibration requirements consistent with MRR regulations in order to promote transparency across different regulatory programs.

For verification of pathway CI values, consider fixing certain values that are difficult to measure or determine with a high degree of certainty (hydrogen use). Also, consider easily and accurately measured and verifiable data to be submitted biannually. For example, use CO-CO₂ mass balance approach to verify yield.

In conclusion, Kern appreciates ARB's consideration of Kern's comments. Kern has had a longstanding working relationship with ARB and is willing to participate, provide relevant comments, and share information. Kern has been commercially co-processing renewable fuels for eight years and feels that it is CARB's best resource for information in the commercial production of co-processing using biofeed stocks locally produced in California. As always, Kern is committed to working with ARB staff and appreciates the chance to provide comments.

Sincerely,



Christopher Hinds
Environmental Advisor
Kern Oil & Refining Co.