Email to CARB on Lori Taylor
Director Fuels Regulatory Affairs
Valero Services Inc
Re: Valero comments on co-processing of biomass at a refinery and measuring the biogenic portion of the finished transportation fuel.

On behalf of Valero Renewable Fuels Company LLC., Valero Refining Company – California, Ultramar Inc., and Valero Services as operator of the Diamond Green Diesel, LLC renewable diesel facility in Norco, Louisiana (together "Valero"), I appreciate the opportunity to provide the following comments regarding the co-processing of biomass at a refinery and alternative methods for measuring the biogenic portion of the finished transportation fuel.

California Air Resources Board (CARB) staff held a public online webinar on September 16, 2020 to hear from experts and the public on reporting greenhouse gas (GHG) emissions associated with co-processing of biogenic feedstocks at petroleum refineries, including emissions from downstream combustion of renewable fuels, under the Regulation for the Mandatory Reporting of Greenhouse Gas Emissions (Mandatory Reporting Regulation, or MRR). Six different topics were presented for which CARB is seeking comments.

- More information on common monitoring practices in refining industry during co-processing
    - Findings from any co-processing pilot programs within the industry – details will be kept confidential

- Should CARB explore methods to report biogenic emissions from finished fuels only? Or also process and combustion emissions?

- If ^{14}C testing is used for finished fuels, at what frequency should that be done? What inputs would need to be included to demonstrate normal operations?

- Should CARB accept alternate methodologies for GHG quantification from different unit types such as FCC and hydrotreaters?

- How could measurement accuracy be assured when a refinery project shares metering with other equipment or process units/inputs?

- What types of information could be provided to demonstrate accuracy/completeness of the proposed method?

Although not mentioned directly in the September 16th presentation, CARB published a draft mass/energy balance worksheets for co-processing in FCCUs and hydrotreaters in 2017 (see attached Excel files). The hydrotreater worksheet was accepted by CARB for the BP Cherry Point tallow co-processing pathway into a diesel hydrotreater. The FCCU method tracks the gasoline components and converts that into a quantity of finished gasoline. Valero believes that tracking the FCCU gasoline components (Alkylate, HCN, etc.) is a much better approach to product testing. Valero suggests that CARB further develop methods outlined in the 2017 draft discussion paper titled "Co-processing of Low Carbon Feedstocks in Petroleum Refineries". Key concepts should include:

1. Performing the material balance around the FCCU and related units,
2. Demonstrating / tracking that the FCCU gasoline components are used in a finished gasoline blend,
3. Converting the mass and energy of the FCCU gasoline components into a quantity of renewable gasoline for sale to California.

Attached is a simple diagram illustrating the boundaries of the mass balance concept which is in line with what the Pacific Northwest National Laboratory presented in November 2014 (also attached).

A material and energy balance approach, combined with purchase and sales verification, metering and lab data where possible is the preferred approach for measuring the biogenic component of co-processed fuels. This approach will provide for redundancy in tracking the renewable fuel production volumes and the corresponding emissions produced from processing this material.

For example,
We purchase a volume of used cooking oil and convert it propane, alkylate, cat gasoline, jet and diesel.

We know the feed energy, the product energy content, hydrogen and the energy consumed. (+/- 1 to 2% accuracy on energy balance).

We know the amount of thermal energy required and emissions produced from processing the renewable portion (+/- 1 to 2 % from metering, CEMS, and modeling)

We know the yields from the units. Developed from modeling and pilot data (Balance to +/ -1 to 2 %)

We know the overall production volumes and sales volumes. All production meters are Coriolis. (+/- 0.1% accuracy)

By using both heat and material balance, yield estimates and supply and distribution, there are many redundant checks in place.

Material Balance	Feed Mass In – Feed Mass Out - Accumulation and Losses = 0
Energy Balance	Feed Energy In – Product Energy Out – Energy for processing – Energy Losses = 0
Overall	Energy In Product / Energy In Feed < 1

With mass and energy approach, combined with pilot data, the tracking process will be easy to document and audit.

The carbon dating approach is often discussed, but this is one of the more vulnerable approaches, since it still relies on reported production volumes, sampling and third party testing. As mentioned during CARB's September public meeting, the reliability of carbon dating decreases with lower biogenic feedstock yields. Our experience to date is that biogenic feedstocks will be used in limited amounts at refineries (2% - 4% injection rates) which would be technically challenging to measure across multiple fuel component tanks once processed. Therefore, this is not the most efficient measurement approach.

We appreciate CARB staff working with industry to develop the most suitable tools and regulations for maintaining liquid transportation fuels. Please do not hesitate to reach out to me if there are follow-up question or if staff would like to have a more detailed discussion.

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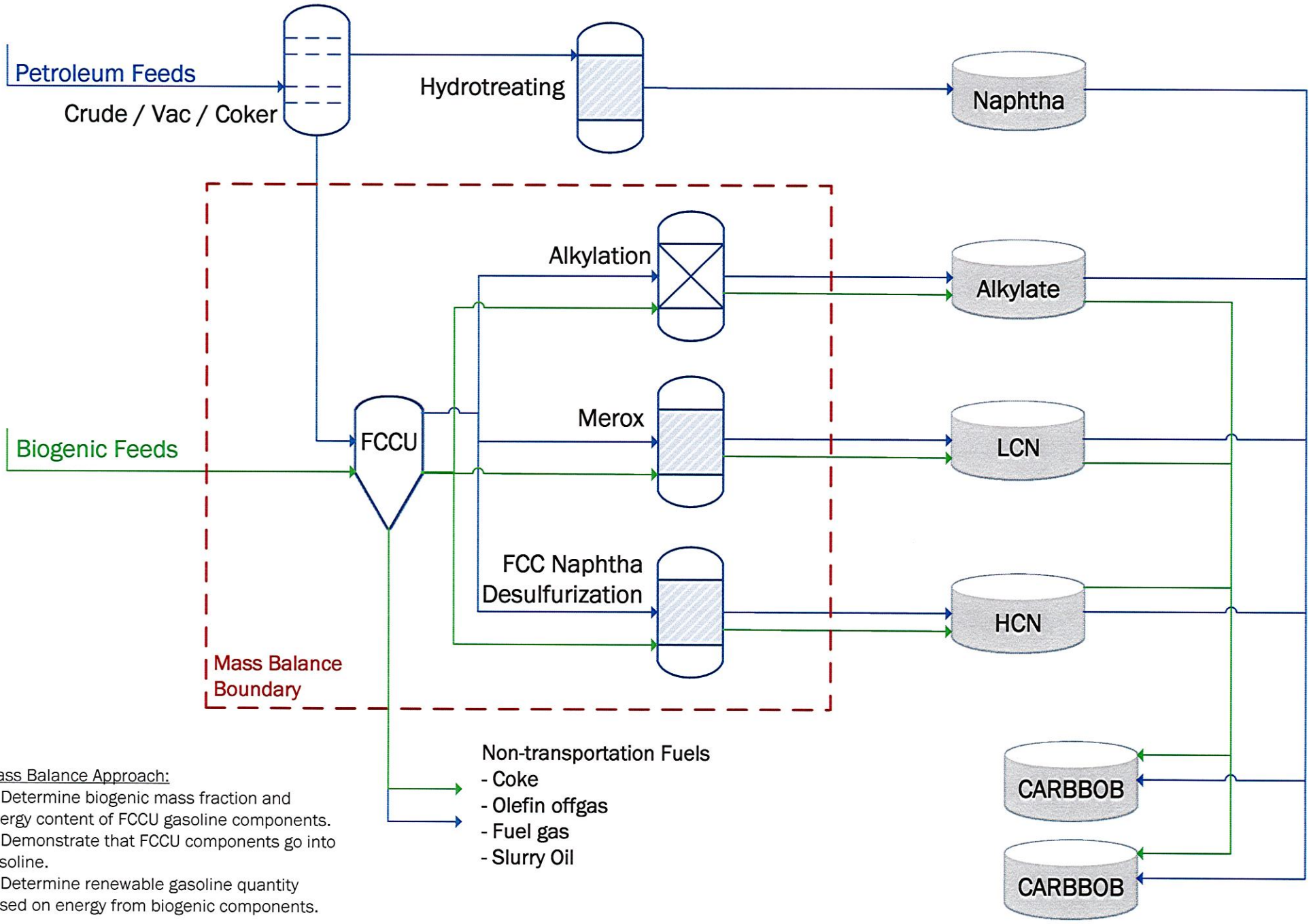
FCCU Co-processing

Mass and Energy Balance of Gasoline Components



Mass Balance Approach:

1. Determine biogenic mass fraction and energy content of FCCU gasoline components.
2. Demonstrate that FCCU components go into gasoline.
3. Determine renewable gasoline quantity based on energy from biogenic components.