Western States Petroleum Association
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Vice President

July 5, 2017

Mr. Sam Wade
Branch Chief
California Air Resources Board
1001 I Street
Sacramento, California 95814

sent via email: LCFSworkshop@arb.ca.gov

Re: WSPA Comments on ARB June 2, 2017 3rd Refinery Co-Processing Working Session

Dear Sam,

The Western States Petroleum Association (WSPA) appreciates this opportunity to provide initial feedback on the California Air Resources Board (ARB) staff presentation at the 3nd Low Carbon Fuel Standard (LCFS) - Refinery Co-Processing Working Session, held on June 2, 2017 in Sacramento, CA. WSPA is providing these comments as part of a continuous effort to provide feedback on the LCFS-related items presented by ARB. WSPA is a non-profit trade association representing companies that explore for, produce, refine, transport and market petroleum, petroleum products, natural gas and other energy supplies in California and four other western states.

On January 16, 2017 and March 22, 2017, WSPA provided feedback on the ARB staff presentations at 1st and 2nd LCFS Refinery Co-Processing Working Sessions, held on December 13, 2016 and February 7, 2017, respectively. Therefore, the comments provided below augment that prior feedback.

Co-processed Fuel Supply

WSPA welcomes ARB's recognition of logistics challenges to the treatment of co-processed products in a fungible system, particularly with the inclusion of supply chain mass balancing.

Co-Processing in Hydrotreating Units

From the ARB staff presentation, it appears that further processing of any fuel gas byproduct from hydrotreating co-processing is excluded from the illustrative system boundary (Slide 18). Although additional gas handling and processing will be present (i.e., gas circulation blowers or compressors, sulfur removal), those additional burdens can be offset by the lower sulfur content of the biogenic feeds which results in significantly lower GHG burdens associated with H_2S removal from the fuel gas. WSPA requests that ARB provide a rationale for the exclusion in the co-processing methodology.

In addition, the further processing of any naphtha byproduct from hydrotreating co-processing also appears to be excluded from the illustrative system boundary. Although additional handling and processing of this intermediate will be present (i.e., circulation, separation, naphtha reforming), the additional GHG burdens can be offset by additional benefits such as H_2 produced by catalytic naphtha reforming. WSPA requests that ARB provide a rationale for the exclusion in the co-processing methodology.

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Finally, any naphtha produced during hydrotreating co-processing will ultimately result in additional volumes of gasoline. It is assumed that credit can be taken for the renewable portion of this naphtha either as renewable gasoline content or as an internal CI offset applied to the main diesel product. The recommended approach for this credit should also be included in the approved co-processing methodology.

Analytical Testing

WSPA believes that ARB should not compel applicants to test for ^{13}C or ^{14}C to demonstrate the presence of renewable carbon in the products of co-processing units as these methods are not very accurate, not widely available and are expensive. These techniques are more oriented toward fundamental research than commercial unit testing.

Temporary Pathways

Can renewable diesel produced from co-processing at a hydrotreating unit qualify as a RNWD300T or a RNWD301T pathway code (table 7 of the LCFS regulations) depending on feedstock in order to generate credits before a provisional pathway is approved or would CARB assign automatically SD801T as the temporary pathway?

ARB Draft Staff Discussion Paper[1]

Section 4.2 – Carbon Mass Balance Method

Although only provided for illustrative purposes, the example described in Figure 1 and Table 1 may be misleading:

- The figure shows a total $CO+CO_2$ byproduct rate of 1 tpd. This 1 tpd is subtracted directly from the biogenic carbon input rate (10 tpd biogenic feed × 60% carbon = 6 tpd biogenic carbon). However, the carbon balance cannot be closed by subtracting the mass of CO or CO_2 from a total carbon input. Instead, the relative amounts of CO and CO_2 need to be known (for example, *a* CO and *b* CO_2 on a mass fraction basis) to be able to calculate the corresponding carbon output in the form of $CO+CO_2$, using the corresponding molecular and atomic masses: $M_{C,}\ CO_x = 1\ \text{tpd} \times (a \times 12.011/28.01 + b \times 12.011/44.009)$ – where $M_{C,}\ CO_x$ is the mass rate of carbon lost via CO and CO_2. We assume that the ARB staff intended the 1 tpd to refer only to the carbon content of the CO and CO_2 produced in the FCC unit. To avoid any confusion the label in the figure should clearly state so (i.e., 1 tpd *carbon*).

- The figure and table show a distinct coke product. FCC units do not produce a coke product. Coke deposits on the catalyst inside the riser (reactor) and is immediately combusted in the regenerator. ARB should correct figure and the table accordingly.

Section 5.1 - Framework for Estimating Refinery Carbon Intensities of Co-processed Fuels

The illustrative examples for FCC and hydrotreater in the discussion paper and Excel template refer to the mass balance approach. ARB should provide examples for the carbon balance approach as well.

Section 5.2 - Process Unit Level Allocation for FCC Co-processing

"Energy Content" based allocation is a *fuel lower heating value (LHV) based* allocation scheme. The complete

[1] https://www.arb.ca.gov/fuels/lcfs/lcfs_meetings/053017draft_discussion_paper_coprocessing.pdf

definition should be included in the approved methodology to avoid any confusion.

The discussion paper does CI calculation using direct emissions only. It does not consider the GHG burden of the inputs and utilities. This should be clearly specified, as the calculation template includes both direct and indirect emissions.

ARB EXCEL Spreadsheets

The use of simplified calculation templates is appreciated as it helps overcome the challenges associated with re-writing formulas for user-defined Tier 2 pathways in the CA-GREET 2.0 model.

WSPA suggests that the following items be addressed in the hydroprocessing spreadsheet (053017draft-qm-hydrotreater.xlsx):

- Under the "User Input Values" tab, specify the units of measure for the Outputs.

- Separate hydroprocessing yield percentages for fossil hydrocarbon and renewable triglyceride components are necessary. For example, the mass yield of liquid fuel product from triglyceride hydroprocessing is only ~85% when considering the loss of mass via propane and oxygen (water). This refers to cell G4 from the worksheet "Renewable yield calc".

- The terminology used requires further clarification: yield is a fraction and not a flowrate. Please use "Flowrate" instead. This refers to cell H8 on the worksheet "Renewable yield calc".

Utility inputs into the CA-GREET model appear to be assumed as direct measurements from the refinery. WPSA requests ARB clarify that due to the integrated nature of the refineries, there are not necessarily meters to measure all required inputs such as electricity, hydrogen, steam, fuel gas, natural gas, etc. For example, hydrogen may be measured at the front end of the hydrotreating section, but not for each individual hydrotreater.

WSPA appreciates this opportunity to provide our initial input regarding the 3rd Refinery Co-Processing Working Session. If you have any questions, please contact me at (805) 701-9142 or via e-mail at tom@wspa.org.

Sincerely,

cc: Catherine Reheis-Boyd, WSPA

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