April 23, 2018

Chair Mary D. Nichols
Air Resources Board
1001 I Street
Sacramento, CA 95812

(Comment submitted electronically via LCFS Portal)

RE: Request for Clarification of Specified Source Feedstock, 17 CCR §95488.8(g)
Support for Design-Based Pathway Provision, §17 CCR §95488.9(e)

Dear Chair Nichols,

Fulcrum BioEnergy, Inc. ("Fulcrum") appreciates the opportunity to provide comments regarding the Air Resources Board's ("ARB") proposed regulations to revise the Low Carbon Fuel Standard ("Proposed Regulations"). Fulcrum is a world leader in the production of low carbon fuels from post-separated municipal solid waste ("Separated MSW").

This Comment addresses two distinct issues:

1. It requests clarification regarding the specified source feedstock provision, §95488.8(g). When applied to Separated MSW, this provision could be interpreted to impose an impossible standard if a fuel producer were required to trace the Separated MSW back to the original waste generator. Fulcrum recommends a word change to resolve this ambiguity.

2. It expresses Fulcrum's strong support for the ARB proposal to include design-based pathways in the Low Carbon Fuel Standard ("LCFS") to better achieve California's greenhouse gas ("GHG") reduction goals. The specific provision referenced is a proposed new section, 17 CCR §95488.9(e).

Fulcrum's Next Generation Biofuel Processing Technology

Fulcrum is the parent company of Fulcrum Sierra BioFuels, LLC ("Sierra BioFuels"). Sierra BioFuels is constructing and will own and operate a commercial scale low carbon fuel production facility comprised of a Feedstock Processing Facility and a Biorefinery (together the "Sierra BioFuels Plant"). The Feedstock Processing Facility is operational and is located near the Lockwood Regional Landfill in Storey County, Nevada. The Biorefinery is located approximately 20 miles east of Reno in the Tahoe-Reno Industrial Center. The Sierra BioFuels Plant will transform Separated MSW into very low carbon diesel fuel that is anticipated to meet ARB's stringent future standard for low emission diesel fuel.[1] The Feedstock Processing Facility will receive Separated MSW that would otherwise be landfilled. A sophisticated feedstock processing system will shred, screen, and sort the MSW producing a MSW-derived feedstock. The resulting products from the Feedstock Processing Facility include the MSW-derived feedstock and recoverable materials with market value (e.g. ferrous and nonferrous metals and high value plastics). The Biorefinery will have the capability to convert the MSW–derived feedstock into very low carbon diesel fuel, jet fuel, and bio-crude using a three-step process comprised of steam reformation, Fischer-Tropsch ("FT") synthesis, and hydroprocessing.

Specified Source Feedstock

The specified source provision pertains to feedstock that is a "waste, residue, by-product or similar material." §95488.8(g)(1). The feedstock that Fulcrum will utilize to produce fuel, Separated MSW, clearly falls within the scope of this definition. For specified source feedstocks, the proposed regulation imposes additional obligations as follows:

> *(B) Chain-of-custody Evidence. Fuel pathway applicants using specified source feedstocks must maintain either (1) delivery records that show shipments of feedstock type and quantity directly from the point of origin to the fuel production facility, or (2) information from material balance or energy balance systems that control and record the assignment of input characteristics to output quantities at relevant points along the feedstock supply chain between the point of*

[1] See Air Resources Board, Mobile Source Strategy, May 2016, (low emission diesel specifications anticipated to be less than one percent aromatics, near zero sulfur, and a CI of 30-60 gCO2e/MJ), https://www.arb.ca.gov/planning/sip/2016sip/2016mobsrc.pdf (last viewed September 12, 2016) at 153-155.

> *origin and the fuel production facility. Chain-of-custody evidence is used to demonstrate proper characterization and accurate quantity.(…)*[2]

For a producer that utilizes Separated MSW as a feedstock, a concern arises as to what is meant by "point of origin". Taken to an extreme in the municipal solid waste context, point of origin could require following the waste all the way back to the original generator. Given the method in which MSW is collected and transported, it is infeasible to trace the material back to the original generator. This ambiguity is not resolved by reference to the definitions, as point of origin is not included. However, there is a related term that is defined, Feedstock First Collection Point. The term is defined as follows:

> *'"Feedstock First Collection Point" means the facility that aggregates and stores or treats feedstock materials collected from a point of origin. The first collection point may be upstream of the fuel production facility, or, if feedstocks are transported to the fuel production facility directly from the point of origin, the first collection point is the fuel production facility'*[3]

As applied to Separated MSW, it would be feasible to obtain chain-of-custody evidence to trace the feedstock back to the Feedstock First Collection Point. Fulcrum therefore requests that this term be substituted for the less precise "point of origin" in §95488.8(g)(1).

Design-based Pathways

Prior to the effective date of the re-adopted LCFS (December 31, 2015), low carbon fuel producers could apply for LCFS pathway approval prior to facility commissioning based on the design and engineering of the planned production facility. Such pathways were referred to as prospective pathways ("Prospective Pathways"). Subsequent to the effective date of the re-adoption (January 1, 2016), ARB ceased certifying Prospective Pathways.

Through proposed §95488.9(e), ARB has proposed to establish a new regulatory basis for Prospective Pathways. As stated in the Initial Statement of Reasons, "Staff is proposing to create a special provision to allow the Executive Officer to evaluate fuel pathways for fully

[2] 17 CCR §95488.8(g)(1). *(emphasis supplied)*
[3] 17 CCR §95481(a)(44).

engineered and designed facilities that have not yet commenced commercial production." [4] Fulcrum is strongly supportive of this proposed regulation, and is able to relate information regarding the company's direct experience regarding the importance of an ARB approved CI in the financing and development of new low carbon fuel facilities.

Fulcrum's Experience with a Design-based Pathway

Fulcrum was successful in obtaining approval for a Prospective Pathway using the CA-GREET 1.8b model under the prior LCFS regulation. Specifically, Fulcrum obtained a pathway for Fischer-Tropsch ("FT") diesel via gasification and FT synthesis of MSW (Pathway Code: FTD 001). Subsequently, Fulcrum received notice that ARB was prepared to re-certify Fulcrum's pathway under CA-GREET 2.0 with a CI score of 14.78. Fulcrum accepted this re-certification.

ARB's approval of Fulcrum's Prospective Pathway approval and re-certification of the FTD 001 pathway has been valuable in facilitating the financing of the Sierra BioFuels Plant. Fulcrum's Prospective Pathway is highly important to investors and impacts the facility's financial projections because Fulcrum's CI score of 14.78 will provide more than $1.00 of LCFS credit value per gallon in an LCFS credit market of approximately $100 per MT.

Fulcrum's direct experience in the marketplace provides market-based evidence in support of the rationale for design-based pathways contained in the ISOR:

> *Rationale Supporting Proposed Solution*
>
> *The LCFS program seeks to incentivize the development of next-generation low-CI fuels. Investors in promising fuel production technologies seek investor support to provide long-term financing for planning, designing, building and commencing operation. Posting such Design-based pathways with a CI score based on considerations by the Executive Officer may help facilitate investments in such*

[4] California Air Resources Board Staff Report, Initial Statement of Reasons (ISOR) at III-05, ISOR available at https://www.arb.ca.gov/regact/2018/lcfs18/isor.pdf (release date March 6, 2018).

projects, potentially ensuring commercialization of novel fuel production technologies.[5]

We therefore concur with staff's rationale for this provision, and support the adoption of §95488.9(e).

Conclusion

Thank you for your consideration of our input. We would welcome the opportunity to provide any further information that would be value to ARB on this subject.

Sincerely,

Ted Kniesche
Vice President, Business Development
Fulcrum BioEnergy, Inc.

[5] ISOR at III-105.