February 17, 2015

Clerk of the Board
Air Resources Board
1001 I Street
Sacramento, CA 95814

Re: CARB Low Carbon Fuel Standard Re-Adoption

Dear Chairwoman Nichols and Honorable Board Members:

Fulcrum BioEnergy, Inc. ("Fulcrum") strongly supports the California Low Carbon Fuel Standard ("LCFS") and we appreciate the opportunity to provide comments to the California Air Resources Board ("CARB") regarding the implementation of this important policy.

Fulcrum BioEnergy Overview

Fulcrum is a leading developer and owner of low carbon fuel projects that convert post-recycled municipal solid waste ("MSW") into drop-in fuels such as syncrude, diesel and jet fuel. We are entering construction on our first commercial project – the Sierra BioFuels Plant ("Sierra") located near Reno, NV – that will convert approximately 200,000 tons of MSW into nearly 12 million gallons of low carbon fuels. Beyond Sierra, Fulcrum has already contracted for long-term supplies of MSW feedstock that supports the development of several more projects collectively capable of generating nearly 400 million gallons per year of low carbon fuels.

Fulcrum has the capability of producing at least three different fuels for sale into the transportation market. Fulcrum's syncrude is an excellent replacement for crude oil, which can be sold directly to petroleum refineries for further refining into diesel and gasoline. Fulcrum can also further refine its own syncrude to make either diesel or jet fuel. Both Fulcrum's diesel and jet fuels are "drop-in" fuels that meet already established ASTM standards for use in vehicles and aircraft, respectively.

Environmental Benefits of MSW-to-Fuels

Fulcrum's projects reduce greenhouse gas emissions on a lifecycle basis by more than 80% when compared to petroleum-based fuels. Fulcrum has carefully integrated its projects into the waste management hierarchy, such that we only utilize MSW that would otherwise be landfilled, after all available recycling and composting activities. Fulcrum further enhances recycling

activities by recovering an additional ten percent of landfilled waste for recycling, which incrementally increases a community's recycling rates. Additionally, Fulcrum converts more than 50% of landfilled waste into low carbon fuels. Between its enhanced recycling activities and the conversion of landfilled MSW into low carbon fuels, Fulcrum will divert a significant portion of waste from landfills.

Moreover, Fulcrum's process does not compete with other waste conversion solutions, such as anaerobic digestion, which are complementary to Fulcrum's efforts because they target wet organics for conversion to biogas.

Credits for Producing Crudes Using Innovative Methods

Fulcrum welcomes CARB's creation of an Innovative Crude pathway that incentivizes the production and sale of lower carbon crudes into California. Fulcrum's projects produce a syncrude, which is an excellent replacement for crude oil and can be refined into transportation fuels at a conventional petroleum refinery. The production of syncrude from waste feedstocks such as post-recycled MSW has several key advantages. It leverages existing infrastructure, reduces the capital costs of emerging biorefineries, minimizes biorefinery emissions and displaces crude oil purchased by a refinery – ultimately reducing the amount of crude oil sold into California.

In reviewing the Innovative Crude requirements in the Proposed Regulation Order, it appears that CARB has focused on several methods to produce conventional crude oil with lower carbon methods (e.g. solar, wind and carbon capture). While these methods have sound GHG benefits, Fulcrum respectfully asks that CARB be open to other forms of innovative crude production – particularly those that directly produce low carbon syncrude and displace actual crude oil. The LCFS program is unique in welcoming innovative and technology-neutral approaches to reducing the carbon intensity of the transportation sector and we hope that the same technology-neutral approach is applied to this section.

Refinery Investment Credit

Fulcrum sees significant opportunity to provide renewable feedstocks directly to a refinery for the production of CARBOB or diesel fuel. As described above, Fulcrum can produce a syncrude from post-recycled MSW feedstock that can be upgraded at a conventional petroleum refinery along with other crude oils. We welcome CARB's inclusion of these renewable feedstocks to generate credit under the Refinery Investment Credit provisions. However, we didn't understand the reason for the 10% minimum requirement to replace fossil based feedstocks. A typical refinery processes well in excess of 100,000 barrels per day and most advanced biofuel refineries will not produce 10,000 to 20,000 barrels of biofuel per day – which would be necessary to meet the minimum threshold for this standard. In fact, many of the advanced biofuel projects that will be built in the coming years will produce 1,000 to 5,000

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barrels per day, well short of the proposed 10% displacement requirement. We encourage CARB to focus instead on the overall Carbon Intensity ("CI") benefit that such a renewable feedstock strategy provides the refinery under this Refinery Investment Credit provision, which would be consistent with how other projects are evaluated under this section. If the focus is instead on CI reduction, then this provision will encourage innovative ways to supply refineries with low carbon feedstocks that reduce the overall carbon intensity of a refineries' fuels – consistent with the intent of the LCFS.

In summary, Fulcrum strongly supports the re-adoption of the California LCFS and continues to work every day towards developing and building projects that will serve this important market. We thank CARB Board Members and Staff for their hard work and dedication in addressing GHG emissions in the transportation fuels sector.

Respectfully,

FULCRUM BIOENERGY, INC.

Ted Kniesche
Vice President, Business Development