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October 6, 2017

Samuel Wade  
Branch Chief, Transportation Fuels  
Air Resources Board  
1001 I Street  
Sacramento, CA 95814  
(Comment submitted via email to [LCFSWorkshop@arb.ca.gov](mailto:LCFSWorkshop@arb.ca.gov) )

RE: Proposed Regulations Pertaining to Alternative Jet Fuel

Dear Mr. Wade:

The alternative jet fuel producers (the “AJF Producers”) appreciate the opportunity to provide comments regarding the Low Carbon Fuel Standard (“LCFS”) regulations under consideration by the Air Resources Board (“ARB”), pertaining to the inclusion of alternative jet fuel (“AJF”) in the LCFS. This comment integrates some aspects of comments we previously submitted to the LCFS workshop process on March 1, 2017, April 27, 2017, and June 29, 2017, and updates those comments. The primary purpose of this letter is to provide specific feedback regarding the draft LCFS regulations dated September 22, 2017, that ARB has released for comment.

## Overview of AJF Producers

The AJF Producers joining this letter are AltAir Fuels, Fulcrum BioEnergy, Neste, Red Rock Biofuels, and Velocys. California-based AltAir Fuels is the only dedicated renewable jet fuel refiner in the world, and is supplying commercial quantities of alternative jet fuel to United Airlines at Los Angeles International Airport (LAX) from the AltAir production facility in Paramount. Fulcrum BioEnergy is developing a facility in Reno, Nevada, and plans to supply AJF into the California market. Neste is the largest existing producer of renewable diesel for the California market and has the capability to produce alternative jet fuel. Red Rock Biofuels is developing a production facility capable of producing alternative jet fuel in Lakeview, Oregon and plans to supply AJF into the California market. Velocys provides small-scale modular Fischer-Tropsch technology to alternative jet fuel producers, and is itself developing production facilities.

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## Strong Support for Inclusion of AJF in the LCFS

The AJF Producers are highly supportive of the LCFS program and of ARB's proposal to facilitate LCFS credit generation through opt-in participation for AJF uplifted in California. The LCFS has proven to be an effective, market-based program that has driven the development and expanded the supply of low carbon fuels in California. By including low carbon alternative jet fuels in the program, ARB will further expand the supply of less carbon-intense fuels and facilitate attainment of California's greenhouse gas ("GHG") reduction policies. By sending a clear and long-term market signal that AJF is eligible to generate LCFS credits in addition to Renewable Fuel Standard ("RFS") credits ("RINs"), ARB is facilitating investment and development in the decarbonization of the aviation sector. This pioneering work by California is crucial given the anticipated growth of the aviation sector, and the technical and energy intensive demands of this sector.

Existing data also suggests that the increased use of AJF in jets departing California airports will provide local criteria pollutant reductions. For purposes of the LCFS, these are ancillary benefits that are not the focus of the program. Nonetheless, it is anticipated that significantly increased use of AJF in the future due to the LCFS will provide significant benefits to local airsheds, including to disadvantaged communities ("DAC") located near airports. We anticipate that the details and scope of the criteria pollutant reductions will be more accurately modeled, measured, and quantified as the scale of AJF production and use in California is expanded.

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## Summary of Additional Issues

While the AJF Producers are strongly supportive of the inclusion of AJF in the LCFS on an opt-in basis, there are several issues that warrant further development and review in ARB's LCFS rulemaking process. The remainder of this comment addresses the following additional issues of import to the AJF Producers:

1. The lack of indication in the regulations regarding the carbon intensity ("CI") score for conventional jet fuel leaves this issue and related policy design issues unresolved. One solution would be to utilize the CI for conventional diesel fuel as the AJF benchmark. Alternatively, the AJF Producers will provide supplemental comments when the proposed CI for conventional jet fuel is established.
2. The approach that ARB has proposed regarding the use of a declining CI curve to measure LCFS credit generation from AJF should be revised once the Jet CI has been established to either a fixed CI baseline or to a CI curve that does not begin to decline until AJF becomes eligible to generate LCFS credits on January 1, 2019.
3. We would recommend two minor changes to the Alternative Jet Fuel definition for reasons of consistency and accuracy.
4. The current language regarding fuel reporting entities for alternative jet fuel could create unnecessarily difficult reporting burdens that can be resolved by language modifications.

## Discussion of Additional Issues

**The lack of indication in the regulations regarding the carbon intensity ("CI") score for conventional jet fuel leaves this issue and related policy design issues unresolved. One solution would be to utilize the CI for conventional diesel fuel as the AJF benchmark. Alternatively, the AJF Producers will provide supplemental comments when the proposed CI for conventional jet fuel is established.**

We understand from our discussions with ARB, and our participation in the workshop process that ARB staff has been working diligently to determine a baseline CI value for conventional jet fuel. This determination is an important aspect of the LCFS credit calculation process as credits are generated for reductions in carbon intensity as compared to the applicable standard. We understand that ARB's intended approach is to determine a specific CI baseline for conventional jet fuel in the California market in the same way that ARB has determined the CI baseline for California gasoline and diesel fuels.

We remain supportive of an alternative approach to credit generation for AJF that ARB previously considered: utilizing the established diesel fuel CI standard as the

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benchmark for credit generation in the AJF sector. Such an approach would be predictable, relatively easy to administer, and would provide consistent treatment for the overall distillate market.

To the extent that ARB determines it necessary to calculate a conventional jet fuel baseline CI score (“Jet CI”) and use that Jet CI as the benchmark, the Jet CI becomes a determining factor for credit generation purposes. This is best examined by comparing a range of Jet CIs against the CI of California diesel fuel as represented by Table 2 and Table 7 of the proposed regulation. A rounded average of the diesel CI is 102.<sup>1</sup> If ARB determines the Jet CI to be equivalent to the diesel CI and ARB establishes a declining annual standard, then producers of AJF and renewable diesel that have the same CI score would receive the same number of LCFS credits.<sup>2</sup> Alternatively, if ARB determines the Jet CI to be 5% less than the CI of California diesel fuel and establishes a declining annual standard, producers of AJF would receive 5% less LCFS credits per gallon as compared to a renewable diesel producer with the same CI score.

From the perspective of the AJF Producers, the lack of a proposed CI score for conventional jet fuel renders it infeasible to constructively comment on the proposed regulatory structure in two distinct respects. First, as illustrated above, different Jet CIs will have different impacts on credit generation opportunities relative to renewable diesel fuel in particular. Second, because the Jet CI has not yet been determined, the AJF Producers cannot provide technical input regarding the various factors that determine the carbon intensity of California jet fuels based on California-modified Greenhouse Gases, Regulated Emissions, and Energy use in Transportation model (“CA-GREET”). Therefore the AJF Producers reserve comment on this issue until a proposed Jet CI has been released by ARB.

**The approach that ARB has proposed regarding the use of a declining CI curve to measure LCFS credit generation from AJF should be revised once the Jet CI has been established to either a fixed CI baseline or to a CI curve that does not begin to decline until AJF becomes eligible to generate LCFS credits on January 1, 2019.**

Table 3 of the proposed regulations is entitled, “LCFS Carbon Intensity Benchmarks for 2019 to 2030 for Fuels Used as a Substitute for Conventional Jet Fuel.” This table is comparable to Table 1 pertaining to the CI benchmarks for gasoline, and Table 2 pertaining to diesel fuel. However, in the current draft of the regulations, Table 3 does not contain any CI values. It is therefore necessary to refer to the staff presentation given at the September 22<sup>nd</sup> workshop to determine

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<sup>1</sup> The units for CI scores are gCO<sub>2</sub>e/MJ for this and all subsequent CI scores.

<sup>2</sup> For purposes of illustration, this discussion assumes that the energy density of diesel fuel and AJF is identical in Table 4 of the proposed regulation.

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ARB's planned CI benchmarks for AFJ. This is found at slide 19, entitled "Initial Thinking for Percent CI Reduction for Gasoline, Diesel, and Jet Fuel." This slide reflects a proposed uniform approach with the same percent reductions required annually to the three types of fuel. Interpreting this slide consistently with Table 3, ARB plans to determine a baseline Jet CI and set a declining CI Benchmark for jet fuel that begins in 2019 at 7.5% below the baseline Jet CI. This approach is consistent with the LCFS approach for gasoline and diesel fuel. However, a review of ARB's regulatory authority suggests that the aviation sector should be treated differently than the on-road sector.

The underlying authority for the LCFS is California's Global Warming Solutions Act of 2006 (AB 32) which set a goal of reducing greenhouse gas (GHG) emissions in the state to 1990 levels by 2020 and charged ARB with developing and implementing regulations in various areas to achieve that goal. In January 2007, then-Governor Arnold Schwarzenegger issued Executive Order S-01-07 calling on CARB to determine whether or not a low carbon fuel standard could be adopted as a standalone measure under AB 32. In April 2010, ARB adopted a final set of regulations for the LCFS that is now codified at Cal. Code Regs. tit. 17, §§ 95480 et seq.<sup>3</sup> The regulations set out a comprehensive program to reduce the carbon intensity of California's transportation fuels by at least 10% by 2020. To do this, the LCFS program establishes reporting, performance and record keeping requirements related to the full life-cycle carbon intensity of fuels sold in or imported into California.

The LCFS applies to transportation fuels that are "sold, supplied, or offered for sale in California" and to "any person who as a regulated party...is responsible for a transportation fuel in a calendar year." The LCFS applies to a wide range of transportation fuels and technologies including liquid and gaseous fuels such as ethanol, biodiesel, hydrogen and biomethane. However, the LCFS does not apply to aviation fuels. Conventional jet fuel remains excluded from the regulation pursuant to proposed §95482(c)(2) which provides an exemption for "Conventional jet fuel or aviation gasoline." Similarly California's Regulation for the Mandatory Reporting of Greenhouse Gases ("MRR") at §95121(d) excludes the reporting of fuels "where use in exclusively aviation or marine applications can be demonstrated."

Thus ARB's authority is markedly different in the aviation sector as compared to the on-road transportation sector. It is for this reason that ARB is not establishing mandatory declining standards for the CI of conventional jet fuel and aviation gasoline in California. Instead, ARB is providing an opt-in LCFS credit generation opportunity for AJF that is intended to have the salutary effect of achieving GHG reductions in the unregulated aviation sector.

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<sup>3</sup> All subsequent references to regulations in this Comment also pertain to Title 17.

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In determining the mechanics of credit generation, the AJF Producers recognize ARB is evaluating policy design issues that warrant careful consideration. However, due to the asymmetry between ARB's authority to regulate on-road transportation fuel as compared to aviation fuel, it is appropriate for the agency to consider the full range of options including a fixed CI baseline for Jet CI and a CI curve that does not begin to decline until 2019. These issues are best considered when the baseline Jet CI has been proposed so that the policy design issues can be evaluated in a market context.

**We would recommend two minor changes to the Alternative Jet Fuel definition for reasons of consistency and accuracy.**

Proposed Section 95481 pertaining to definitions and acronyms, provides the following:

"Alternative Jet Fuel" means drop-in fuels made from petroleum or non- petroleum (biogenic) sources, which can replace conventional jet fuels without the need to modify aircraft engines and existing fuel distribution infrastructure.

Regarding the highlighted word and parentheses "(biogenic)", we would recommend that ARB remove this word from the definition. As ARB is aware, there is no requirement under the LCFS that a feedstock consist of renewable biomass as is required by the RFS. Instead, the LCFS evaluates feedstocks from a lifecycle GHG perspective. This approach has proven successful and enabled the LCFS program to improve the carbon intensity of fuels without being distracted by whether the feedstock contains renewable content. Including the term "biogenic" in the definition of alternative jet fuel would run counter to the consistency of the program and would not further the program goals.

Regarding the highlighted word "replace", we think it would be more accurate to characterize alternative jet fuel as fuel that will be blended and used with conventional jet fuels. We therefore provide the following modified definition for your consideration:

"Alternative Jet Fuel" means drop-in fuels made from petroleum or non- petroleum (biogenic) sources, which can be blended and used with ~~replace~~ conventional jet fuels without the need to modify aircraft engines and existing fuel distribution infrastructure.

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**The current language regarding fuel reporting entities for alternative jet fuel could create unnecessarily difficult reporting burdens that can be resolved by language modifications.**

Section 95483 designates the fuel reporting entities for each type of transportation fuel. Subsection 95483(g) provides the designated fuel reporting entity for alternative jet fuel and confirms that there are not reporting obligations for conventional jet fuel. The subsection includes provisions pertaining to neat alternative jet fuel and alternative jet fuel blended with conventional jet fuel. Both provisions include the language, “alternative jet fuel that is uploaded to an aircraft in California”.

We are concerned regarding the logistical and potential reporting complexities associated with fully documenting that a specific load of the alternative jet fuel has been uploaded to an aircraft in California. As is the case for other liquid alternative fuels such as ethanol and biodiesel, the supplier of alternative jet fuel does not typically deliver the fuel to the end user. There is some variability in California airports regarding fuel logistics with some airports utilizing a central hydrant system, and others utilizing storage tanks and fuel trucks or other modes of delivery. Due to strict security and safety measures, it is anticipated that alternative jet fuel will typically be supplied by the alternative jet fuel producer at the production facility or delivered to a location outside of the airport perimeter. However, due to the heightened handling and specification requirements that attach to jet fuel, any such fuel will be clearly designated as alternative jet fuel. We therefore propose the following alternative language for the subsection.

## § 95483. Fuel Reporting Entities.

The purpose of this section is to designate the fuel reporting entities for each type of transportation fuel.

(...)

(g) *Fuel Reporting Entities for Alternative Jet Fuel or an Alternative Jet Fuel Blend.*

- 1) *First Fuel Reporting Entity for Alternative Jet Fuel not Blended with Conventional Jet Fuel.* For an alternative jet fuel that is not blended with conventional jet fuel, the first fuel reporting entity is the producer or importer of the alternative jet fuel that is ~~uploaded~~ designated to be supplied to an aircraft in California.
- 2) *First Fuel Reporting Entity for Blends of Alternative Jet Fuel and Conventional Jet Fuel.* For a jet fuel that is a blend of alternative jet fuel and conventional jet fuel, the first fuel

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reporting entity is the following:

- A. For the alternative jet fuel component, the producer or importer of the alternative jet fuel that is ~~uploaded~~ designated to be supplied to an aircraft in California; and
  - B. The conventional jet fuel component is not subject to the Low Carbon Fuel Standard.
- (...)

## Conclusion

Thank you for your consideration of our input. Please contact us if any further input would be helpful. We look forward to continuing to provide input to this proceeding.

Sincerely,



Graham Noyes