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Summary Testimony of Derrick Morgan, Senior Vice President, AFPM

The Energy Independence and Security Act of 2007 ("EISA") established aggressive targets for cellulosic and advanced biofuel production, including a topline mandate of 21 billion gallons of advanced biofuels in 2022. For conventional biofuels such as corn ethanol, the RFS helped to grow investment in ethanol plants and distribution infrastructure, such as terminal tankage and at blending racks. E10 (10 percent ethanol) is now ubiquitous in the United States, and the U.S. corn ethanol industry is the largest in the world. The advanced biofuels mandates are a very different story, as these fuels have either not materialized in the volumes envisioned by Congress or are prohibitively expensive.

Liquid cellulosic biofuel production has been virtually non-existent—with only 10 million gallons produced in 2017. For perspective, that was enough fuel to satisfy approximately 40 minutes of U.S. fuel consumption last year. Biodiesel is the primary advanced biofuel used in the U.S. However, at $1.00 more per gallon than petroleum diesel, biodiesel mandates effectively act as a multi-billion dollar fuel tax on U.S. consumers. Domestic biodiesel production is expected to fall short of mandated advanced biofuel levels in 2018, leaving imported fuels to fill the balance.

AFPM supports the market-driven integration of renewable fuels into the U.S. fuel supply, and as a result supports transitioning from the RFS to a competitive fuels market at the earliest feasible date. A natural transition would come in 2022, providing the biofuels industry the full promised timeline for the statutory tables, but before the program reverts to EPA without appropriate Congressional input.

EPA should set annual cellulosic, biomass-based diesel, and advanced requirements that are based on a reasonable estimate of domestic production and on sustained actual production. This will help to ensure that targets are achievable and meet EISA's policy aim of reducing U.S. reliance on imported fuel. Anchoring the mandate to domestic production will also limit the financial burden it inflicts on consumers. Government should not mandate more than what's produced in the United States, and with biodiesel consistently more expensive than petroleum diesel, imports should continue to be permitted to compete and to ensure mandates are met as economically as possible. It is critical that the cellulosic waiver credits remain available as a consumer price protection mechanism.

Finally, although AFPM recognizes the need for an orderly transition out of the RFS program, it cautions policymakers against relying on overly-optimistic projections about the ability of advanced biofuel producers to meet growing mandates. Experience with implementation of the RFS has repeatedly shown that fuels will not be produced just because policymakers set aggressive targets. Although there are many exciting technologies, many of which are being developed by AFPM's membership, the fuels must also demonstrate economic value to work at the scale envisioned by the RFS.

Testimony of Derrick Morgan, Senior Vice President, American Fuel & Petrochemical Manufacturers
U.S. House Energy and Commerce Subcommittee on the Environment
Advanced Biofuels Under the Renewable Fuel Standard: Current Status and Future Prospects
June 22, 2018

The American Fuel & Petrochemical Manufacturers ("AFPM") appreciates the opportunity to provide testimony on advanced biofuels under the Renewable Fuel Standard ("RFS"). AFPM's members operate approximately 120 refineries, representing more than 95 percent of U.S. refining capacity. AFPM's members produce the gasoline, diesel, jet fuel, and building blocks for the thousands of products that make innovation and progress possible. As refiners and importers of transportation fuels, AFPM's members are the obligated parties under the RFS and are acutely aware of the costs and challenges associated with the advanced biofuel mandates.

The Energy Independence and Security Act of 2007 ("EISA") established aggressive targets for cellulosic and advanced biofuel production, including a topline mandate of 21 billion gallons of advanced biofuels in 2022. At the time, policymakers concerned about U.S. reliance on foreign oil and high prices sought to diversify the U.S. fuel supply under the notion that if Congress simply mandates a product, it will materialize. In the time since, the U.S. energy landscape has undergone seismic shifts. The United States is producing more of its own crude oil and is now a net exporter of refined petroleum products. Meanwhile, the RFS has had mixed results. For conventional biofuels such as corn ethanol, the RFS helped to grow investment in ethanol plants and distribution infrastructure, such as terminal tankage and at blending racks. E10 (10 percent ethanol) is now ubiquitous in the United States, and the U.S. corn ethanol industry is the largest

in the world. In fact, ethanol producers exported more than a billion gallons of ethanol last year, demonstrating that ethanol is a competitive product without mandates like the RFS.

The advanced biofuels mandates are a very different story, as these fuels have either not materialized in the volumes envisioned by Congress or are prohibitively expensive. AFPM's written testimony will expand on the following points.

1. The mandates have largely failed to help commercialize cellulosic biofuels and advanced biofuels other than biodiesel.
2. The mandates have outpaced domestic production and incentivized imports to replace U.S.-produced diesel, undermining the energy security goals of the Energy Independence and Security Act.
3. Biodiesel mandates are expensive and disadvantage consumers.
4. Until the RFS sunsets, EPA should set reasonable advanced biofuels mandates tied to demonstrated domestic production.

I. The RFS has largely failed to commercialize cellulosic biofuels and advanced biofuels other than biodiesel.

Cellulosic biofuels are produced from biomass such as switchgrass and corn stover and, by law, are supposed to reduce carbon emissions by at least 60 percent. However, despite Congress' intent that a growing proportion of the mandates come from these cellulosic biofuels (intended to comprise nearly half of the total mandate by 2022), the most significant shortfalls in the RFS have come in the cellulosic category. In fact, EPA has waived virtually all of the cellulosic mandate due to lack of sustained commercial production. The majority of the cellulosic fuel that has been produced has been generated primarily from landfill biogas converted into liquified and compressed natural gases. Liquid cellulosic biofuel production has been virtually non-existent—with only 10 million gallons produced in 2017. For perspective, that was enough fuel to satisfy approximately 40 minutes of U.S. fuel consumption last year.

AFPM member companies have spent significant resources attempting to commercialize cellulosic technologies, whether directly or through off-take agreements with cellulosic biofuel producers. Despite significant investment by some of the most sophisticated, technically savvy, and innovative companies in the world, the cellulosic mandates have proven to be infeasible. According to a comprehensive 2011 report by the National Academy of Sciences, cellulosic biofuel facilities face significantly higher capital costs than corn ethanol plants, as well as higher operating costs, more complex processes, logistical challenges, and scale-up issues.

Congress had the foresight to build the only true consumer protection mechanism into the RFS when it included a waiver provision and cellulosic waiver credit as an alternative compliance path. Without these mechanisms in place, compliance would be impossible, as cellulosic fuels are simply not available in sufficient quantities. Even still, refiners face perennial issues with cellulosic mandates that exceed production, even after EPA exercises its waiver authority. In 2016, for instance, EPA set the cellulosic mandate at 230 million gallons, but only 191 million gallons were produced – a 39 million gallon shortfall. Despite the 2016 shortfall,

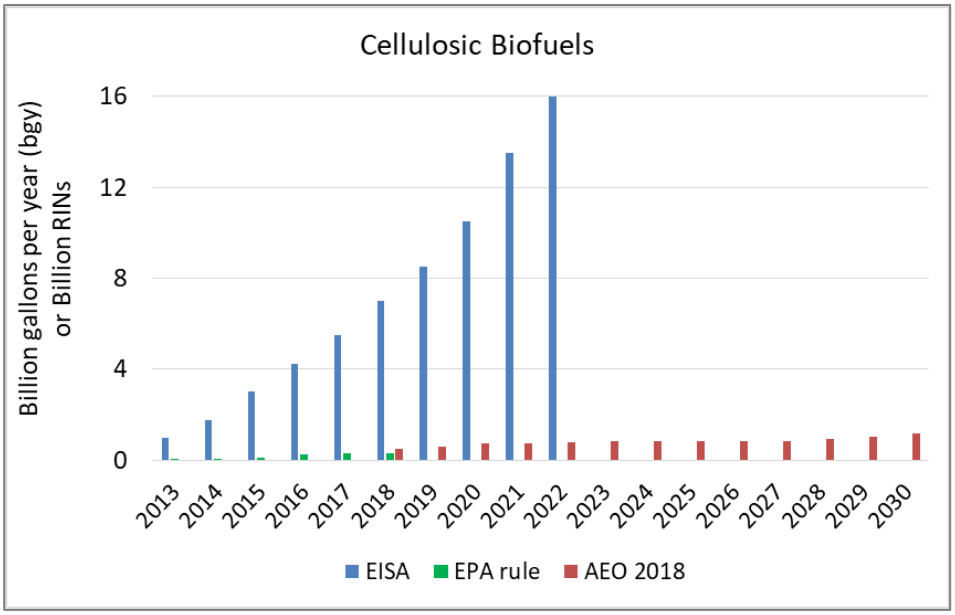

Figure 1 (Source: derived from EISA 2007 statute, various EPA final RFS rules, EIA annual energy outlook)

EPA raised the 2017 mandate to 311 million gallons, and again production fell short, this time by more than 60 million gallons. And for every cellulosic gallon that doesn't exist, refiners still have to purchase waiver credits according to a formula in the statute.

Cellulosic fuels are a subcategory of "advanced biofuels," which includes all cellulosic fuels, as well as other products—notably sugarcane ethanol (primarily Brazilian), renewable diesel, and biodiesel, which combined to meet approximately 99 percent of the advanced biofuel mandate. The remaining fuels include small volume fuels like renewable heating oil, naphtha, and jet fuel.

II. Existing biomass-based diesel and "other advanced" mandates are too aggressive, disadvantage consumers, and have promoted imports over domestic fuels.

For 2018, EPA finalized a total renewable fuel requirement of 19.29 billion ethanol-equivalent gallons, including an advanced biofuel mandate of 4.29 billion RINs (approximately 2.86 billion physical gallons), and an implied conventional mandate of 15 billion gallons. As part of the advanced biofuel mandate, biomass-based diesel must account for at least 3.15 billion RINs (2.1 billion gallons).[1]

According to the EPA Moderated Transaction System (EMTS), U.S. biomass-based diesel production is currently on pace to generate only 2.74 billion RINs, 0.2 billon cellulosic RINs, and only an additional 0.09 billion advanced biofuel RINs, for a total of 3.03 billion domestic RINs to meet an advanced biofuel mandate of 4.29 billion. Even assuming EIA's more generous

[1] For clarity, AFPM's testimony will convert volume standards to RIN obligations. Biodiesel generates 1.5 RINs per gallon. Other advanced biofuels generate as many as 1.7 RINs per gallon, depending on energy content.

projection of 3.15 billion biodiesel RINs is correct, the U.S. will still be more than 800 million RINs short.

Gasoline consumption in the United States is projected to be approximately 143 billion gallons in 2018. Due to a lack of E15 and E85 sales, ethanol will comprise approximately 10 percent of the gasoline pool (14.3 billion gallons), leaving a 700 million RIN deficit in the general renewable category. In the past, this conventional ethanol shortfall, stemming from a lack of consumer demand for midlevel ethanol blends, has been met through the use of imported biomass-based diesel. As a result, the inherent advanced biofuel mandate for 2018 is more than 3.3 billion gallons (or five billion RINs), which acts as a mandate to import (and subsidize) over one billion gallons of foreign biodiesel. This is not what Congress envisioned when it enacted the RFS.

To put this challenge in perspective, in 2017, there were only four billion advanced biofuel RINs generated, meaning advanced biofuels will need a year-over-year increase of 25 percent in order to meet the 2018 mandates without using banked credits from previous years. Importantly, the United States has limited capacity to meet these aggressive mandates. For instance, although the United States is home to 95 biodiesel plants with approximately 3.6 billion RINS of capacity, the biodiesel industry produced only 2.4 billion RINs in 2017, a record high. Domestic renewable diesel production added an additional 0.3 billion RINs, for a total of 2.7 billion—slightly below 2016's record production of 2.85 billion RINs. As a result of production and economic realities, nearly a third of the RFS advanced biofuel mandates have been met with imported fuels the last two years.

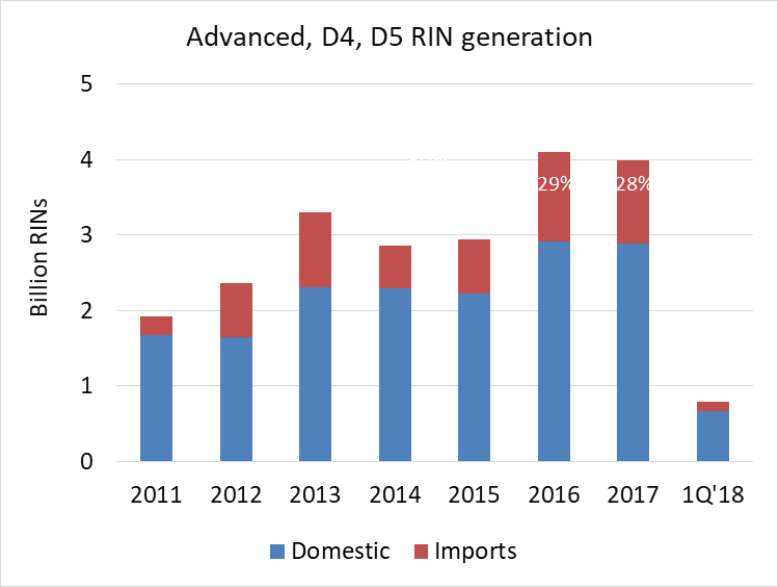

Figure 2 D4 and D5 RIN generation (Source: EPA EMTS)

Previously, the majority of biomass-based diesel imports came from Argentina and Indonesia, which combined to provide nearly 700 million gallons of fuel each of the past two years. Last fall, however, the United States determined that Argentina and Indonesia were illegally subsidizing their biodiesel production and imposed countervailing duties. Imports from Argentina and Indonesia have all but ceased, and domestic production has increased, although not in sufficient volume to meet growing RFS mandates or to make up the import losses from Argentina and Indonesia. Rather, imports have increased from other producers, particularly Canada and France.

The major challenge with biodiesel is that, unlike ethanol, the fuel is simply not economical without substantial subsidies. Without accounting for biodiesel's lower energy content, which is seven percent below the energy content of petroleum diesel, the price of biodiesel averaged $1.50 more per gallon than the petroleum diesel it replaced in 2017. Despite a recent narrowing of that gap, a gallon of biodiesel remains nearly $1.00 more expensive per gallon—and

consumers are shouldering those costs. For every gallon of renewable fuel mandated beyond the E10 blend wall, the RFS pushes obligated parties toward biodiesel as the marginal compliance mechanism. And since biodiesel is both more expensive and less-energy dense, the RFS is effectively serving as a multi-billion fuel tax on consumers.

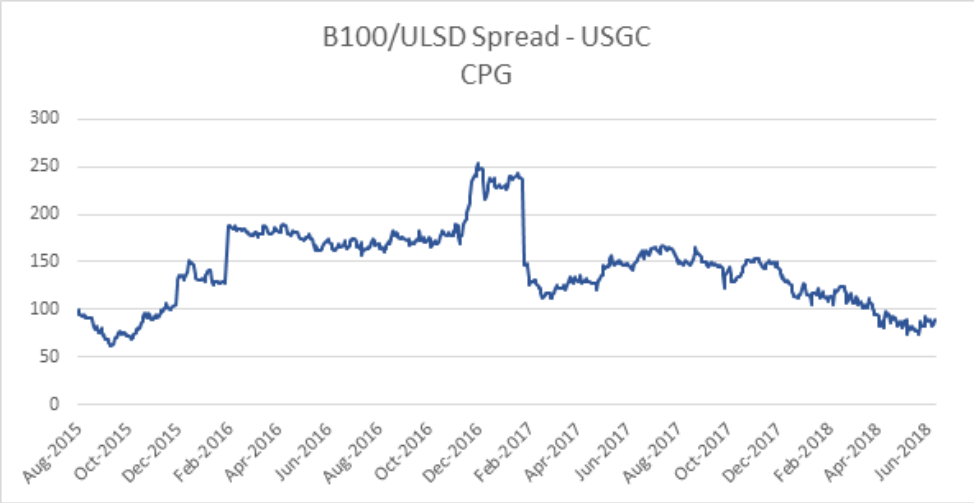

Figure 3 Spread between biodiesel and petroleum diesel prices (source: Argus)

III. AFPM Recommendations

AFPM supports the market-driven integration of renewable fuels into the U.S. fuel supply, and as a result supports transitioning from the RFS to a competitive fuels market at the earliest feasible date. A natural transition would come in 2022, providing the biofuels industry the full promised timeline for the statutory tables, but before the program reverts to EPA without appropriate Congressional input.

As a policy matter, the RFS was designed during a different time and policymakers now have the benefit of nearly a decade of experience to determine what has worked and what has not. In the case of conventional biofuels, notably corn ethanol, E10 blends are economic and do not require

a mandate. Conversely, cellulosic biofuel mandates are unachievable, due to an array of market, technology, cost, and logistics challenges. Advanced biofuels, other than biodiesel, have been similarly limited. Biodiesel, although commercially available, is expensive and domestic production has not kept pace with RFS mandates. For these reasons AFPM recommends the following course of action as a bridge until the RFS sunsets.

EPA should set annual cellulosic, biomass-based diesel, and advanced requirements that are based on a reasonable estimate of domestic production and on sustained actual production. This will help to ensure that targets are achievable and meet EISA's policy aim of reducing U.S. reliance on imported fuel. Anchoring the mandate to domestic production will also limit the financial burden it inflicts on consumers. Government should not mandate more than what's produced in the United States, and with biodiesel consistently more expensive than petroleum diesel, imports should continue to be permitted to compete and to ensure mandates are met as economically as possible. It is critical that the cellulosic waiver credits remain available as a consumer price protection mechanism.

Finally, although AFPM recognizes the need for an orderly transition out of the RFS program, it cautions policymakers against relying on overly-optimistic projections about the ability of advanced biofuel producers to meet growing mandates. Experience with implementation of the RFS has repeatedly shown that fuels will not be produced just because policymakers set aggressive targets. Although there are many exciting technologies, many of which are being developed by AFPM's membership, the fuels must also demonstrate economic value to work at the scale envisioned by the RFS.

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AFPM appreciates the opportunity to share its views as the Committee continues to find an appropriate balance to U.S. fuels policy. AFPM supports the market-driven adoption of biofuels into the U.S. transportation fuel market, and indeed are among the largest producers and investors in biofuel technologies. However, the RFS has failed to deliver affordable, commercial-scale advanced biofuels, leaving refiners to displace U.S.-produced fuels with expensive imported substitutes. These challenges with commercializing a new biofuels industry are unlikely to be overcome in the near term. For these reasons, AFPM recommends transitioning from the RFS toward policies that better recognize market realities and promote competition to protect consumers.