Growth Energy Comments on EPA's Proposed Modifications to Fuel Regulations To Provide Flexibility for E15; Modifications to RFS RIN Market Regulations

Docket # EPA-HQ-OAR-2018-0775

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April 29, 2019

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I. INTRODUCTION

Growth Energy respectfully submits these comments on the Environmental Protection Agency's ("EPA's") proposed rulemaking entitled "Modifications to Fuel Regulations To Provide Flexibility for E15; Modifications to RFS RIN Market Regulations."[1] Growth Energy is the leading association of ethanol producers in the country, with 100 producer members, producing more than 8.3 billion gallons of ethanol, and 82 associate members who serve the nation's need for renewable fuel. Growth Energy strongly supports EPA's proposal to lift summertime Reid Vapor Pressure ("RVP") restrictions on E15 volatility. However, we have concerns regarding the proposed Renewable Identification Number ("RIN") reform efforts, as explained in detail below.

Removing the needless RVP regulatory barrier to sale of E15 in the summer will provide relief to nearly 1,800 retail stations across 30 states currently offering E15 – and open new opportunities for more than 3,500 sites with retailers seeking to offer their customers a lower-cost, higher-octane gasoline option. For motorists, the value proposition of E15 is clear. Drivers typically save up to 10 cents per gallon, while E15's superior octane rating provides better engine performance for vehicles that benefit from higher octane fuel. Moreover, removal of the RVP impediment to sale of E15 in the summer places *no* costs on any parties in the fuel manufacturing and distribution chain and will *reduce* gasoline volatility compared to the dominant E10 gasoline in the market. It will give consumers additional choice at the pump and allow an additional pathway to market for homegrown ethanol. This regulatory action is thus consistent with environmental goals and supportive of the Renewable Fuel Standard ("RFS") and its aims to increase the United States' energy independence and security by reducing our dependence on foreign oil and diversifying our energy sources, while creating American jobs, revitalizing rural economies, and adding much-needed competition in the vehicle-fuels market.

Additionally, removal of needless regulatory barriers to E15 that are not grounded in science or common sense ensures that consumers will have access to a lower greenhouse gas-intensive, cleaner burning fuel. Numerous recent studies show that conventional corn ethanol reduces greenhouse gas emissions by approximately 40 percent or more below petroleum fuel, meaning E15 is the least carbon-intensive gasoline on the market today. Further, the additional ethanol in E15 displaces toxic aromatics, such as benzene. And, as EPA correctly observes, E15's evaporative emissions are actually *lower* than the evaporative emissions from E10 when blended with the same base gasoline. These environmental benefits underscore the need for EPA to move swiftly to finalize the RVP relief measures in the Proposed Rule, and level the playing field for E10 and E15.

Specifically, for the reasons explained below, Growth Energy urges EPA to: (1) finalize its reinterpretation of section 211(h) of the Clean Air Act ("CAA") to mean that the statutory 1

[1] Modifications to Fuel Regulations To Provide Flexibility for E15; Modifications to RFS RIN Market Regulations, 84 Fed. Reg. 10,584 (proposed March 21, 2019) ("NPRM or "Proposed Rule").

psi tolerance applies to all ethanol blends "containing 10 percent ethanol," including E15, and conform its regulations under section 211(c) and (h) applying the 1 psi tolerance to E10 and E15; (2) finalize its proposal to find that E15 is "substantially similar" to Tier 3 E10 certification fuel under section 211(f)(1) subject to existing precautions ensuring that it is appropriately used in Model Year ("MY") 2001 and later light-duty vehicles; (3) finalize its clarification of the regulated parties to whom the section 211(f)(4) waiver conditions apply under current law; (4) remove the RVP-related provisions of the Misfueling Mitigation Rule; (5) retain the remainder of the current misfueling measures while rejecting additional labeling requirements and physical barriers to E15 as unnecessary, un-workable, and outside of the scope of the current rulemaking; and (6) clarify that state RVP limits for E15 that are more stringent than the federal 10 psi limit are presumptively preempted. EPA should also make clear in its final rule that the RVP regulations and any RIN reform regulations are entirely distinct, involving different CAA programs and provisions, and operate independently of one another.

Additionally, Growth Energy urges EPA not to adopt the proposed reforms to the RIN market. EPA presents no evidence that there has been RIN price manipulation, let alone evidence justifying the significant changes that are proposed. Even if there were such evidence, the proposed reforms would not be an appropriate solution. Rather than preventing price manipulation, they would afford obligated parties and other exempt entities a monopoly on price manipulation (should there be an incentive to manipulate). Moreover, the proposed rules would have significant harmful consequences—reducing liquidity, imposing unworkable constraints on blenders, and making it more difficult overall for obligated parties to achieve RFS compliance. EPA should continue its existing monitoring efforts or, at most, implement some form of enhanced data collection or market monitoring.

Finally, EPA should finalize and promulgate the final rule providing RVP relief to E15 as expeditiously as possible, but no later than June 1, 2019, in time for the summer driving season in order to minimize disruption of the E15 supply and distribution system and to provide as much clarity to regulated parties as possible. As the rule is lifting a regulatory restriction, it can and should take effect immediately upon publication in the Federal Register.[2]

II. EPA SHOULD FINALIZE ITS REINTERPRETATION OF SECTION 211(h).

Growth Energy supports EPA's proposed revised interpretation of section 211(h)(4), under which the 1 psi tolerance applies to gasoline-ethanol blends containing at least 10 percent ethanol, including E15. EPA's revised interpretation reflects the best, most natural reading of section 211(h)(4) and its place in the statutory structure. EPA's revised interpretation is also consistent with Congress' intent as reflected in the legislative history. Growth Energy, however, has several comments and suggestions regarding the specifics of EPA's analysis.

[2] *See* 5 U.S.C. § 553(d)(1). EPA may also allow the rule to become effective immediately for "good cause." *See id.* § 553(d)(3).

A. The Definition of the Term "10 Percent" Should Not Include 9 Percent.

Growth Energy questions the aspect of EPA's revised interpretation in which the Agency proposes "not [to] change [its] definition of the term 10 percent, which includes as little as 9 percent, to continue to provide the necessary blending flexibility for E10 blends." 84 Fed. Reg. at 10,591 n.64. EPA adopted that definition of the term "10 percent" long ago, based on practical concerns about "necessary blending flexibility" that no longer apply. EPA's proposal notes that, in its 1991 rulemaking to implement section 211(h)(4), the Agency stated that "requiring exactly 10 percent ethanol 'would place a next to impossible burden on ethanol blenders' and that '[t]he nature of the blending process itself . . . further complicates a requirement that the ethanol portion of the blend be exactly 10 percent.'" *Id.* (quoting 56 Fed. Reg. 24,242, 24,245 (May 29, 1991)). That rationale for interpreting "10 percent" to mean "between 9 and 10 percent," however, assumed that it would be impermissible for the ethanol content of a gasoline-ethanol blend to be *greater* than 10 percent. That assumption is why the *only* alternative EPA considered to "a requirement that the ethanol portion of the blend be exactly 10 percent" was allowing the ethanol content to be *lower* than 10 percent—down to as little as 9 percent.

EPA's assumption was correct in 1991, but it is not correct today. Under EPA's current proposal, it is no longer impermissible for the ethanol content of a gasoline-ethanol blend to be greater than 10 percent, at least for MY 2001 and later light-duty gasoline-fueled vehicles. In 2010 and 2011, EPA granted partial waivers under section 211(f)(4) allowing manufacturers to first introduce blends with greater than 10 percent ethanol into commerce for such vehicles. To be sure, those partial waivers imposed a condition requiring the resulting blend to have an RVP not greater than 9 psi during the summertime, making it largely impractical to sell blends with greater than 10 percent ethanol, at least in the summer. The whole purpose of the E15 portion of EPA's current proposal, however, is to remove that practical impediment. Growth Energy recognizes, however, that blenders relying on the 1 psi tolerance under section 211(h)(4) may also wish to avoid exceeding the "10 percent ethanol" limit that remains applicable under misfueling requirements with respect to older light duty vehicles, heavy duty gasoline engines, and nonroad engines and vehicles. *See* 40 C.F.R. § 80.1504.

EPA's rationale for construing "10 percent" to mean "between 9 and 10 percent" is also potentially in tension with the rationale for EPA's revised interpretation of section 211(h)(4). As EPA's proposal explains, under its revised interpretation, "ethanol blends containing *at least 10 percent ethanol* would receive the 1-psi waiver." 84 Fed. Reg. at 10,587 (emphasis added). Variants of the phrase "at least 10 percent ethanol" appear throughout EPA's explanation for its revised interpretation.[3] On their face, these statements might be difficult to reconcile with EPA's

[3] *E.g.*, *id.* at 10,591 ("[T]he 1-psi waiver would apply to gasoline containing at least 10 percent ethanol."); *id.* ("We interpret this language as establishing a lower limit, or floor, on the minimum ethanol content for a 1-psi waiver . . . ."); *id.* ("Under this interpretation, the statute sets the minimum ethanol content, such that all fuels which contain at least 10 percent ethanol may receive the 1-psi waiver . . . ."); *id.* (quoting legislative history indicating that the 1-psi waiver is available for gasoline-ethanol blends "containing at least 10 percent ethanol"); *see also id.* at 10,585 n.1

proposal to continue to allow blends with as little as 9 percent ethanol to qualify for the 1 psi tolerance.

EPA should have discretion in reconciling these requirements to construe the term "10 percent" so as to account for some amount of blending or rounding error, and accounting for this error may be relevant to preserving flexibility with regard to misfueling requirements that limit ethanol content to 10 percent. For example, EPA could conceivably construe the term "10 percent" to include figures as low as 9.5 and up to 10.4 percent, which, when rounded to the nearest whole number percentage point, would equal 10 percent. To the extent blending is imprecise, there is no longer any impediment to parties blending between 9.5 percent and 10.4 percent ethanol. This approach would seem most consistent with EPA's proposed interpretation of section 211(h)(4) as applying the 1 psi tolerance to blends containing at least 10 percent ethanol.

B. EPA Should Finalize Its Proposed Interpretation of the "Deemed To Comply" Provision.

Growth Energy supports EPA's proposed interpretation of the "deemed to comply" provision in section 211(h)(4) as articulated in EPA's discussion of its revised interpretation of section 211(h)(4). There, EPA explained that the "deemed to comply" provision "further supports the interpretation that the 1-psi waiver under CAA sec. 211(h)(4) can apply to gasoline with ethanol content greater than 10 percent." 84 Fed. Reg. at 10,592. EPA noted that the "deemed to comply" provision "contemplates ethanol blends beyond E10, the only gasoline-ethanol blended fuel with a CAA sec. 211(f)(4) waiver at the time of enactment, because EPA's waiver authority under that provision is not limited to gasoline containing any particular range of volume percent ethanol." *Id.* EPA further noted that the "deemed to comply" provision applies "upon a demonstration that, among other things, 'the ethanol portion of the blend does not exceed its waiver condition under subsection (f)(4).'" EPA explained that it "read[s] this phrase to apply to only the waiver condition specifying the ethanol content of the fuel," and thus, "[p]ursuant to the E15 waivers issued in 2010 and 2011, a fuel that contains 15 percent ethanol contains an ethanol portion that does not exceed the 211(f)(4) waiver condition." *Id.* Thus, the "deemed to comply" provision "can be construed as a defense against liability for any ethanol blend that has received a CAA sec. 211(f)(4) waiver, which at present includes E15." *Id.* In Growth Energy's view, the "deemed to comply" provision not only *can* be construed in this way, but *should* be, for precisely the reasons EPA has articulated.

Separately, EPA invited comment on the "deemed to comply" provision and its relationship to EPA's proposed substantially similar ("sub sim") interpretive rule under section 211(f)(1). *See* 84 Fed. Reg. at 10,601. Because the "deemed to comply" provision only applies where a gasoline-ethanol blend "does not exceed its waiver condition under subsection (f)(4)," EPA indicated that "[a] plain reading of th[e] provision . . . would suggest that it could

(defining "E15" for purposes of EPA's proposal to "refer[] to gasoline-ethanol blended fuels that contain greater than 10 volume percent and no more than 15 volume percent ethanol content.").

not apply where the agency concludes that a fuel is [sub sim] under CAA sec. 211(f)(1)." *Id.* In Growth Energy's view, that supposed "plain reading" is incorrect. When Congress enacted section 211(h)(4), certification fuel contained no ethanol. Structurally, moreover, the "does not exceed its waiver condition under subsection (f)(4)" language serves to ensure that regulated parties cannot obtain the benefit of the 1 psi tolerance if they distribute blends that contain more ethanol than EPA has authorized to be introduced into commerce. Accordingly, Growth Energy believes that the term "does not exceed its waiver condition under subsection (f)(4)" is, at a minimum, ambiguous as to whether it applies to sub sim fuels. It could reasonably be construed to mean that the "deemed to comply" provision applies *either* when a fuel's ethanol content does not exceed a waiver under section 211(f)(4) *or* when a waiver is unnecessary because the gasoline-ethanol blend is sub sim under section 211(f)(1).

In any event, EPA need not resolve this interpretive issue in this rulemaking, because EPA's question about how the "deemed to comply" provision applies to sub sim fuels is academic with respect to E15. EPA granted partial waivers for E15 under section 211(f)(4) in 2010 and 2011, and EPA has made clear that those waivers will remain in place even after the proposal is finalized: "EPA is not proposing to revise the E15 partial waivers under CAA sec. 211(f)(4), and is therefore not soliciting comments on the waiver itself or any of its conditions." 84 Fed. Reg. at 10,588. Those regulatory actions thus remain in effect and continue to be relevant for purposes of the "deemed to comply" provision in section 211(h)(4). For that reason, EPA should make clear that a gasoline-ethanol blend containing not more than 15 percent volume ethanol "does not exceed its waiver condition under subsection (f)(4)," and therefore falls within the scope of the "deemed to comply" provision.

III. EPA SHOULD FINALIZE ITS CLARIFICATION OF PARTIES TO WHOM THE SECTION 211(f)(4) WAIVER CONDITIONS APPLY.

Growth Energy supports EPA's conclusions regarding the effect of its proposed reinterpretation of section 211(h)(4) on regulated parties. Specifically, EPA explains that its reinterpretation of section 211(h)(4) does not affect the section 211(f)(4) waiver conditions for E15, including the requirement that fuel and fuel additive manufacturers meet the summertime 9 psi RVP requirement for E15. 84 Fed. Reg. at 10,593. However, as EPA notes, parties that only blend oxygenate at allowable levels are *not* "fuel manufacturer[s]" pursuant to EPA's regulatory definition of that term, *see* 40 C.F.R. § 79.2(d). EPA indicates that this regulatory definition reflects EPA's interpretation of the term "manufacturer of any fuel." Accordingly, EPA's position is that parties that only blend oxygenate at allowable levels are not, and have never been, subject to the conditions in EPA's 2010 and 2011 waiver decisions, including the 9 psi limitation. Additionally, EPA reasonably clarifies that downstream retailers who offer E15 at their stations, through the use of a blender-pump that blends certified blendstocks or gasoline and oxygenates, are likewise not "fuel manufacturers" under 40 C.F.R. 79.2(d). 84 Fed. Reg. at 10,594. In these circumstances, blender-pump retailers are appropriately considered "analogous to downstream oxygenate blenders," which are excluded from the regulatory definition of "fuel

manufacturers."[4] *Id.* at 10,596. This is an apt analogy because in both cases the chemical composition of the fuel is altered solely by blending with an oxygenate (ethanol).

EPA's explanation of the parties to whom the 211(f)(4) waiver decisions apply is consistent with its 2010 and 2011 waiver decisions for E15. As EPA stated in 2010:

> EPA can impose waiver conditions *only on those parties who are subject to the section 211(f)(1) prohibition* and the waiver of that prohibition. These parties are the *fuel and fuel additive manufacturers*.

75 Fed. Reg. 68,094, 68,146 (Nov. 4, 2010) (emphasis added); *see also id*. at 68,095 (referring to the "parties covered by this waiver" as "fuel and fuel additive manufacturers"); *id.* at 68,099 ("today's partial waiver decision places several conditions on fuel and fuel additive manufacturers . . . ."); *id.* at 68,150 ("Fuel and fuel additive manufacturers subject to this partial waiver . . . ."); 76 Fed. Reg. 4662, 4682 ("fuel and fuel additive manufacturers" are "subject to th[e] partial waiver").[5]

EPA's explanation is supported by the text of section 211. EPA adopted its regulatory definition of "fuel manufacturer" at 40 C.F.R. § 79.2(d) to implement the fuel designation and registration requirements for manufacturers of fuels in sections 211(a) and (b) of the statute. EPA is not proposing to change or modify that longstanding regulatory definition and is not seeking comment on it. *See* 84 Fed. Reg. at 10,593. Rather, EPA is merely confirming its interpretation that the term "manufacturer" of "fuel" in sections 211(a), (b), and (f), has the same meaning.[6] *Compare* 42 U.S.C. § 7545(a) (referring to the "manufacturer . . . of any such fuel or additive" who "introduce[s] into commerce such fuel or additive"); *with* 42 U.S.C. §

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[4] "Oxygenate blender means any person who owns, leases, operates, controls, or supervises an oxygenate blending facility, or who owns or controls the blendstock or gasoline used or the gasoline produced at an oxygenate blending facility" which is defined as "any facility (including a truck) at which oxygenate is added to gasoline or blendstock, and at which the quality or quantity of gasoline is not altered in any other manner except for the addition of deposit control additives." 40 C.F.R. § 80.2.

[5] We note that, under EPA's definition of "fuel manufacturer" in 40 C.F.R. § 79.2(d), ethanol or oxygenate blenders that are *also* "refiners" qualify as "fuel and fuel additive manufacturers" to whom section 211(f) applies and thus would remain subject to the 9 psi RVP waiver condition. *See* 84 Fed. Reg. at 10,594 (explaining that "refiners and importers who blend E15," i.e., who are also oxygenate blenders, "would still need to comply with the waiver conditions"); 54 Fed. Reg. 11,868, 11,874 (March 22, 1989) ("[T]here may still be cases in which a . . . party meets both the definition of 'ethanol blender' and that of another regulated party."). EPA recognized as much in its partial waiver decisions. *See, e.g.*, 76 Fed. Reg. 44,406, 44,411 (July 25, 2011) ("Under CAA section 211(f)(4), EPA can place conditions on fuel or fuel manufacturers but cannot place conditions on other parties in the fuel distribution system. Consequently, EPA placed the partial waiver conditions on ethanol blenders, fuel manufacturers, and ethanol producers, the parties subject to the prohibition in section 211(f)(1), and thus the parties that benefit from the partial waiver of that prohibition . . . .").

[6] Congress's intent to give the term "manufacturer" the same meaning throughout section 211 is also made clear in section 211(r), which expressly provides that "[f]or purposes of *this section*"—meaning the entirety of section 211—the term "manufacturer" includes importers.

7545(f)(1)(B) (referring to "any manufacturer of any fuel or fuel additive" who "first introduce[s] into commerce . . . any fuel or fuel additive"); *and* 42 U.S.C. § 7545(f)(4) ("The Administrator, upon application of any manufacturer of any fuel or fuel additive, may waive the prohibitions established under paragraph (1) or (3) of this subsection . . ."). This is a reasonable interpretation of the statute. Congress is generally presumed to intend the same terms to have the same meaning when used in closely related provisions within the same statutory section. *See Sullivan v. Stroop*, 496 U.S. 478, 484 (1990) (applying "the normal rule of statutory construction that identical words used in different parts of the same act are intended to have the same meaning") (internal citation and quotation omitted). Accordingly, EPA is appropriately applying the same regulatory definition of "fuel manufacturer" in section 79.2 to interpret consistently the statutory references to "manufacturer of any fuel" throughout section 211.

EPA's interpretation of the term "manufacturer of any fuel" makes sense. The prohibition in section 211(f)(1) against first introducing a fuel that is not substantially similar to a fuel utilized in certification applies only to a "manufacturer" of a "fuel" or "fuel additive"; likewise, a waiver from that prohibition under section 211(f)(4), upon application of a "manufacturer of any fuel," applies only to "manufacturers" of "fuel" or "fuel additives." Under EPA's interpretation, Congress chose to focus section 211's regulation of the introduction of fuels and fuel additives on the "manufacturers" of those products, and EPA has reasonably decided that its regulatory definition of "fuel manufacturer" in 40 C.F.R. § 79.2(d) fits this construct. Moreover, EPA has appropriately defined the term "fuel manufacturer" to mean a party that "alter[s] . . . the chemical composition of a bulk fuel, or the mixture of chemical compounds in a bulk fuel," and to exclude parties such as oxygenate blenders that solely add allowable quantities of regulated oxygenate (such as ethanol) to tested and certified gasoline or conventional blendstock for oxygenate blending ("CBOB"). 40 C.F.R. § 79.2(d). Applying this definition to section 211(f) allows EPA to define the term consistently across section 211.

As applied to section 211(f), the exemption of oxygenate blenders from the regulatory definition of "fuel manufacturer" is reasonably premised on EPA's assumption that the upstream manufacturers of the products being blended (i.e., the CBOB and the allowable quantity of oxygenate), as the parties subject to section 211(f), will already have sought and received a waiver under section 211(f)(4). Indeed, under 40 C.F.R. § 79.2(d), the oxygenate blender must comply with the oxygenate content limitation of the section 211(f)(4) waiver obtained by such upstream manufacturers (e.g., no more than 15 percent ethanol), in order to qualify for the exemption from the definition of "fuel manufacturer." EPA's approach is also reasonable because it leaves intact the Agency's "catch-all" authority under section 211(c) to regulate, as appropriate, the environmental and public health effects of fuels and fuel additives regardless of how they were produced or who introduced them into commerce.[7]

[7] Thus, downstream parties not covered by section 211(f)—oxygenate blenders, retailers, consumers—are not forgotten in section 211's framework. Section 211(c), which empowers EPA to regulate fuel and fuel additives for environmental and health reasons, extends to all parties, not merely "manufacturers."

EPA's clarification regarding the application of the regulatory definition of "fuel manufacturer" to certain retailers that provide blender-pumps to combine E85 and E10 to make E15 is also reasonable. As noted above, EPA analogizes such blender-pump retailers to oxygenate blenders, which are exempt from that definition. *See* 84 Fed. Reg. at 10,596. In both circumstances, the ethanol and the base certified fuel that are to be combined have each already been "manufactured" by regulated upstream parties.

Finally, we note that EPA's proposal leaves intact the anomaly that refiners and importers remain subject to the summertime 9 psi RVP condition that EPA imposed in its E15 waivers. As these comments address, EPA should adopt its proposed interpretation under section 211(f)(1) that E15 is "substantially similar" to fuels utilized in certification, which would fully remove the RVP barrier to introduction of E15 into commerce during the summer ozone season. As a result, both E10 and E15 would be subject to the 1 psi tolerance under section 211(h)(4) to the same extent.

In sum, EPA's clarification of the parties to whom the section 211(f) waiver decisions apply is reasonable, with "[t]he result . . . that any party who is not a refiner or importer that produces E15 from only certified gasoline (including CBOB) and denatured fuel ethanol would be entitled to receive the 1-psi waiver just as is the case currently when such parties produce E10." *Id*. at 10,594. EPA should nonetheless also finalize its proposed substantially similar interpretation with the result that all parties, including refiners and importers, will benefit from the 1 psi tolerance under section 211(h)(4). Finally, to limit market disruption, Growth Energy also recommends that EPA, in a subsequent rulemaking, consider finalizing the regulatory path to allow use of natural gasoline as a blendstock in E15 production, as discussed in the proposed Renewables Enhancement and Growth Support Rule, 81 Fed. Reg. 80,828 (Nov. 16, 2016).

IV. EPA SHOULD FINALIZE ITS INTERPRETIVE RULE THAT E15 IS SUBSTANTIALLY SIMILAR TO E10.

Growth Energy supports EPA's proposed interpretive rule whereby E15 is sub sim to Tier 3 E10 certification fuel. E15 and Tier 3 E10 certification fuel (as well as E0 Indolene) have similar exhaust emissions, materials compatibility, and driveability impacts for MY 2001 and later gasoline-fueled light-duty vehicles. *See* 84 Fed. Reg. at 10,596-601. As for evaporative emissions, any difference in such emissions would be attributable solely to the 1 psi RVP difference between these two fuels. And EPA's longstanding criteria in sub sim interpretive rules has been to specify only that the fuel must meet *one* of ASTM's volatility classifications—which would include an RVP of 10 psi. *See id.* at 10,599-601. New gasoline formulations without any ethanol, for example, have long been permitted under these criteria to be introduced into commerce without any volatility limitation under section 211(f)(1) other than meeting one of ASTM's volatility classifications. Growth Energy agrees with EPA's proposal to adhere to this longstanding approach here.

EPA's well-established approach is all the more appropriate after EPA adopted volatility regulations under section 211(c) in 1989 and Congress largely codified them in the 1990 Amendments to the Clean Air Act in section 211(h). Both EPA's 1989 volatility regulations and Congress's codification thereof included a 1 psi tolerance for ethanol blends. Congress and EPA thus have both confirmed that regulations under sections 211(c) and (h) are sufficient to address any concerns about gasoline volatility. EPA need not now for the first time require a new fuel to meet a volatility standard beyond the ASTM requirements in order for manufacturers to introduce the fuel into commerce under section 211(f)(1). EPA should follow its well-established approach in its final rule.

Growth Energy also supports EPA's alternative proposed interpretive rule comparing E15 and E10 at specific RVP limits, even though it is sufficient for EPA to conclude that E15 is sub sim to E10 without regard to the 9 versus 10 psi RVP distinction. To the extent, however, that EPA adopts its alternative approach in addition to its primary approach noted above, Growth Energy suggests that EPA should clarify its reasoning. EPA describes its alternative interpretive rule as determining that "E15 at 9 psi is [sub sim] to Tier 3 E10 certification fuel at 9 psi," which, "[i]n conjunction with [EPA's] interpretation . . . of CAA sec. 211(h)(4) . . . would allow all fuel manufacturers . . . the ability to lawfully introduce into commerce E15 at 10.0 psi RVP" during the summer driving season. 84 Fed. Reg. at 10,596. EPA explains that "Congress intended for gasoline-ethanol blends to have a 1-psi waiver in order to promote ethanol blending in gasoline," and that therefore in light of section 211(h)(4), "it is appropriate when interpreting sub sim for CAA sec. 211(f)(1) to compare E15 at 9.0 psi RVP to E10 certification test fuel at 9.0 psi RVP." *Id.* at 10,600.

Growth Energy generally agrees with that reasoning, but suggests that the way EPA has framed it in its proposal may be susceptible to misinterpretation by a reviewing court. In particular, a court might construe EPA as having concluded that section 211(h)(4) somehow trumps or partially impliedly repeals section 211(f)(1). On that view of EPA's alternative approach, even if section 211(f)(1) prohibits E15 at 10 psi from being first introduced into commerce, section 211(h)(4) allows it, and section 211(h)(4) prevails over section 211(f)(1). Growth Energy, however, does not understand EPA to be proposing that section 211(h)(4) trumps section 211(f)(1), nor is such a position necessary.

In Growth Energy's view, EPA's alternative interpretation, like its primary interpretation, reflects an ultimate determination that 211(f)(1) itself allows E15 and 10 psi to be introduced into commerce because it is sub sim. But while EPA's main approach reaches that determination in *one* analytical step, EPA's alternative approach, properly understood, does so in *two* analytical steps. First, EPA determines, based on its expert technical judgment, that E15 *at 9 psi* is sub sim to Tier 3 E10 certification fuel at 9 psi. Second, based on the congressional policy judgment embodied in section 211(h)(4), EPA then determines—relying on a combination of its own expert technical judgment and Congress's policy judgment embodied in section 211(h)(4)—that E15 is sub sim to Tier 3 E10 certification fuel without regard to RVP (outside of meeting ASTM standards). In other words, rather than determining that E15 *at 9 psi* is sub sim, and relying on section 211(h)(4) as somehow superseding the RVP limitation of that sub sim determination,

EPA instead relies on congressional intent behind section 211(h)(4) to *inform* the Agency's conclusion that E15 is sub sim to Tier 3 E10 certification fuel. Specifically, section 211(h)(4) reflects Congress's policy judgment that the 1 psi difference in RVP is adequately addressed through sections 211(c) and (h), which is consistent with and serves to reinforce EPA's longstanding view that section 211(f)(1) does not require imposition of new and separate RVP requirements, beyond meeting ASTM standards, for purposes of sub sim interpretive rules. Understood in this way, Growth Energy believes that EPA's alternative interpretive rule appropriately construes the sub sim requirement and does so in a way that "harmonizes" sections 211(f)(1) and (h) rather than setting them in conflict. *Nat'l Ass'n of Home Builders v. Defs. of Wildlife*, 551 U.S. 644, 665 (2007). With this clarification, Growth Energy supports EPA also adopting its alternative rationale—in addition to its primary approach—for the sub sim interpretation.

A. EPA Has Ample Support for Its Sub Sim Technical Findings.

As noted above, Growth Energy supports EPA's findings that E15 and Tier 3 E10 certification fuel would have similar exhaust emissions, materials compatibility, and driveability characteristics. Specifically, with respect to exhaust emissions, EPA discusses in the proposed rule that some criteria pollutants may have small increases (e.g., NOx and PM) and others may have similar decreases (e.g., VOC and CO) when light-duty gasoline vehicles operate on E15 relative to E10. *See* 84 Fed. Reg. at 10,599. Accordingly, the Agency proposed to determine E15 at 10 psi is sub sim, reasoning that the "small changes in exhaust emissions from E15 relative to Tier 3 E10 certification fuel used in Tier 3 certified vehicles are within the scope of what we have determined to be sub sim in our prior sub sim interpretive rulemakings." *Id.* We agree with this conclusion. We question, however, whether the data that EPA relies upon from the EPAct study in fact establish even such small exhaust emissions impacts. Rather, in the EPAct study, in order to hold the test fuel's distillation properties constant while increasing ethanol content, certain other constituents had to be adjusted, raising a question of whether the observed small emissions impacts result from the increase in ethanol content or the other fuel constituent changes made to hold distillation properties constant. *See* "Review of U.S. EPA's Analysis of the Emissions Impacts of Providing Regulatory Flexibility for E15," Trinity Consultants at 3-5 ("Trinity Report") (attached as Exhibit 1). Contrary to the EPAct statistical models, across a wide range of other studies that evaluated a large subset of MY 2001 and later light-duty vehicles (including Tier 2 and Tier 3 vehicles), E15 does not demonstrate statistically significant adverse NOx or PM impacts as compared to E10; at the same time, there are CO emissions benefits as well as benzene emissions benefits associated with the lower aromatic content of the fuel. *See* Trinity Report at 1.[8]

[8] In any event, even if there are small NOx and PM emissions impacts, in prior interpretive rulemakings EPA has considered the characteristics of a new fuel to be sub sim to certification fuel notwithstanding a slight increase in emissions. *See, e.g.*, 56 Fed. Reg. 5352, 5353 ("[I]n general[,] NOx emissions from vehicles using unleaded gasolines with up to 2.7 percent oxygen by weight are *not significantly different* from results obtained using certification gasolines.") (emphasis added); *see id.* at 5354 (finding NOx emissions increases associated with 2.7 weight percent alcohol are either "nonexistent *or at such low levels* that such unleaded gasolines can reasonably be considered substantially similar to certification gasoline") (emphasis added). Accordingly, EPA has ample

In fact, although EPA explained in its proposal that its assessment was limited to vehicles certified using Tier 3 E10 certification fuel, 84 Fed. Reg. at 10,602, the data show that E15 will not cause a meaningful increase in emissions or raise concerns regarding materials compatibility or driveability for the MY 2001 and later gasoline-fueled light-duty fleet in which E15 is otherwise allowed to be used. Specifically, the data presented by EPA in its proposal and reviewed in the Trinity Report, as well as EPA's findings in its partial waiver decisions and section 211(c) Misfueling Mitigation rulemaking, support this conclusion. As discussed in EPA's proposal, studies have evaluated the immediate tailpipe emissions (i.e., combustion effects) and long-term durability impacts of E15 on MY 2001 and later light-duty gasoline vehicles and found that there would be no impact on their compliance with standards to which they were certified using E0, and no statistically significant emissions impacts relative to that fuel (rather than E10). 84 Fed. Reg. at 10,598. Additional data discussed in the proposal and in the Trinity Report confirm these findings comparing the effects of E15 versus E0 on these vehicles. Where the difference in ethanol concentration is of course only 5 percent between E15 and E10 (versus 15 percent as between E15 and E0), EPA is justified in finding that E15 would have even less of an impact on exhaust emissions from MY 2001 and later vehicles as compared to E10 in those vehicles.

EPA may also supplement the analysis above by exercising reasonable engineering judgment to confirm that E15 will not result in adverse exhaust emissions impacts. Among other things, EPA may take into consideration advanced fuel management software that makes adjustments to ensure higher NOx emissions do not occur.[9] Further, with respect to PM, the primary driver of emissions is aromatics and heavier compounds in gasoline, not ethanol.[10] EPA and others have theorized that ethanol's higher heat of vaporization and subsequent cooling effect might hinder vaporization of heavier fuel components, resulting in slightly higher PM.[11]

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discretion to make a similar finding—that E15 is sub sim to E10 notwithstanding minor differences in exhaust emissions—here.

[9] *See* Keith Knoll et al., *Effects of Mid-Level Ethanol Blends on Conventional Vehicle Emissions,* SAE Int'l (2009). This is confirmed by the University of California, Riverside Center for Environmental Research and Technology ("CE-CERT") study; all five Tier 3 vehicles showed either a reduction or no change in NOx emissions between E10 and E15 (Fuels 3 and 5). *See* CE-CERT Study. EPA notes that the measured emissions differences in the CE-CERT study and others "may be statistically insignificant due to the limited scope of the test program and/or the number of variables left uncontrolled." 84 Fed. Reg. at 10,598. However, EPA also acknowledges that the CE-CERT study's findings with respect to NOx and PM *are* statistically significant within the context of that study. *See id*. at 10,599. In any event, given the limitations in the EPAct study, these other studies at least indicate that it is premature to draw any conclusion that the extra five percent ethanol in E15 cause even small increases in PM and NOx emissions.

[10] *See, e.g.*, Georgios Karavalakis, et al., *Evaluating the Effects of Aromatics Content in Gasoline on Gaseous and Particulate Matter Emissions from SI-PFI and SIDI Vehicles,* 49 ENVTL. SCI. & TECH. 7021 (2015); Koichiro Aikawa, et al., *Development of a Predictive Model for Gasoline Vehicle Particulate Matter Emissions,* SAE INT'L J. OF FUELS & LUBRICANTS (2010).

[11] *See generally* Aron D. Butler, et al., *Influence of Fuel PM Index and Ethanol Content on Particulate Emissions*

But when E15 is created through splash-blending ethanol with E10 or the same base gasoline used to make E10, aromatics decrease (by dilution), which should directionally reduce PM emissions. This decline would likely offset any potential slight increase associated with ethanol's higher heat of vaporization, to the extent any increase exists. Additionally, EPA might expect, at least in the long run, that refiners would offset the higher octane that an additional five percent ethanol contributes by reducing other components that provide octane, specifically aromatics. *See* Trinity Report at 5. This should further reduce particulate emissions, or, at a minimum, offset any slight increase that might be associated with ethanol's higher heat of vaporization. Thus, EPA may conclude that exhaust emissions impacts of E15 are substantially similar to E10 in all MY 2001 and later gasoline-fueled light-duty vehicles, including, but not limited to, Tier 3 vehicles certified using E10, which conclusion is amply supported by both existing data and engineering judgment.

With respect to materials compatibility and driveability, EPA concludes that, because Tier 3 certified vehicles "should be designed to encounter E15 in-use and manufacturers are required to use E15 as an aging fuel for evaporative durability testing," Tier 3 vehicles "would have similar, if not better, materials compatibility [and driveability] with E15" than older vehicles for which the fuel is approved. 84 Fed. Reg. at 10,600; *see also id.* at 10,601 (drawing the same conclusion with respect to driveability). In addition to the studies on which EPA relied in the partial waiver decisions, this conclusion is amply supported because E15 has been in use for a considerable period of time without any reports of materials compatibility or driveability issues. *See* Trinity Report at 9. Moreover, EPA has already found that E15 would not result in materials compatibility or driveability issues at all for MY 2001 and later gasoline-fueled light-duty vehicles, 84 Fed. Reg. at 10,600-01. Further, a recent analysis of the fleet finds that more than 91 percent or more than 223 million vehicles on the road are compatible to run on E15.[12] EPA may thus reasonably conclude that E15 and E10 are sub sim in this regard. Moreover, with respect to driveability, after close to a decade of E15 use and more than 8 billion miles driven on the fuel, there is *no* evidence of any adverse impacts of the fuel on normal driving operation, let alone any such evidence for such impacts as compared to E10 in these vehicles. *See, e.g.*, Sheetz, Inc. Comment Letter on the Proposed Rule (Apr. 29, 2019) (attached as Exhibit 2).

Accordingly, EPA may find that E15 and E10 (and even E0) are substantially similar with respect to their functional impacts (including exhaust emissions, driveability, and materials compatibility on MY 2001 and later gasoline-fueled light-duty vehicles.[13]

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from Light-Duty Gasoline Vehicles, SAE Int'l (2015); Rafal Sobotowski, et al., *A Pilot Study of Fuel Impacts on PM Emissions from Light-Duty Gasoline Vehicles*, SAE Int'l (2015).

[12] Air Improvement Resource, Inc., *Analysis of Ethanol-Compatible Fleet for Calendar Year 2019* 4-5 (Aug. 16, 2018) (attached as Exhibit 15 to Growth Energy's Comments on the 2019 Renewable Volume Obligation Rulemaking).

[13] That EPA granted a partial waiver without addressing whether E15 was substantially similar to E0 in 2010/2011 is irrelevant. EPA was not asked to address the substantially similar issue at that time, and the data support such a finding now.

B. E15 Does Not Have Adverse Emissions Impacts on Criteria Pollutants or Air Toxics; It Lowers Harmful Aromatics Through Dilution.

In addition to proposing to find that E15 at 10 psi is sub sim to E10 at 9 and 10 psi from an emissions perspective, EPA separately analyzes the expected real-world emissions impacts of providing E15 RVP parity with E10. *See* 84 Fed. Reg. at 10,603. With respect to evaporative emissions, EPA is correct that E15 at 10 psi would *lower* the volatility of in-use gasoline (predominantly E10 at 10 psi) by approximately 0.1 psi. *See id.*; *see also* Trinity Report at 7. This basic fact underscores why, as a policy matter, providing E15 RVP parity makes common sense.

With respect to exhaust emissions, EPA is correct that blending an additional five percent ethanol into the same gasoline blendstock dilutes aromatics and other hydrocarbon components. The findings of the University of California, Riverside Center for Environmental Research and Technology ("CE-CERT") study and other studies that show no adverse NOx, NMHC, or PM emissions impacts, coupled with decreased CO, make sense in light of this observation. *See* Trinity Report at 4-6. Similarly, reduced aromatics content results in lower benzene emissions from E15 as compared to E10 (as well as E0). *See id*. at 7. EPA notes that, over time, refiners might adjust the base blendstock for E15 blending. *See* 84 Fed. Reg. at 10,604. To take advantage of the higher octane of E15, such refiners could reduce the content of aromatics (which are otherwise used to provide octane), thus further reducing benzene emissions beyond the impact of dilution. It is not apparent that refiners would *increase* aromatics content so as to counteract the effect of dilution with ethanol. And in any case, the emissions benefits of dilution will occur in the interim and it is unclear at what point in the future E15 might reach a market penetration so as to prompt refiners to adjust the content of blendstocks used to make E15.

C. EPA Reasonably Proposes to Remove the Impediments Posed by Section 211(f) Through a Sub Sim Interpretive Rulemaking Rather than a Waiver Application.

Growth Energy anticipates that other commenters may question EPA's proposal to address the barrier section 211(f) poses to E15 at 10 psi through a sub sim interpretive rule under section 211(f)(1), rather than through a waiver application under section 211(f)(4). After all, EPA previously allowed E15 (with a summertime RVP limitation of 9 psi) to be first introduced into commerce in 2010/2011 through partial waivers under section 211(f)(4). And in its proposed sub sim interpretive rule here, EPA is relying in part on evidence developed in those partial waiver decisions. Growth Energy, however, strongly supports as appropriate and well-founded EPA's proposal to address the impediment posed by section 211(f) through a sub sim interpretive rule rather than a new waiver application.

To begin with, the surrounding regulatory framework has changed since 2010/2011. In particular, when EPA issued the 2010/2011 partial waiver decisions, certification test fuel was still E0. EPA did not adopt Tier 3 E10 certification fuel until 2013, so that a comparison of E15 to E10 utilized in certification of Tier 3 vehicles is now appropriate whereas that was not the case in 2010/2011. That said, EPA's analysis and review of data indicate that EPA could equally

conclude that E15 satisfies the criteria for being substantially similar to E0 utilized in the certification of MY 2001 and later gasoline-fueled light-duty vehicles. As explained above, EPA's conclusions in the partial waiver decisions in 2010 and 2011 and the totality of data demonstrate that there is no meaningful exhaust emissions, materials compatibility, or driveability difference between E15 and E0 when used in those MY 2001 and later vehicles. In other words, EPA may reasonably draw the same conclusion regarding the similarity of those fuels with respect to their functional impacts on MY 2001 and later vehicles as EPA may draw with respect to their functional impacts on Tier 3 vehicles certified with E10.

D. EPA May Constrain Its Finding That E15 Is Sub Sim to Certification Fuel to the Extent That E15 Is Used in MY 2001 and Later Light-Duty Vehicles and Include Appropriate Misfueling Mitigation Conditions.

EPA also invited comment on potentially imposing "conditions" on E15 as part of its sub sim interpretive rule. *See* 84 Fed. Reg. at 10,602. At the outset, EPA's proposed "substantially similar" rule is an interpretive rule rather than a legislative rule or regulation. Its purpose is "to advise the public of the agency's construction of" section 211(f)(1) of the CAA, rather than promulgating a regulation with the force and effect of law. *See Perez v. Mortg. Bankers Ass'n*, 135 S.Ct. 1199, 1204 (2015) (quoting *Shalala v. Guernsey Mem'l Hosp.*, 514 U.S. 87, 99 (1995)). Accordingly, in declaring its understanding of what the term "substantially similar" means, EPA may reasonably define and explain the scope of its analysis in determining whether one fuel or fuel additive is sub sim to another. Historically, EPA has done so by establishing physical and chemical criteria for what fuels may be considered substantially similar to fuels utilized in certification, taking into account the functional impacts of the fuels with regard to emissions, materials compatibility, and driveability. In the course of providing its interpretation of what the statutory sub sim analysis requires, EPA may also reasonably construe what is "substantially similar" against the backdrop of certain real world conditions and limitations that constrain its analysis. Specifically, EPA may reasonably conclude that E15 is substantially similar to E10 (or even E0) when used in appropriate vehicles.[14] In other words, in assessing the emissions, materials compatibility, and driveability impacts of E15, EPA may appropriately conclude that E15 is sub sim with regard to MY 2001 and later vehicles, the class of vehicles currently allowed to use E15 and for which robust data are available. EPA may also reasonably consider, and premise its determination on, the assumption that certain misfueling requirements—whether through existing regulations or through other mitigation measures—will ensure that E15 will be used properly so as to mitigate any potential impacts.

One of the potential limitations discussed in EPA's proposal is a physical or chemical characteristic of a sub sim fuel. EPA suggests that, in order to be sub sim to Tier 3 E10 certification fuel, E15 must be produced from "denatured fuel ethanol that meets industry established quality standards." 84 Fed. Reg. at 10,602. EPA originally imposed this limitation

[14] Throughout EPA's sub sim interpretations, EPA implicitly assumes that the sub sim fuels will be sold for use in appropriate vehicles. For example, when EPA has interpreted what is "substantially similar" to gasoline certification fuel, it has expected that such sub sim fuels would not be sold for general use in diesel-fueled light-duty vehicles.

as a condition on the 2010/2011 partial waiver decisions, at Growth Energy's request. *See* 75 Fed. Reg. at 68,148. EPA may reasonably impose this ethanol quality limitation as part of the criteria for qualifying under EPA's sub sim interpretive rule. If EPA does so, however, EPA should make clear that it is limiting its sub sim conclusion to E15 that is produced from denatured ethanol meeting ASTM quality standards because otherwise the fuel's physical and chemical characteristics do not sufficiently resemble certification fuel meeting such standards.[15] In this sense, EPA would be specifying the physical and chemical characteristics a fuel must have in order to be substantially similar.

Beyond this ethanol quality criterion, EPA's proposal suggests imposing conditions in its sub sim interpretive rule limiting the fleet of gasoline vehicles for which E15 could be introduced into commerce as substantially similar to certification fuel. In particular, EPA proposed and sought comment on including limitations contained in its section 211(f)(4) partial waiver decisions that are designed to prevent misfueling with E15 in vehicles or engines other than MY 2001 and later gasoline-fueled light-duty vehicles. *See* 84 Fed. Reg. at 10,602. Growth Energy does not have any practical objection to these limitations aimed at preventing misfueling (though Growth Energy does oppose any additional limitations or conditions as inappropriate and unnecessary). Indeed, as EPA notes, restrictions on the sale, introduction or use of E15 in MY 2000 and earlier gasoline-fueled light-duty motor vehicles, heavy-duty motor vehicle engines, and nonroad vehicle and engines is prohibited by regulation adopted independently under sections 211(c), 208, and 114, and misfueling mitigation requirements such as pump labeling, survey requirements, and product transfer document requirements also apply by such regulation. 84 Fed. Reg. at 10,602 n.128. These regulatory restrictions plainly apply to all parties in the gasoline distribution system.

EPA may reasonably confine its interpretation that E15 is "substantially similar" to E10 (and even to E0) insofar as E15 is utilized only in MY 2001 and later gasoline-fueled light-duty motor vehicles—i.e., the vehicles for which EPA has concluded that E15 is similar to certification fuel(s) with respect to functional impacts on exhaust emissions, materials compatibility, and driveability. As discussed above, consistent with EPA's longstanding sub sim interpretive criteria, EPA may reasonably conclude that E15 is substantially similar with respect to these impacts on this portion of the fleet. Because EPA has not reached a similar conclusion for other vehicles and engines, EPA might withhold any determination or interpretation that E15 is substantially similar to E10 or E0 certification fuels for use in such other vehicles and engines.

EPA also seeks comment on whether it should go so far as to limit its sub sim interpretation for E15 "only to vehicles and engines certified using Tier 3 E10 certification fuel." 84 Fed. Reg. at 10,602. This limitation would be entirely unjustified and unlawful. This is

[15] As EPA notes, its partial waiver decisions require that ethanol used to make E15 meet ASTM D4806-10 specifications for ethanol quality. *See* 84 Fed. Reg. at 10,587 n.19. Similarly, E10 certification fuel must meet ASTM D4814-13b, which, in turn, requires that ethanol meet ASTM D4806. *See* 40 C.F.R. § 1065.701(f) (requiring that E10 certification fuel meet ASTM D4814); 40 C.F.R. § 1065.1010(b)(30) (incorporating ASTM D4814-13b by reference); ASTM D4814-13b (requiring that "denatured fuel ethanol used in gasoline-ethanol blends [] conform to the requirements of Specification D4806").

because EPA has no basis to conclude that the additional ethanol in E15 would have a meaningfully different functional impact on exhaust emissions, materials compatibility, or driveability than E10 (or even E0) when used in MY 2001 and later vehicles, as compared to the difference in impact when used in the very small portion of the current fleet certified using Tier 3 E10 fuel.[16] As discussed above, EPA has already found there to be no meaningful exhaust emissions impact in using E15 as compared even to E0 (let alone E10), in MY 2001 and later vehicles. Moreover, EPA has determined that E15 has no materials compatibility or driveability issue at all for such vehicles. Further, by limiting the use of E15 at 10 psi to a tiny fraction of the vehicle fleet—MY2020 vehicles and a few earlier vehicles—this condition would eviscerate the core purpose of EPA's proposal, which is "to create parity in the way the RVP of both E10 and E15 is treated under EPA regulations." 84 Fed. Reg. at 10,585. Growth Energy strongly opposes any such limitation.

V. EPA SHOULD REMOVE THE RVP-RELATED PROVISIONS OF THE MISFUELING MITIGATION RULE.

Growth Energy supports EPA's proposal to remove the RVP-related provisions of the Misfueling Mitigation Rule ("MMR") related to product transfer documents ("PTDs") and summertime commingling of E10 and E15, in conjunction with its extension of the 1.0 psi RVP allowance to E15. *See* 84 Fed. Reg. at 10,602. Under the revised interpretation of section 211(h)(4), the RVP-related statements required for PTDs would be inaccurate or unnecessary, and the MMR's prohibitions on commingling would no longer be needed because E10 and E15 would be subject to the same RVP limit. Likewise, EPA should remove the survey requirement in 40 C.F.R. § 80.1502 to conduct RVP testing to confirm the RVP of E15 does not exceed 9 psi in the summertime, which EPA intended to address commingling. *See* 76 Fed. Reg. at 44,421-22 (noting that the purpose of the RVP testing requirement is "to ensure that E15 being sold at retail stations was in compliance with the RVP condition of the E15 waiver and that an E10 fuel that used the 1.0 psi RVP waiver under CAA section 211(h) was not commingled with E15, which must have a lower RVP in the summertime.").

EPA promulgated these provisions primarily pursuant to its authority under sections 208 and 114, and, with respect to the commingling prohibition, in order to implement section 211(h). *See* 75 Fed. Reg. 68,044, 68,061 (Nov. 4, 2010) (explaining that the Agency "believe[s] that the[] [RVP-related] PTD proposals are appropriate under our authority under sections 208 and 114 of the Clean Air Act."); *see also* 79 Fed. Reg. 42,128, 42,158 (July 18, 2014) (revising the PTD language and commingling prohibitions as "procedural and compliance related aspects of th[e] rule" pursuant to EPA's authority under "sections 114, 208, and 301(a) of the Clean Air Act"); 75 Fed. Reg. at 68,059 (explaining that the commingling prohibitions rest upon "an existing prohibition with respect to exceeding applicable summertime RVP requirements" and citing 40 C.F.R. § 80.27, which EPA promulgated under section 211(h)). Accordingly, in order to

[16] Indeed, adopting a general rule that a fuel that is sub sim to a particular certification fuel may only be introduced into commerce in those vehicles certified using that particular certification fuel would imply that fuels that are sub sim to E0 Indolene could not be used in Tier 3 vehicles not certified using E0 Indolene. This cannot be the case.

effectuate the Agency's reinterpretation of section 211(h), EPA has ample authority to revise these regulatory provisions.[17]

VI. EPA SHOULD FINALIZE THAT ADDITIONAL MISFUELING MITIGATION MEASURES ARE UNNECESSARY AND OUTSIDE OF THE SCOPE OF THIS RULEMAKING.

Growth Energy agrees that new and additional misfueling mitigation measures to prevent misfueling of nonroad engines and vehicles and MY2000 and older light-duty vehicles are both unnecessary and outside the scope of the current RVP rulemaking. *See* 84 Fed. Reg. at 10,603. E15 has been legal for sale for close to a decade, during which time consumers have engaged in millions of transactions to purchase the fuel and have driven more than eight billion miles on it. Today, twelve of the largest retail chains in the nation offer E15 across 30 states.[18] The current fuel labeling and broader misfueling mitigation regime adequately prevent misfueling; there is no need to revisit this comprehensive regulatory framework to prevent misfueling simply because E15 may receive RVP parity with E10 during the summer ozone season.

In 2010 and 2011, EPA sought comment and carefully considered input on a wide range of strategies to prevent misfueling of nonroad vehicles, engines, and equipment, and pre-MY 2001 light-duty vehicles. In addition to a myriad of labeling requirements, the Agency considered numerous physical barriers to access to E15 at the pump. *See, e.g.*, 76 Fed. Reg. at 44,426-27. In the final MMR, EPA settled on a prominent orange label that in plain terms informs the consumer that the fuel contains 15 percent ethanol, can only be used in 2001 and new passenger vehicles and flex-fuel vehicles, and *cannot* be used in any "other vehicles, boats, or gasoline-powered equipment." *Id*. at 44,415. The label contains a clear admonition that other use of the fuel may "cause damage and is **prohibited** by federal law." *Id.*. After careful review, EPA also determined that additional physical impediments to accessing E15 "present[ed] implementation, feasibility or cost issues." *Id.* at 44,426.

As detailed further below, the current labeling regulations sufficiently inform consumers of legal and prohibited uses of E15 and prevent misfueling, without imposing unnecessary costs or implementation problems. There is no need for EPA to require the misfueling mitigation measures for which the Outdoor Power Equipment Institute ("OPEI") and the National Marine Manufacturers Association ("NMMA") advocate, including more alarmist language on pump

[17] Nothing in section 211(c) of the CAA would bar EPA from withdrawing the RVP-related provisions of the MMR, because EPA did not promulgate these provisions pursuant to section 211(c). In any case, there is no basis under section 211(c) for EPA to restrict the summertime RVP of E15 more tightly than E10. In particular, EPA made no similar findings about the pollution or emissions effects of E15 with an RVP of greater than 9 psi. Indeed, EPA could not have made the necessary finding under section 211(c)(2)(C). Prohibiting use of E15 with an RVP of up to 10 psi simply leads to the use of E10 with an RVP of up to 10 psi, which accounts for virtually the entire gasoline market. And E10 with an RVP of up to 10 psi has slightly *greater* volatility and hence evaporative emissions than E15 made using the same base gasoline or blendstock.

[18] Growth Energy, "Progress Report: E15 Rapidly Moving Into the Marketplace" (updated Dec. 11, 2018), https://growthenergy.org/wp-content/uploads/2018/12/e15-locations-1690-2018-12-11.pdf.

labels and physical barriers to accessing the fuel. EPA considered and rejected these measures in 2010 and 2011, and they are equally as cost-prohibitive, infeasible, and/or unnecessary now. *See id.* at 44,411-18. Further, even if EPA were inclined to consider any new misfueling mitigation measures, in order for such measures to be binding and enforceable regulations applicable to all parties in the fuel distribution system, EPA would have to do so through notice-and-comment rulemaking addressing all criteria under section 211(c). *See* 42 U.S.C. § 7545(c); 76 Fed. Reg. at 44,410.

The E15 label required by current EPA regulations effectively informs consumers of appropriate and prohibited uses of the fuel. *See* 40 C.F.R. § 80.1501. On this point, it is instructive that the Federal Trade Commission ("FTC"), the federal agency tasked with ensuring consumers are not misled by deceptive business practices and are adequately informed, recently promulgated new gasoline and ethanol flex fuel labeling regulations that explicitly embraced EPA's current E15 labeling regime and declined to require additional labeling requirements. *See* 81 Fed. Reg. 2054 (Jan. 14, 2016). The FTC carefully evaluated EPA's current approach to E15 labeling and the record supporting EPA's adoption of the same, and concluded that any additional labeling requirements may cause "consumer confusion" and would be an "unnecessary burden on industry." *Id.* at 2055. In fact, FTC's new labeling requirements for ethanol flex fuels in many ways mirror EPA's current requirements in terms of the color scheme, size, and information provided. *Compare* 16 C.F.R. § 306.12(4) (requiring ethanol flex fuels labels to note that the fuels "may harm other engines"); *with* 40 C.F.R. § 80.1501(a) (requiring label language that delineates categories of vehicles/engines for which E15 is prohibited and requiring the label to state the fuel "may cause damage and is prohibited by Federal law" in those engines). Additionally, the broader misfueling mitigation regulations, including the existing E15 survey's requirements to survey the ethanol content of gasoline sold as E15 and to confirm appropriate retailer implementation of E15 labels, provides EPA ample information regarding appropriate E15 blending, labeling, and documentation, and provides ample legal safeguards against consumer misuse of the fuel. *See* 40 C.F.R. § 80.1502; 76 Fed. Reg. at 44,420-24.

OPEI/NMMA rely on a 2018 Harris Poll to argue that EPA's current misfueling measures are inadequate and consumers are more confused about E15 and other ethanol-blended fuels than they used to be. Reliance on the Harris Poll for this proposition is misplaced. Among many other issues with the poll, it did not target consumers that have actually encountered E15 in the marketplace. E15, with its bright orange cautionary label, is not yet available at most gas stations; therefore, it is unsurprising that many Americans are unaware that gasoline with an ethanol content greater than 10 percent is available for sale at some retail stations in the United States. OPEI/NMMA Joint Comments, Attachment 2, *Look Before You Pump Survey Results* (Mar. 2, 2018). Similarly, what the Harris Poll characterizes as "Bad Behavior at the Pump" may simply be rational consumer behavior: according to the poll, 41 percent of Americans "do not check the fuel pump for any warning labels when they fuel up their car." *Id.* at 4. This statistic is not itself of concern. Consumers repetitively refuel at the same or one of a small number of filling stations, and it is not surprising that they do not look for new warning labels each time. More relevant would be whether a consumer reviews pump signage before putting a *new* fuel in their vehicle. Similarly, it is not surprising that many respondents in the Harris Poll were not

aware that many boats are warrantied for use of specific ethanol-free fuels and may not use E15, since most such respondents do not own boats. *Id.* Moreover, contrary to OPEI/NMMA's conclusions that the poll indicates consumers are more likely to misfuel nonroad equipment with E15, the Harris Poll found that American consumers are in fact *more* likely than in past years to "always read the labels on fuel pumps." *Id.* at 6. Neither OPEI nor NMMA point to a single specific instance of an FTC complaint, claim against a retail station, or warranty claim related to a consumer misfueling a boat, lawnmower, or other vehicle/engine contrary to the clear EPA E15 label.[19] In sum, there is no evidence that EPA needs to modify its misfueling mitigation requirements for nonroad engines and vehicles.

OPEI/NMMA's wish-list of "physical barriers" to accessing E15, all of which EPA considered in 2010 and 2011, are no more cost-effective, workable, or necessary now than they were then. *See* 76 Fed. Reg. at 44,426-27. For each of the options summarized below, OPEI/NMMA claim that costs on fuel retailers and/or consumers may be outweighed by costs to nonroad engine and vehicle owners associated with engine damage and replacement of equipment associated with misfueling; however, OPEI/NMMA provide *no* evidence of any such damage or harm to owners of such products associated with E15 misfueling. Such purely hypothetical economic impacts should not trump the very real costs to fuel retailers and/or consumers associated with implementation of any of these physical barriers to E15 access.

1. *Keypad approval system at every pump that dispenses E15.* Implementation of this option would require every pump dispensing E15 to be equipped with a video screen, which would entail extensive retrofitting costs at existing pumps, to the extent it is technically feasible at all, or would require additional capital expenditures for new pumps. Based on estimates from our retail partners, we anticipate that these upgrades would cost millions of dollars, but in many cases would not be possible to implement based on existing pump infrastructure. *See* Exhibit 2. As EPA concluded in 2011, "[p]roviding an interactive process for selecting E15 would . . . require substantial upgrades to the point-of-sale system of the dispensers" and "available information does not support requiring this measure." 76 Fed. Reg. at 44,427.

2. *Different fuel pump nozzle size for E15.* This option is infeasible and amounts to a prohibition on use of E15. Vehicles would have to be designed with a larger (or smaller) port to accommodate a differently-sized E15 pump nozzle. Essentially, consumers would be inhibited from refueling with E15 in *any* vehicle or equipment, irrespective of whether EPA approved the fuel for use in the vehicle. OPEI/NMMA provides no evidence as to why this option, which EPA rejected as infeasible almost a decade ago, is any more workable now. *See id.* at 44,426.

[19] Further, EPA's current labeling requirements merely set a floor as to what retail stations must include on E15 pumps. To the extent there has been or may be widespread consumer confusion about the legal and illegal uses of the fuel (notwithstanding the cautionary labels), retail stations may take additional measures they consider necessary to inform consumers.

3. *Fuel pump nozzle grips for E15 dispensers*. In 2011, EPA "carefully considered the workability and utility of this measure" and found that even if it were technically feasible and not cost-prohibitive to have a distinct nozzle grip for an E15 pump, the Agency did not view it as an effective misfueling strategy. *Id*. This is because there is no uniformity or consistency at retail stations between non-E15 nozzle grips from which to differentiate E15 nozzle grips. *Id.* This remains true today. With no discernible misfueling benefit, this option is not worth further consideration.

4. *Radio Frequency Identification ("RFID") technologies*. This option would entail retrofitting all MY 2001 and later vehicles with RFID devices that would be paired with RFID technology at individual E15 pumps, which, of course, also would need to be retrofitted. EPA's analysis in 2011 that this barrier to E15 would be costly to retailers ($10,000-20,000 per central controller plus $500 per fuel nozzle) and time-intensive for consumers is equally true today. *See id.* at 44,427; *see also* Exhibit 2.

5. *Separate pumps for E15 and E10/E0*. As a practical matter, the majority of retailers already offer E15 through a separate hose. Today, if a retailer offers E15 on the same hose as E10, one of the misfueling mitigation requirements dictates that a dedicated E10 or E0 hose must exist on the premises for engines not approved for E15. Growth Energy would continue to support this retail configuration—currently named "Configuration 2" by EPA. A separate and new requirement that all E15 must be sold by a separate hose is unnecessary and would impose additional restrictions beyond those in place today. We would oppose such further restriction.[20]

In sum, none of these options merit additional consideration in a notice-and-comment rulemaking subsequent to the present proceeding. EPA's comprehensive existing misfueling mitigation regulations do not require update or revision associated with provision of the 1 psi RVP allowance to E15, aside from the minor revisions (*e.g.*, PTD requirements, commingling, RVP sampling survey requirements) discussed above.

VII. ONCE EPA FINALIZES THE RVP RULE, STATES WILL BE PREEMPTED FROM ENFORCING MORE STRINGENT RVP STANDARDS FOR E15.

A number of states appear to have RVP standards that set a summertime limit of 10 psi for E10 (i.e., for gasoline with 9-10 percent volume ethanol), and a summertime limit of 9 psi for E15. These state RVP limits mirror the current federal RVP standards. To the extent these state

[20] In any case, retailers currently do seek to limit any potential concerns in this regard. *See* Renewable Fuels Ass'n, E15 RETAILER HANDBOOK 44 (2013), https://www.epa.gov/sites/production/files/2016-06/documents/rfa-e15-retailer-handbook.pdf ("For a common hose dispensing both E10 and E15, EPA's concern is addressed by: Providing at least one fueling position offering gasoline containing no more than 10 percent from a dedicated hose/nozzle. The retailer will post clear and visible signage of the non-E15 fuel's availability. Affixing a label on the E15 dispenser that reads 'Passenger Vehicles Only. Use in Other Vehicle Engines and Equipment May Violate Federal Law' consistent with applicable regulations.").

RVP standards are "identical" to the federal standards, they are currently exempt from preemption under section 211(c)(4)(A)(ii). When EPA finalizes its rule, however, there will be a revised federal summertime RVP limit of 10 psi for E15. Because the state RVP limit for E15 will no longer be identical to the federal limit, the exemption will no longer apply, and any state limit of 9 psi will be preempted.

Growth Energy's full analysis of preemption is set forth in a docketed memorandum and will not be repeated here. In these comments, we focus on the essence of the argument and the need for EPA to address this issue in the final rule. To avoid confusion in the marketplace, we strongly recommend that EPA include a statement in the preamble clarifying the preemptive effect of the new federal RVP standard for E15. Doing so will help address questions about the status of state RVP standards, and will help ensure a smooth transition for the quickly approaching 2019 summertime ozone driving season. Specifically, EPA should clarify that once the new federal standard for E15 is finalized (i.e., allowing E15 to be sold year-round at 10 psi), any state that seeks to maintain or enforce a different RVP standard for E15 (e.g., limiting summertime E15 to 9 psi) would presumptively be preempted under the CAA, as state RVP standards are presumptively for purposes of motor vehicle emission control.

A. Summary of Preemption Analysis.

Section 211(c)(4) preempts states (other than California) from prescribing or attempting to enforce, "for purposes of motor vehicle emission control, any control or prohibition respecting any characteristic or component of a fuel or fuel additive in a motor vehicle or motor vehicle engine" if EPA has, under section 211(c)(1), prescribed "a control or prohibition applicable to such characteristic or component of a fuel or fuel additive." 42 U.S.C. § 7545(c)(4)(A). There are two relevant exceptions. First, a state standard is not preempted if it is "identical to the prohibition or control prescribed by the Administrator." 42 U.S.C. § 7545(c)(4)(A)(ii). Second, a state standard is not preempted if EPA has incorporated the control or prohibition into the state's State Implementation Plan ("SIP") based on a finding that it is "necessary to achieve the [NAAQS]." *Id.* at § 7545(c)(4)(C)(i).

EPA has regulated the relevant fuel "characteristic"—gasoline volatility—under section 211(c), thereby triggering preemption of state RVP standards promulgated for purposes of motor vehicle emissions control that do not fall into one of the two statutory exceptions. EPA promulgated gasoline volatility controls under section 211(c)(1) in 1989 and 1990. *See* 54 Fed. Reg. 11,868 (Mar. 22, 1989); 55 Fed. Reg. 23,658 (June 11, 1990). Notably, EPA's original "Phase I RVP control program" included a 1 psi tolerance for gasoline-ethanol blends containing 9-10 percent ethanol, which effectively established different summertime RVP limits for E0 (9 psi) and for E10 (10 psi). These standards, all issued under the authority of section 211(c), were codified at 40 C.F.R. § 80.27. EPA expressly recognized at the time that the CAA "prohibited states from enacting controls on a fuel" that were "different" from the newly-enacted federal RVP controls, which controls included separate RVP limits for E0 and E10, unless a specific

statutory exception applied.[21] Even after Congress codified the distinct RVP standards for E0 and gasoline-ethanol blends containing 10 percent ethanol in the 1990 Amendments, EPA has consistently referred to its RVP standards as promulgated under joint authority of sections 211(c) and (h). *See* 56 Fed. Reg. 64,704, 64,709 (Dec. 12, 1991) ("The statutory authority for the [gasoline volatility regulations at 40 C.F.R. § 80.27] announced today is granted to EPA by sections . . . 211(c) [and] 211(h) . . . of the Clean Air Act . . . ."); 62 Fed. Reg. 13,849, 13,850 (Mar. 24, 1997) (in explaining that Kansas' RVP standards would be preempted unless under a statutory exemption, EPA continued to acknowledge that "a Federal control *promulgated under section 211(c)(1)* applies to the fuel characteristic RVP") (emphasis added).[22]

As both EPA[23] and the courts[24] have recognized, lower RVP standards are intended to control evaporative emissions from vehicles; therefore states' RVP controls that provide a lower RVP limit for E15 are presumptively "for purposes of motor vehicle emission control." *See* 68 Fed. Reg. 42,978, 42,979 (July 21, 2003) ("Lower Reid vapor pressure gasoline is a *fuel control measure* that is used during the summer ozone season *to reduce emission of volatile organic compounds* from motor vehicles.") (emphasis added). Accordingly, the state standards are presumptively preempted unless the statutory exceptions apply.

Indeed, from a bigger picture perspective, it is immaterial whether a state's (or EPA's) decision to grant a 1 psi tolerance for certain ethanol blends reflects other economic and policy

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[21] *See* 54 Fed. Reg. at 11,882 ("[T]he Clean Air Act prohibits states from enacting controls on a fuel that are different from EPA controls, except in certain circumstances. Thus, the Phase I RVP control program finalized today will preempt any state (except California) from enforcing RVP controls different from EPA's unless such a program is approved in a [SIP] (or unless the purpose is something other than air quality improvement).").

[22] The 2006 Boutique Fuels Rule provides a clear example of where EPA continues to view federal RVP controls as grounded in section 211(c). As EPA explained, the whole premise of the Boutique Fuels program is based on the recognition that, "[u]nder the Clean Air Act (CAA), state fuel programs respecting a fuel characteristic or component"—i.e., fuel volatility—"that we have *regulated under section 211(c)(1)* are preempted" unless a statutory exception applies. 71 Fed. Reg. 78,192 (Dec. 28, 2006) (emphasis added).

[23] *See* 62 Fed. Reg. at 13,850 (Kansas SIP approval discussed above); *see also* 62 Fed. Reg. 43,100, 43,101 (Aug. 12, 1997) (approving Illinois SIP regarding RVP in the St. Louis metro area; later repealed in 79 Fed. Reg. 60,065 (Oct. 6, 2014)) ("State governments are generally preempted under section 211(c)(4)(A) of the Act from requiring that any or all areas in a State meet a more stringent volatility standard.").

Nothing in EPA's Boutique Fuels Rule is to the contrary. *See* 71 Fed. Reg. 78,192; discussed *supra*, n.22. Out of concern for creating too many "fuel islands," Congress placed limits on the number of "Boutique Fuels" that EPA could approve by "waiving" preemption under section 211(c)(4)(C) (SIP approval). EPA's Boutique Fuels Rule adopted a "fuels-based" methodology for accounting for the number of waivers it had granted, for purposes of determining the statutory cap. EPA's methodology groups such fuels according to the RVP limits set by the states, without regard to whether the states included a 1 psi tolerance for ethanol-blended gasoline. Nowhere does EPA suggest that a state's decision not to extend a 1 psi tolerance, in the absence of EPA SIP approval, would somehow not be preempted because it would not be for purposes of motor vehicle emission control.

[24] *See*, *e.g.*, *Am. Petroleum Inst. v. Jorling*, 710 F. Supp. 421, 429 (N.D.N.Y. 1989); *Exxon Corp. v. City of New York*, 548 F.2d 1088, 1095 (2d Cir. 1977).

considerations, such as energy security. The RVP limits for any particular gasoline formulation such as an ethanol blend, at whatever level the limits are set, are still volatility "controls"; i.e., they are still limits applicable to each type of gasoline formulation that the state established to "control" the amount of evaporative emissions released into the atmosphere.[25]

Moreover, nothing in the 1990 Amendments indicates that, by codifying EPA's section 211(c) RVP control program in section 211(h), Congress intended to weaken or alter the preemptive effect of that program. Before Congress enacted section 211(h), it was clear that any state deviation from EPA's section 211(c) RVP control program—including any deviation from the distinct 9 psi standard for E0 and 10 psi standard for blends containing 10 percent ethanol—was preempted, unless incorporated into a SIP as necessary to achieve the NAAQS. And there is no evidence that Congress intended, in section 211(h), to free states from that preemption framework under section 211(c), or to allow states unilaterally to decide (without any EPA review or approval) whether to set more stringent RVP limits for ethanol blends.[26]

The first exception to preemption—that the state standards are identical to the federal standards—will not apply when EPA finalizes its rule, as many states' RVP standard of 9 psi for summertime E15 will then be more stringent than, and no longer identical to, the federal standard of 10 psi for summertime E15. From that point forward, if any of the states that today have a summertime limit of 9 psi for E15 wish to maintain or enforce that more stringent standard, these states will no longer have standards that are identical to the federal standards, and will no longer qualify for the exemption from preemption on that basis. Additionally, in most cases, the second exception to preemption—that the standard is incorporated into a SIP—does not apply.[27]

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[25] In numerous contexts under the CAA—from MACT standards, to NSPS standards, to vehicle emissions standards—EPA must balance a variety of factors (e.g., costs, technology, feasibility, economic impacts, etc.) in determining where precisely to set the emission limits for any given category or sub-category of sources. But at the end of the day, the resulting standard that applies to each particular source category is still fundamentally for purposes of air quality control.

[26] Indeed, the inclusion of section 211(h)(5) proves the opposite. Section 211(h)(5) establishes an explicit mechanism, with detailed criteria and procedures, by which the governor of a state can seek approval to establish a more stringent RVP standard for certain ethanol blends. Thus, Congress provided two mechanisms—section 211(h)(5) and the SIP approval process in section 211(c)(4)(C)(i)—by which states can seek to impose more stringent RVP limits. If states were not otherwise preempted from deviating from federal RVP standards, i.e., if they were free unilaterally to impose more stringent limits without following these statutorily-prescribed procedures, these carefully crafted mechanisms would be meaningless—a result clearly in conflict with congressional intent.

[27] The handful of states that have a 1 psi RVP tolerance provision in an EPA-approved SIP would likely no longer qualify for the exception under section 211(c)(4)(C)(i). Their RVP standards for E15 will no longer be "identical" to the federal standards, and it is difficult to imagine that EPA could find that imposing a 1 psi lower standard for E15 is "necessary" to achieve the NAAQS where the state provides the 1 psi tolerance to E10. Indeed, blending 15 percent ethanol in gasoline results in a slightly lower increase in RVP than blending 10 percent ethanol in the same gasoline. *See* 84 Fed. Reg. at 10,603.

In short, Congress did not intend to allow states unilaterally to impose different RVP standards than those set by EPA, except by seeking special EPA approval for more stringent standards through a specific statutory mechanism established by Congress.

B. Need for EPA Clarification on Preemption.

While Growth Energy believes the law on preemption is clear, questions will inevitably arise when EPA's rule is finalized. A number of states have statutory or regulatory language that may be construed as RVP standards that provide a 1 psi tolerance for E10 but not E15, so that the standard in those states is 10 psi for E10 and 9 psi for E15. Questions as to the continued applicability of state RVP standards will arise immediately, as suppliers and retailers will have to move quickly to prepare for the 2019 summer ozone driving season.

Growth Energy expects that many states, in order to support the expanded fuels market and enhance consumer choice at the pump, will readily conform to the new federal RVP standards for E15. They will do so either by changing their regulations or by simply refraining from implementing or enforcing a 9 psi limit for E15. Many states may also be able to clarify their regulatory language so as to avoid a conflict with the new federal rule. Indeed, Growth Energy strongly encourages states to remove all barriers to the availability of E15 and stands ready to help states pave the way for the transition to the new federal standard. Growth Energy also urges EPA to work collaboratively with its state partners to ensure an efficient transition in order to support the objective of putting E15 on an even playing field with E10.

Despite these efforts, some states may nonetheless express support for maintaining a more stringent RVP standard for E15 or states may be delayed in providing guidance, or take no position at all. Given the number of states involved and the potential for mixed signals, we could see a patchwork of confusing and conflicting responses and questions develop across multiple states. The ensuing uncertainty and delay will inevitably be disruptive to the fuels market, with particularly acute effects for summer 2019.

EPA can and should help to reduce the potential for confusion and uncertainty by issuing a clarifying statement on the preemptive effect of the new federal standard. EPA need not analyze particular state regulations in detail or issue definitive findings with respect to specific states. Rather, EPA should simply clarify the basic legal framework for preemption. In particular, EPA should clarify that, once the new federal RVP standard for E15 is finalized (i.e., providing a 1 psi allowance to E15 in the summer ozone season), any state that seeks to maintain or enforce a more stringent RVP standard for E15 (e.g., limiting summertime E15 to 9 psi) would presumptively be preempted from maintaining or seeking to enforce that standard, as more stringent state RVP standards are presumptively for purposes of motor vehicle emission control. Such a statement would help clarify the generally applicable legal framework, promote consistency and uniformity in how these issues are addressed across the nation, and help avoid a confusing situation where these issues are addressed on a state-by-state basis.

This is the legal framework that would govern the majority of potentially affected states, whose RVP standards for E10/E15 are *not* already incorporated into an EPA-approved SIP. As for those few states whose RVP standards for E10/E15 are already contained in an EPA-approved SIP, EPA may simply wish to clarify that their standards will no longer be identical to the federal standards once EPA's rule is finalized, and to note that the Agency will consult (or is in process of consulting) with such states to help amend and conform their SIPs, as needed and appropriate in light of the criteria for such SIP approval under section 211(c)(4).

VIII. EPA SHOULD MAKE CLEAR THAT THE RVP RULE AND ANY FINAL RIN REFORM REGULATIONS ARE SEPARATE, INDEPENDENT MEASURES.

Growth Energy appreciates EPA's recognition that the "objectives" of the March 21 proposal "are twofold," 84 Fed Reg. at 10,585, and that the Agency is in fact soliciting comment on two separate sets of proposals relating to two different CAA programs, with distinct statutory authority and policy justifications. "First," EPA proposes a series of "steps"—which include both rulemaking and regulatory interpretations—"intended to create parity in the way the RVP of both E10 and E15 fuels is treated under EPA regulations." *Id.* (collectively, "RVP proposals"). These regulations, promulgated under sections 211(c), (f), and (h) control the introduction into commerce of fuels and fuel additives. "Second," as a separate matter, EPA also proposes "reforms to RIN regulations intended to increase transparency and deter [certain] behaviors in the RIN market." *Id.* (collectively, "RIN proposals"). The RIN market is part of a different CAA program, i.e., the RFS program, which Congress added through the Energy Policy Act of 2005 and the Energy Independence and Security Act of 2007, and was codified in section 211(o). *Id.* at 10,604. The RFS program does not address the introduction into commerce of fuels and fuel additives or regulate the volatility of such fuels.

In addition to addressing different CAA programs, the RVP proposals and RIN proposals relate to different categories and subcategories of regulated entities (e.g., "fuel manufacturers," "downstream oxygenate blenders, and retailers," etc., *see id.* at 10,593, versus "obligated parties," *see id.* at 10,604), and are intended to operate independently of each other. For example, the RVP proposals will be effective in achieving parity between E10 and E15 regardless of whether or when any of the RIN reforms are adopted. Indeed, as EPA notes, EPA has previously sought input on similar RIN reform proposals on a different regulatory track, i.e., during the 2018 and 2019 RVO rulemakings, which set volumes of renewable fuels under the RFS program. *Id.* at 10,607-08. EPA's previous discussion of these RIN reform proposals did not link them in any way to EPA's treatment of E10 and E15 under sections 211(f) and (h), and EPA has never before linked them. They are separate and independent issues.

In short, in other rulemaking contexts, where EPA has combined disparate proposals in one package, EPA has made clear that it viewed the separate pieces as "appropriate policies in their own right and on their own terms." 83 Fed. Reg. 44,746, 44,783 (Aug. 31, 2018). Similarly here, for the sake of clarity and to avoid confusion, whether or not EPA takes actions on its RVP and RIN proposals in a single or in separate Federal Register notices, EPA should

make clear that it views the RVP proposals and RIN proposals "as appropriate policies in their own right and on their own terms." *Id.*

IX. EPA SHOULD NOT ENACT THE PROPOSED CHANGES TO THE RIN MARKET

In this comment, Growth Energy also adds to the chorus of voices—across the spectrum of market participants—urging EPA not to upend the RIN market to combat unsubstantiated fears of market manipulation.[28] No evidence before the Agency indicates that market manipulation has occurred. And even if market manipulation were a genuine risk, the proposed market alterations would fail to address it; they would merely concentrate manipulation efforts in the hands of obligated parties, while giving would-be manipulators incentives to become obligated parties. Finally, the proposed alterations would seriously harm the RIN market—undercutting liquidity, increasing volatility, and putting both EPA and market participants in an unworkable position.

Rather than shooting in the dark to solve a problem that does not exist, and rather than issuing major market reforms that would not solve any supposed problem but would damage the RFS program, EPA should at this time continue with existing monitoring efforts or, at most, enhance its monitoring by collecting additional data or engage a third party to monitor.

A. The NPRM Fails to Justify the Proposed Changes with Evidence of RIN Market Manipulation.

The principal reason EPA should not implement its proposed changes to the RIN market is straightforward: by the Agency's own account, the changes' only justification is a problem that does not appear to exist.

As the NPRM states, the purpose of the proposed reforms is to ameliorate some commentators' professed fear of "market manipulation." More specifically, the concern appears to be that market participants are hoarding surplus RINs to artificially inflate RIN prices.[29] EPA

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[28] *See also, e.g.*, Covington & Burling LLP, *An Analysis of the Renewable Fuel Standard's RIN Market* (Feb. 15, 2019), https://www.api.org/~/media/Files/Policy/Fuels-and-Renewables/2019/RIN-market-paper.pdf; Comment of the National Association of Convenience Stores (NACS) and the Society of Independent Gasoline Marketers of America (SIGMA) (Aug. 21, 2018), EPA-HQ-OAR-2018-0167-0523.

[29] *E.g.*, 84 Fed. Reg. at 10,607 ("[C]ommenters have argued that a small number of sophisticated market participants control a large number of 'surplus' RINs that they hoard and use to squeeze the market."); *id.* at 10,609 ("The fundamental concept underpinning [Reform One] is that increased transparency can help deter market actors from amassing an excess of separated RINs, which due to the concentration in ownership of available supplies could result in undue influence or market power."); *id.* at 10,615 ("We believe [Reform Two] could potentially help minimize opportunities for hoarding or other behavior that could negatively impact the RIN market."); *id.* at 10,618 ("The goal of [Reform Three] is to minimize the number of parties trading RINs so as to reduce the risk of hoarding or other actions by non-obligated parties that could improperly impact the prices of RINs and thus impact the cost of compliance for obligated parties."); *id.* at 10,620 ("The potential anti-competitive behavior related to non-obligated parties holding RINs that would be avoided with [Reform Four] is the potential to accumulate enough RINs to gain market power and then use that market power to manipulate the price of RINs.").

properly distinguishes this behavior from the act of "withhold[ing] separated RINs from the market until the price is high enough to secure a large profit," which EPA does not consider inherently problematic.[30] The NPRM provides no other examples of manipulative or anti-competitive behavior that its proposed reforms might address.[31] So the only problem the NPRM invokes to justify the proposed changes to the RIN market is that of price-manipulative hoarding.

At the same time, however, the NPRM candidly acknowledges that EPA "ha[s] yet to see data-based evidence of RIN market manipulation." 84 Fed. Reg. at 10,607; *accord id.* at 10,586; *see also id.* at 10,610 (noting "insufficient evidence of any identified parties currently exhibiting what might be considered excessive market power"); EPA 2017 Point of Obligation Denial, *supra* note 30, at 38 ("EPA has not seen evidence manipulation in the RIN market . . . ."). This is not for lack of trying. On two prior occasions, EPA has solicited comments on whether it should reform the RIN market to allay purported manipulation concerns. 84 Fed. Reg. at 10,607-08; *see* 83 Fed. Reg. 32,024, 32,027 (July 10, 2018); 82 Fed. Reg. 34,206, 34,211 (July 21, 2017). Both times the evidence of manipulation came up short. *See* 84 Fed. Reg. at 10,607 (confirming that, even after both sets of comments, EPA "ha[s] yet to see data-based evidence of RIN market manipulation"); *see also id.* at 10,586, 10,610. None of the principal commentators supporting market reform identified any evidence beyond pure speculation that manipulation is actually taking place. *See, e.g.*, Comment of the Valero Energy Corporation 35 (Aug. 17, 2018), EPA-HQ-OAR-2018-0167-1041 (asserting without citation or analysis that hoarding "remains a real and costly issue"); Comment of Monroe Energy, LLC 33 (Aug. 22, 2018), EPA-HQ-OAR-2018-0167-0622 (relying on the assumption that any changes in RIN prices can be attributed only to unlawful manipulation, without acknowledging that other regulatory changes by EPA can impact the demand for RINs). In addition, a separate petitioning process prompted EPA to conduct its own "extensive analysis of RIN prices and market dynamics," 84 Fed. Reg. at 10,607, from which it concluded that "the current RIN market does not appear to be subject to significant manipulation" and that current RIN prices do not "reflect successful efforts by some parties to artificially inflate RIN prices," EPA 2017 Point of Obligation Denial, *supra* note 30, at 38-39. Finally, out of an abundance of caution, EPA engaged the U.S. Commodity Futures Trading Commission ("CFTC") to investigate potential RIN market manipulation.[32] Based on the data

[30] *Id.* at 10,621; *see also id.* at 10,608-09 ("[P]arties that make a profit on the RIN market are not necessarily conducting manipulative or anti-competitive behavior and may very well be increasing market efficiency and liquidity with their actions."); *id.* at 10,619 ("[S]imply making a profit on the RIN market is not manipulative or anti-competitive behavior."); EPA, *Denial of Petitions for Rulemaking to Change the RFS Point of Obligation*, No. EPA-420-R-17-008, at 38 n.115 (Nov. 2017) [hereinafter "EPA 2017 Point of Obligation Denial"] ("Speculation is a normal part of the market. Market participants that *speculate* on future supply or demand, and therefore prices, aren't doing anything wrong. In fact, this helps the market ensure that the future demand is met at the lowest overall price possible.").

[31] Although the NPRM also describes "false or misleading representations in transactions" as potentially manipulative or anti-competitive, 84 Fed. Reg. at 10,608, that behavior has no apparent relationship to the proposed reforms. The same is true of commentators' expressed concerns that "thin market volume, opaque price signals, and inelastic demand and supply curves" have "ma[d]e the RIN market vulnerable to [unspecified] anti-competitive behavior." *Id.* at 10,607.

[32] 84 Fed. Reg. at 10,607; *see Memorandum of Understanding Between the Environmental Protection Agency and the Commodity Futures Trading Commission on the Sharing of Information Available to EPA Related to the*

available, CFTC was "not able to find any misbehavior in the market."[33] Perhaps more importantly, the NPRM also identifies no reason to suspect that unlawful price manipulation will "tak[e] root in the future." 84 Fed. Reg. at 10,624.

These findings—or the lack thereof—are dispositive. As a matter of both administrative law and common sense, agencies should not implement sweeping, untested regulatory changes to address problems that do not exist. "Professing that an order ameliorates a real industry problem but then citing no evidence demonstrating that there is in fact an industry problem is not reasoned decisionmaking." *Nat'l Fuel Gas Supply Corp. v. FERC*, 468 F.3d 831, 843-44 (D.C. Cir. 2006) (Kavanaugh, J., for the court) (citing *Motor Vehicle Mfrs. Ass'n of U.S., Inc. v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29, 42-43 (1983)).

B. At Most, Enhanced Public Disclosure (Reform 1) and Monitoring Are Appropriate at This Time.

The NPRM proposes a public disclosure regime designed to alert the public when a market participant's RIN holdings exceed certain thresholds. 84 Fed. Reg. at 10,610. The NPRM also proposes alternatively that EPA could use a lower threshold for non-obligated parties, in which case the lowered public-disclosure threshold for non-obligated parties would replace the significant limitations on non-obligated parties' RIN trading proposed by Reforms Three and Four. *Id.* at 10,612. Finally, the NPRM proposes "taking additional steps to enhance [EPA's] market monitoring capabilities in order to better detect market manipulation." *Id.* at 10,622.

"[I]n the face of insufficient evidence of any identified parties currently exhibiting what might be considered excessive market power," it is Growth Energy's view that no public disclosure thresholds are appropriate right now and that the only possible "appropriate first action" may be the collection of additional data to determine whether a problem actually exists. *Id.* at 10,610.

That said, insofar as EPA determines that *some* additional measures are warranted to deter potential RIN price manipulation, Growth Energy strongly supports EPA's proposed alternative one-percent disclosure threshold rather than Reforms Two, Three, and Four. As EPA recognizes, these proposals entail operational costs for both the parties and EPA. *See id.* ("A real risk exists of setting a RIN holding threshold in this rulemaking incorrectly. If a threshold is set too low, it could unnecessarily compromise market efficiency and liquidity and interfere with obligated parties' ability to comply with regulations by disincentivizing them from holding the

Functioning of Renewable Fuel and Related Markets (Mar. 2016), https://www.epa.gov/sites/production/files/2016-03/documents/epa-cftc-mou-2016-03-16.pdf.

[33] CFTC Chairman J. Christopher Giancarlo, Testimony before the United States Senate Committee on Agriculture, Nutrition, and Forestry (Feb. 15, 2018), at 1:03:40, https://www.agriculture.senate.gov/hearings/state-of-the-cftc-examining-pending-rules-cryptocurrency-regulation-and-cross-border-agreements.

necessary quantity of RINs to meet their" RFS obligations.). But those costs would be dwarfed by the market-distorting effects of the other proposed reforms, as discussed below.

Thus, to the extent that EPA takes any action, it should first implement enhanced disclosure requirements or third-party monitoring along the lines proposed. Any such enhancements should collect information about contractual affiliates only if absolutely necessary, and only if EPA treats that information as the highly confidential business information that it is. Once EPA has a sufficient set of additional data, that data may inform its assessment of the risk of market manipulation and the need for more restrictive measures. As EPA has noted, it "could follow up with more restrictive measures later if warranted." *Id.*

C. The Proposed Trading Constraints (Reforms 2-4) Would Not Prevent Manipulation and Would Actively Harm the RIN Market.

Even if RIN price manipulation were a documented problem, the proposed restraints on trading would fail meaningfully to address it. For example, although the proposed trading constraints would severely curtail the ability of non-obligated parties to participate in the RIN market, they would leave obligated parties just as free to hoard as they are now.[34] And the only newly proposed constraint on obligated parties—quarterly compliance—would have no effect on price manipulation at all. These features render the proposals doubly ineffective.

The proposals would also be actively harmful. Non-obligated parties serve critical liquidity-enhancing functions that the NPRM would eliminate. And forced retirement of unsold RINs at the end of every quarter would make it harder for obligated parties to achieve RFS compliance. Because these proposals entail serious costs but no discernable benefits, they should be rejected.

1. *Excluding Non-Obligated Parties from the D6 RIN Market (Reform Three) Would Decrease Liquidity and Increase Volatility, Without Preventing Manipulation*

The NPRM's most drastic proposal would prohibit large numbers of non-obligated parties from purchasing separated D6 RINs. The only exceptions would be non-obligated parties who (1) are corporately or contractually affiliated with an obligated party; (2) are replacing invalid RINs; or (3) are exporting renewable fuel and thus must acquire and retire RINs as though they were obligated parties. 84 Fed. Reg. at 10,619-20. By design, this proposal purports to "block market traders and brokers whose only intention is to make a profit." *Id.* at 10,619.

a. This proposal would improperly reverse decades of EPA policy favoring open RIN markets. When EPA designed the RIN market in 2007, it specifically rejected the proposal

[34] To the extent EPA determines that the public disclosure provision may discourage such hoarding, that proposal could be enacted without imposing the substantive constraints.

to exclude non-obligated parties, without whom the RIN market could not function. *See* 72 Fed. Reg. 23,900, 23,944 (May 1, 2007). EPA's grounds for that decision remain equally valid today.

First, EPA correctly determined that allowing open trade with non-obligated parties is the only way to achieve the requisite level of RIN-market liquidity. *See id.* Liquidity in the RIN market is essential to the RFS program. Because obligated parties "do not generally produce or blend renewable fuels at their facilities," they can comply with RFS standards only by purchasing separated RINs. *Id.* at 23,937; *accord id.* at 23,944 ("[O]bligated parties are typically not the ones producing the renewable fuels and generating the RINs, nor blending the renewable fuels into gasoline, so there is a need for trades to occur between obligated parties and non-obligated parties."); 84 Fed. Reg. at 10,618 ("[O]bligated parties are typically dependent on the action of other parties, such as renewable fuel producers and blenders, to actually introduce the renewable fuel and the RINs into the marketplace."). When liquidity is lower—that is, when there are fewer market participants and a lower frequency of trading—it is by definition "more difficult for RINs to eventually be transferred to the obligated parties that need them." 72 Fed. Reg. at 23,944. EPA thus determined that "the trading structure must maximize the fluidity of those RINs." *Id.*

To that end, EPA made the express determination to allow RIN trades by non-obligated parties whose only intention is to make a profit. *Id.* ("Allowing other parties, *including brokers*, to own and transfer RINs may create a more fluid and free market that would increase the venues for RINs to be acquired by the obligated parties that need them." (emphasis added)). By serving as market intermediaries, these non-obligated parties increase liquidity across multiple dimensions. They allow parties to buy and sell RINs in a timely fashion, without the transaction costs associated with waiting for a counterparty. And they enable the buying and selling of RIN quantities that would otherwise be unmarketably small or large. *See* 84 Fed. Reg. at 10,619 (describing the "many" commentators who explained that "some parties without a compliance obligation alleviate the burden on the seller of finding a counterpart willing to buy the exact amount of RINs for sale at that exact time. They do so by aggregating small RIN bundles for large buyers, disaggregating large RIN parcels for sale to multiple buyers, and holding RINs until the parties are ready to buy."); *see also* Comment of ACT Commodities 2 (Aug. 22, 2018), EPA-HQ-OAR-2018-0167-0615. Absent intermediaries of this kind, many parties with excess RINs might be unable to find willing buyers, and thus "might opt not to transfer their RINs at all rather than participate in the RIN market." 72 Fed Reg. at 23,944.

Second, EPA determined that a wide RIN market with as many participants as possible would not negatively affect market volatility. *Id.* In fact, a more open market is beneficial: "especially in a market as sensitive to policy announcements as the RIN market, higher participation can reduce volatility and help the market adjust to a policy or other shock more quickly than curtailed participation." 84 Fed. Reg. at 10,619 (characterizing comments); *accord* Comment of ACT Commodities, *supra*, at 2. A larger number of market participants means a greater range of risk tolerances and a price points among prospective trade partners. This dynamic smooths the market's response to shocks by increasing the frequency of parties willing to trade at or near equilibrium prices.

Finally, EPA correctly determined that allowing trade by non-obligated parties would actually *reduce* the risk of market manipulation. "[B]y expanding the number of parties that can hold RINs, we minimize the potential for any one party to exercise market power." 72 Fed. Reg. at 23,944. EPA also found the risk of hoarding implausible, given that "RINs have a limited life and new RINs will be generated and will enter the market continuously." *Id.*

The NPRM does not explain why a nearly opposite policy might now be appropriate.[35] For example, the document does not purport to abandon EPA's determination that "the trading structure must maximize the fluidity of . . . RINs," 72 Fed. Reg. at 23,944, but neither does it explain how ejecting most participants from the market would be consistent with that directive. Likewise, although the NPRM asserts that profit-seeking intermediaries "serve no function in the fuels market," 84 Fed. Reg. at 10,620, it fails to reconcile that assertion with its previous finding that profit-seeking intermediaries play important trade-facilitating roles. 72 Fed. Reg. at 23,944. Nor does the NPRM respond to comments emphasizing the proposal's negative effects on liquidity and volatility. 84 Fed. Reg. at 10,619. And the NPRM does not acknowledge EPA's previous, seemingly dispositive judgment that the best way to prevent RIN price manipulation is to *expand*, not contract, "the number of parties that can hold RINs." 72 Fed. Reg. at 23,944. These gaps in reasoning portend that Reform Three would have "negative unintended consequences." 84 Fed. Reg. at 10,618.

b. Nor would the proposal accomplish its goal of preventing RIN-market manipulation. On the contrary, the proposal would merely concentrate any opportunity for manipulation in the hands of obligated parties or their affiliates. And any other would-be manipulators could evade its restrictions by becoming obligated parties or affiliates.

The NPRM seems to assume that, in the unlikely event that RIN price manipulation is both possible and profitable, non-obligated parties would be the only ones to take advantage. But there is no reason to expect that to be true. To the contrary, obligated parties would be equally incentivized and permitted to "warehouse" excess RINs to artificially suppress supply.[36] The same would be true for the other entities that the NPRM exempts from this restriction: "corporate affiliates" of obligated parties (defined as those owned at least 20 percent by an obligated party or owning 20 percent of an obligated party), and "contractual affiliates." 84 Fed. Reg. at 10,619-20. This proposal does nothing to address any purported manipulation that obligated parties or their corporate or contractual affiliates could be engaged in. For instance,

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[35] *See, e.g., FCC v. Fox Television Stations, Inc.*, 556 U.S. 502, 515-516 (2009) ("An agency may not . . . depart from a prior policy *sub silentio*" and, if the new policy "rests upon factual findings that contradict those which underlay [the] prior policy" or "has engendered serious reliance interests," then "a reasoned explanation is needed for disregarding facts and circumstances that underlay or were engendered by the prior policy").

[36] Merchant refiners might claim that they would not have incentive to drive up RIN prices because of the effect that has on their RIN obligations. EPA has already rejected this claim by finding that merchant refiners pass through their RIN costs through higher blendstock pricing. *See* EPA 2017 Point of Obligation Denial, *supra* note 30, at 23. But even accepting the proposition, it would not apply to integrated refiners that separate more RINs than they are obligated to retire, or to merchant refiners to the extent that the profit from the purported manipulation exceeds the effect on their obligation.

EPA states that the term "contractual affiliates" includes "traders" that supply obligated parties with RINs. 84 Fed. Reg. at 10,620. But that runs counter to the stated purpose of the restriction to prevent "traders" from being able to purchase RINs. *See id.* More generally, if there is financial incentive to engage in such manipulation, there is every reason to believe that at least some of these entities would take advantage, whether by acquiring the market-manipulating operations of other businesses or developing their own. Providing these entities with a monopoly on the ability to profit from market manipulation would not achieve the goal of preventing market manipulation.

And that is all before considering the possibility that non-obligated parties that are not corporate or contractual affiliates would reorganize to avoid the NPRM's restrictions. The NPRM acknowledges this concern when it notes that the proposed reform "could create strong incentives for non-obligated parties to become obligated parties"—which could be achieved "relatively easily by importing a small volume of fuel or blending small volumes of blendstock to produce fuel." 84 Fed. Reg. at 10,620. Similarly, the NPRM notes that "a non-obligated party could create a contract with an obligated party at a minimum level as a way to game this reform." *Id.* The NPRM provides no answer to these conundrums, and for good reason: there is none. EPA could not detect "gaming" simply by monitoring for obligated parties or affiliates with "a minimal level" of fuel. For whatever level EPA set as "minimal," market participants could subvert such monitoring by increasing their volumes just above that level or by becoming an obligated party.[37] Non-obligated parties might take such an action because they genuinely believe the contract to be a worthwhile business transaction on its own, because they want the flexibility to trade RINs but without any intent to manipulate the market, because they want to manipulate the market, or some combination of the three. EPA could not discern the intent behind such market transactions or contracts, and it should not put itself in the unworkable position of having to try.

At bottom, there is no basis to believe that price manipulation is a problem, and no basis to believe that, if it were a problem, this proposal would provide any kind of solution. It would not stop manipulation by those exempted from it, and it would not stop non-exempt entities from becoming exempt. On the other hand, there is an ample basis to conclude that the proposal would harm the RIN market and put EPA in an unworkable position. EPA therefore should not proceed with this proposal.[38]

[37] Because as currently proposed, the NPRM applies a duration limit to all non-obligated parties, including corporate or contractual affiliates, in practice it may be easiest for the entity to become an obligated party and thereby avoid all restrictions on non-obligated parties.

[38] As an alternative approach to this proposal, the NPRM seeks comment on imposing position limits on non-obligated parties. *See* 84 Fed. Reg. at 10,620. While such a reform might have fewer negative consequences than the primary proposal, it also should not be adopted at this time given the absence of evidence of manipulation.

2. *Prohibiting Non-Obligated Parties from Increasing Their Quarterly D6 RIN Holdings (Reform Four) Would Further Depress Liquidity Without Preventing Manipulation*

If enacted, the NPRM would additionally restrict non-obligated parties' ability to participate in the RIN market: At the end of every quarter, each non-obligated party would have to sell or retire D6 RINs equal to the number of D6 RINs that party acquired during the same period. 84 Fed. Reg. at 10,620. Because many non-obligated parties would be prohibited from purchasing D6 RINs entirely (as discussed above), this proposal would apply only to non-obligated parties who are exempt from that rule or who can separate their own RINs by blending them.

This proposal, too, would have serious adverse effects while failing to accomplish its intended goal.

For one, the proposal would leave non-obligated blenders with so little flexibility that their participation in the market would become functionally impossible. The NPRM recognizes that too short of a holding period would create problems for non-obligated blenders, as "a fuel blender with separated RINs to sell may not be able to find a party willing to buy those RINs at the time of blending." *Id.* at 10,621. EPA offers the calendar quarter as an appropriate period, but the NPRM fails to recognize that the period it proposes would not always be a calendar quarter, and that its proposal would create the very problem it seeks to avoid. Under EPA's proposal, a non-obligated blender would not have three months to sell its RINs; it would only have the time between the date of acquisition and the end of that calendar quarter. Thus, if the blender acquired a RIN on May 15, it would only have 45 days to sell it; if it acquired the RIN on June 29, it would have to sell the next day. As EPA states, this "could take too much flexibility away from non-obligated parties and make it difficult for them to participate in the RIN system." *Id.* Blenders holding a RIN balance when the proposed rule took effect might still have some flexibility because they could sell those RINs earlier in the quarter, in anticipation of future blending. But because a blender's volumes may vary, this flexibility would be imperfect; the blender would not necessarily be able to predict exactly how many RINs it would acquire in a given quarter and thus how many it would need to sell in advance. Moreover, EPA should not adopt a regime that advantages or disadvantages market participants based on the happenstance of whether they have RINs before the new rule takes effect.

The consequences of these dynamics are far from clear but may lead to significant market distortion. The structure may give non-obligated blenders a disincentive to blend as quarter end approaches (raising questions about whether this could affect the retail gasoline market as a whole). At a minimum, it would put obligated parties in a position of market power over blenders because blenders would need to sell their RINs by the end of the quarter.[39]

[39] In theory, a non-obligated party might attempt to avoid this predicament by entering into an indefinite quantity contract in which the obligated party agrees to purchase the total volume of D6 RINs, whatever it happens to be. But even this solution is market distorting: in that case, the proposal merely hands unilateral market power to the

Contrary to the NPRM's suggestion, the proposed quarterly RIN retirement rule for obligated parties (Reform Two) would not alleviate this problem because the reforms are asymmetric. For example, under the proposed rules, obligated parties need only retire 80 percent of their annual obligation during the first three quarters of the year. 84 Fed. Reg. at 10,615. Obligated parties are also free to carry over quarterly deficits and can hold an unlimited number of RINs as a buffer. *Id.* at 10,616, 10,626 (proposed 40 C.F.R. § 80.1428(b)(2)(ii)). And obligated parties need not meet quarterly compliance obligations until two months after the quarterly deadline. *Id.* at 10,627. None of these flexibilities are available to non-obligated parties endeavoring to sell end-of-quarter RINs.

The proposal's grandfathering would create additional market distortions. As the NPRM recognizes, the proposal and its variants "would allow a non-obligated party to maintain the RIN holdings it would have on the day before the effective date of this reform." *Id.* at 10,622. In essence, the RIN balance at the start of the rule could be rolled forward in perpetuity or drawn down, but it could never be built up after the rule becomes effective. The NPRM recognizes—but does not solve—one market distortion that will result: the grandfathering would "incentivize non-obligated parties to build up their RIN holdings in advance of the final rule effective date, which would be counter to the goal of this reform." *Id.* In effect, EPA's speculative concern about the possibility of hoarding would lead EPA to enact a reform that it knows *will* lead to hoarding. This is not a reasonable approach.

A second market distortion goes unmentioned in the NPRM: the proposal would create a disincentive to new non-obligated parties entering the market. Would-be entrants would by definition have had no RIN holdings at the time the proposal became effective, meaning that their maximum D6 RIN holdings at each quarter's end would be zero. This would put new entrants at a disadvantage compared to pre-existing non-obligated parties with grandfathered RIN caps in excess of zero. The NPRM thus again is likely to create actual market distortions because of speculative fears of existing ones.

Ultimately, non-obligated blenders would be encouraged to become obligated parties to avoid the proposal's restrictions—thus rendering the proposal toothless. EPA acknowledges this possibility in the NPRM, writing that "non-obligated parties who want to evade the duration limit for holding separated RINs could easily take the minimal action necessary to become an obligated party." *Id.* at 10,621. But the NPRM has no proposed solutions, and it in fact understates the problem. The difficulty is not just that "gaming" "could harm the integrity of the program if done widely" and "could increase the implementation and oversight burden on EPA." *Id.* The problem is that the proposal, like the one discussed above, actually would incentivize the targets of the proposal to restructure themselves to become obligated parties, and at that point, would not prevent any manipulation in which those targets might engage. Thus, the proposal may distort the market as regulated parties contort themselves to avoid it, but it will not serve its

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obligated party to dictate the terms of the indefinite quantity contract. After all, the non-obligated party has no choice but to sell its RINs before the quarterly deadline.

stated goal of preventing manipulative hoarding. EPA should not proceed with this proposal, either.

3. *Requiring Obligated Parties to Demonstrate Quarterly RIN Compliance (Reform Two) Would Impose Unnecessary Burdens for No Discernable Benefit*

The last proposed trading constraint would govern obligated parties, and require them to demonstrate compliance by retiring RINs on a quarterly basis in addition to an annual one. *See* 84 Fed. Reg. at 10,615.

EPA recognizes that whether this proposal would ultimately be beneficial is unclear. *See id.* at 10,615. Indeed, this proposal would not by itself prevent market participants from "hoarding" separated RINs; it would merely prevent obligated parties from acquiring their RINs all at once during the last quarter of the year. So to the extent annual retirement obligation creates "manipulative" market power, that same manipulation would repeat four times a year, just on a smaller scale. *Id.* at 10,615 ("Even though the magnitude of the obligation would be roughly decreased by a factor of four, sellers with excess RINs beyond their quarterly retirement requirements could still exercise power over the RIN market—now several times throughout the year before each quarterly deadline instead of just once annually."). And because "market power is relative," "a smaller stockpile of RINs in a party's account relative to a smaller pool of available RINs can still result in market power." *Id.* "Therefore, the ultimate benefit of this reform on the RIN market and on parties' behavior is unclear." *Id.*

Although EPA advocates this reform as a means to counteract the liquidity-reducing effect of the duration limit for non-obligated parties (Reform Four), that duration limit is itself a flawed policy that should not be implemented in the first place (as discussed above). And as further discussed above, any mitigating effect is unlikely to materialize given the inherently asymmetric flexibilities that obligated parties enjoy at the quarterly compliance stage compared to their non-obligated counterparts.

Despite bringing no identifiable benefit, quarterly retirement obligations would burden both EPA and the industry by quadrupling the transaction costs associated with ensuring annual compliance. This regulation also should not come into effect.

Exhibit List

Growth Energy Comments on EPA's Proposed Modifications to Fuel Regulations To Provide Flexibility for E15; Modifications to RFS RIN Market Regulations

Docket # EPA–HQ–OAR–2018-0775

Exhibit Number	Title of Exhibit
1	*Review of U.S. EPA's Analysis of the Emissions Impacts of Providing Regulatory Flexibility for E15*, Trinity Consultants, J. Lyons (Apr. 29, 2019)
2	Sheetz, Inc. Comment Letter on Proposed Rule, M. Lorenz, Executive Vice President of Petroleum Supply (Apr. 29, 2019)

Growth Energy Comments on EPA's
Proposed Modifications to Fuel Regulations To Provide Flexibility for E15; Modifications to RFS RIN Market Regulations

Docket # EPA–HQ–OAR–2018-0775

Exhibit 1

Review of U.S. EPA's Analysis of the Emissions Impacts of Providing Regulatory Flexibility for E15

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SUMMARY

On March 21, 2019, the U.S. Environmental Protection Agency (EPA) published a Notice of Proposed Rulemaking addressing modifications to fuel regulations to provide flexibility for E15.[1] The proposed flexibility for E15 blends involves extending the current 1 pound per square inch (psi) RVP tolerance available for E10 blends[2] to E15. More specifically, the proposed E15 flexibility provisions would revise the current maximum allowable summertime RVP limit of 9 psi for E15 to 10 psi, the same limit that applies to E10 blends.

EPA has proposed, among other things, to modify its interpretation of Clean Air Act section 211(h)(4) as applying the 1.0 psi RVP tolerance to gasoline ethanol blends of 10% or more, and also to update its interpretation under section 211(f)(1) of what is "substantially similar" ("sub sim") to certification fuel utilized in certification to include E15 at 10.0 psi. Specifically, EPA is proposing to find that E15, whether with an RVP of 9 or 10 psi, is substantially similar to the E10 fuel used in the certification of Tier 3 vehicles (which has an RVP specification of 9 psi).

EPA's emissions analysis is comprised of (1) an evaluation of whether E15 is sub sim to E10 certification fuel; and (2) a discussion of the overall impact of the proposed rule. First, in analyzing whether E15 is substantially similar to E10 certification fuel, EPA evaluated the potential impacts of E15 relative to E10 on exhaust emissions, materials compatibility, and driveability. Overall, EPA found that the exhaust emissions impacts of E15 as compared to E10 would be slight, that there would be no impacts on driveability and materials compatibility, and that, consistent with its established practice, a fuel qualifies as sub sim if its volatility meets ASTM specifications. Based on this analysis, EPA concludes that E15 is substantially similar to E10 certification fuel. These findings are also consistent with those made previously by EPA in authorizing the use of E15 in model year (MY) 2001 and later vehicles.[3,4]

Second, regarding the overall emissions impacts of the rule with respect to evaporative emissions, EPA observed that E15 at 10 psi is *less* volatile than E10 at 10 psi, which is the fuel it would likely replace. Therefore, the proposed rule would lower the volatility of in-use gasoline and reduce evaporative emissions. In addition, EPA finds that the additional dilution associated with E15 relative to E10 will reduce evaporative emissions of benzene, a toxic air contaminant. With respect to exhaust emissions, relying on the EPAct models, EPA suggested that E15 blends may result in slightly lower CO emissions, which can play a role in ozone formation, and slightly higher NOx and PM emissions.

This report provides input regarding EPA's technical emissions analyses and conclusions that E15 is sub sim to E10 certification fuel, as well as the overall emissions impact of the proposed rule. The results of the review support EPA's overall findings that E15 is substantially similar to E10 certification fuel and that any impacts of the proposed rule on emissions will be, at most, small. This conclusion that E15 and E10 will have similar emissions effects applies to Tier 3

[1] 84 Fed. Reg. 10,584 – 10,630 (Mar. 21, 2019).
[2] See Section 211(h)(4) of the Clean Air Act.
[3] 75 Fed. Reg. 68,094 (Nov. 4, 2010).
[4] 76 Fed. Reg. 4,662 (Jan. 26, 2011).

vehicles certified using E10 as well as MY 2001 and later gasoline-fueled light-duty vehicles certified using E0. However, due to shortcomings in the EPAct study methodology on which EPA relies, this review also indicates that the small increases in exhaust emissions of some pollutants that EPA reports as possible from the proposed rule are less certain to exist than EPA asserts and may in fact not actually occur—EPA should acknowledge this uncertainty in the final rule. In addition, this review confirms that the reductions in general evaporative emissions as well as evaporative emissions of benzene and emissions of carbon monoxide that EPA suggests will in fact occur.

REVIEW OF EPA'S EMISSIONS ANALYSES

Exhaust Emissions

With respect to both its sub sim interpretive rule and the overall emissions impact of the proposed rule, EPA's analysis of the exhaust emission impacts of E15 relative to E10 relies heavily upon statistical models that were developed using vehicle emissions data collected as part of the "EPAct study." The EPAct study involved testing of 15 MY 2008 vehicles designed with port fuel injection systems (PFI) that were certified using Indolene fuel to Tier 2 emission standards on a suite of specially blended test fuels in order to determine the impact of changes in RVP (or Dry Vapor Pressure Equivalent, DVPE), ethanol and aromatic content, as well as the temperatures at which 50% (T50) and 90% (T90) of a fuel is evaporated.

Based on the statistical models derived from the analysis of EPAct emissions test data and test fuel properties, EPA concludes that the proposed rule could result in slightly lower emissions of carbon monoxide (CO), slightly higher emissions of oxides of nitrogen (NOx) and particulate matter (PM), and small but variable impacts on emissions of non-methane organic gases (NMOG) from vehicles in which E15 has been approved for use, as EPA reports in Table II.E-1. EPA characterizes these impacts as real but relatively small. EPA emphasizes the results from the EPAct statistical models over results from other studies that used different methodologies to evaluate E15's exhaust emissions impacts. The agency also cites results from the MOVES model, Complex Model, and Predictive Model as supporting the conclusions it draws from the EPAct models.[5] As discussed in more detail below, the exhaust emissions impacts of providing E15 flexibility through the proposed action will be at most small.[6] Further, given the results of

[5] EPA references the Complex Model and the Predictive Model as supportive of these conclusions regarding emissions increases and decreases; however, the ability of those models to accurately show emissions differences between E10 and E15 is limited or nonexistent. EPA developed the Complex Model as part of the Reformulated Gasoline regulations based on testing of vehicles representative of MY *1990* vehicle emission control technology for which use of E15 is not authorized. In addition, the test data used to develop the model were limited to ethanol gasoline blends of up to only E10. Similarly, the Predictive Model developed by the California Air Resources Board is based on test data from blends only up to E10 and addresses impacts from the entire light-duty vehicle fleet, including vehicles for which E15 has not been approved.

[6] It should be noted that the emission impacts presented by EPA from the EPAct models in Table II.E-1 apply only to the MY 2001 and later light-duty vehicles for which E15 use has been approved. The small emission changes noted in the table, even if accurate, should be viewed in light of overall emissions of these pollutants from *all* onroad vehicles, including those that cannot legally use E15 and therefore to which the emissions impacts do not apply. Depending on the pollutant and the year, the contribution of other vehicles to total on-road emissions varies but currently is generally on the order of 50% (NMOG, CO) to 75% (PM, NOx).

other studies and issues with the data that underlie the EPAct models, it is not clear that there will be, in fact, *any* increase in exhaust emissions of NOx, PM, or NMOG associated with the proposed rule.

There has been considerable debate regarding the basis for and performance of the EPAct models, which underlie the MOVES model. Major criticisms of the EPAct models relate to the design of the test fuel matrix for study; the way in which the test fuels were "match blended" in an effort to independently vary certain fuel properties; and the resulting properties of the test fuels, particularly their distillation curves and the amounts and types of aromatic compounds they contain relative to commercial fuels. In addition, EPA assumes that the emission results observed from testing of vehicles certified to Tier 2 standards will also apply to vehicles certified to Tier 3 standards.

Beyond the studies referenced by EPA in its assessment of the proposed rule, there are numerous notable publications that document the debate surrounding the EPAct models with respect to the emissions impacts of ethanol blends and that address issues pertaining to the exhaust emissions impacts of the proposed rule. These include the publications listed below.

- Anderson, J.E., et al., "Issues with T50 and T90 as Match Criteria for Ethanol-Gasoline Blends," Society of Automotive Engineers Technical Paper Series, Paper No. 2014-01-9080.

- Darlington, T.L., et al., "Analysis of EPAct Emission Data Using T70 as an Additional Predictor of PM Emissions from Tier 2 Gasoline Vehicles," Society of Automotive Engineers Technical Paper Series, Paper No. 2016-01-0996.

- Request for Correction of Information, submitted on behalf of the State of Kansas, the State of Nebraska, the Energy Future Coalition, and the Urban Air Initiative, Concerning the U.S. Environmental Protection Agency's EPAct/V2/E-89 Fuel Effects Study and Motor Vehicle Emissions Simulator Model (MOVES2014).[7]

- Agency Response to Request for Correction of Information Petition #17001 Concerning the EPAct/V2/E-89 Fuel Effects Study and the Motor Vehicle Emissions Simulator (MOVES2014), Developed by The USEPA Office of Transportation and Air Quality.[8]

- "California Multimedia Evaluation of Gasoline Ethanol Blends between E10 and E30, Tier 1 Report," Submitted by the Renewable Fuels Association and Growth Energy to the California Multimedia Working Group, February 14, 2019. (See excerpt in Appendix A.)

- Clark, N., et al., "Emissions from Low- and Mid-Level Blends of Anhydrous Ethanol in Gasoline," Society of Automotive Engineers Technical Paper Series, Paper No. 2019-01-0997.

[7] Available at https://www.epa.gov/quality/epa-information-quality-guidelines-requests-correction-and-requests-reconsideration#17001.
[8] Available at https://www.epa.gov/sites/production/files/2018-09/documents/ethanol-related_request_for_correction_combined_aug_31_2018.pdf.

These studies encompass evaluations of the impacts in MY 2001 and later vehicles, including Tier 2 and Tier 3 vehicles. One key concern with the basis for the EPAct models identified in the literature above is how the design of the study sought to independently assess the impacts of ethanol content and T50 on vehicle emissions. As is well-known and documented in detail in the references listed above, addition of 10% or 15% ethanol to a gasoline blend substantially reduces T50, which necessitates the addition of heavier, higher-boiling hydrocarbons to the gasoline if one seeks to restore T50 to its original value, as was the case in the EPAct study. The EPAct study also attempted to independently vary RVP/DVPE, aromatic content, and T90. Table 1 presents the correlation matrix for the EPAct test fuels. Values closer to 1 or -1 indicate greater positive or negative correlations between fuel properties, while values close to zero indicate no correlation. As shown in Table 1, fuels with higher ethanol content were correlated with T50 and DVPE. This is important because it means that statistical analysis of ethanol impacts on emissions using the EPAct data cannot be completely isolated from impacts actually associated with T50 or the changes to the base gasoline that were made in the attempt to hold T50 and DVPE as constant as possible. These correlations between variables can confound the analysis of data from emissions testing programs that seek to examine fuel-related effects, and this confounding is not necessarily eliminated by the type of statistical analysis performed to develop the EPAct statistical models. This is shown, for example, in the analysis presented by Darlington et al., where substitution of one distillation variable for another in a re-analysis of the EPAct data leads to the conclusion that E15—made by slash-blending ethanol and thus without other base gasoline adjustments to increase T50—will result in *reductions* in PM emissions, rather than the increase in PM emissions predicted by the EPAct models.

Table 1
Correlation Matrix for EPAct Test Fuel Design Variables

	EtOH	DVPE	T50	T90	Aromatics
EtOH	1.00	-0.10	-0.56	0.02	-0.04
DVPE		1.00	-0.30	0.13	0.05
T50			1.00	-0.04	-0.07
T90				1.00	-0.01
Aromatics					1.00

Given the above, there is reason to believe, as is discussed in detail by Anderson et al., that the EPAct study design caused emissions impacts due to changes in the base gasoline made in the attempt to hold other fuel properties, in particular T50, constant, and not due to the addition of ethanol itself to an otherwise unaltered blendstock. As noted by Clark et al., in normal practice it is not possible to add ethanol to a gasoline blendstock while keeping other properties, such as T50, constant. Finally, in the "real world," ethanol is splash-blended into gasoline blendstocks to make E15, and there is no reason to believe that refiners will seek to make adjustments to these blendstocks to hold distillation properties such as T50 constant. Accordingly, evaluating the effect of E15 while allowing properties such as T50 to vary is a more realistic representation of what will result in practice than the approach used to blend the fuels used in the EPAct study.

To put this in context, the primary effect of the proposed rule, at least in the near- to mid-term, will be that additional ethanol will be added to E10 fuels or to gasoline blendstocks designed for use with ethanol. As noted above, this "splash blending" will affect other fuel properties besides ethanol content and will have impacts on exhaust emissions. In the long-term, changes in blendstocks may be made to take advantage of, for example, the higher octane content of E15; those changes, however, will be made based on refinery economics, not as part of an effort to hold T50 and other fuel properties constant.

As noted above, the EPAct models are based on data from match-blended gasoline; however, EPA has used these models in an attempt to account for splash blending of E15 from E10 by estimating the RVP, T50, T90, aromatic, and ethanol content of resulting E15 fuels and found, as shown in Table II.E-1, that impacts on emissions will be small. However, given the issues raised above with the EPAct models, the agency should not ignore the results from studies other than EPAct, particularly those that have relied on splash blending to prepare test fuels as occurs in the real world.

As noted by Anderson et al., numerous studies based on splash blending have shown reductions in exhaust emissions of non-methane hydrocarbons (NMHC) and PM. In addition, the review and analysis of studies other than EPAct included in the California Multimedia Evaluation found no statistically significant impacts or statistically significant reductions in exhaust emissions of organics (e.g., NMOG), NOx, CO, PM, or potency-weighted emissions of air toxics (based on California risk factors) from E15 relative to either E10 or E0. Those findings are reported in Table 7 of that review and are reproduced below. Of particular note in that review is the wide range of vehicle model years and technologies spanned (MY 2001 to 2017 vehicles certified to California Air Resources Board [CARB] LEV I, LEV II, or LEV III, and/or EPA Tier 2 and Tier 3 standards using both PFI and gasoline direction injection [GDI] fuel systems) by the studies considered and the consistency of the assessment of the findings across those studies.

TAILPIPE EMISSIONS STUDIES ON E15 VERSUS EITHER E10 OR E0 AS BASE FUEL

Study Name	Test Cycle	No. of Vehicles	Vehicle Model Years	Base Fuel and Blending Strategy	NO_x	Organic Emissions	CO	PM mass emissions	Potency Weighted Toxics
DOE Intermediate Fuel Blends	LA-92	13	2001-2007	E10 splash blend	No significant difference	No significant difference	No significant difference	Not tested	Not tested
DOE Catalyst Study	FTP	24	2003-2009	E0 splash blend	No significant difference	No significant difference	↓	Not tested	Not tested
UC Riverside -1	UC and FTP	7	2007-2012	E10 match blend	No significant difference	No significant difference	No significant difference	No significant difference	No significant difference
UC Riverside -3	LA-92	5	2016-2017	E10 low aromatics splash	↓	↓	No significant difference	No significant difference	↓
UC Riverside -3	LA-92	5	2016-2017	E10 low aromatics match blend	No significant difference	No significant difference	No significant difference	No significant difference	No significant difference
UC- Riverside-3	LA-92	5	2016-2017	E10 high aromatics match blend	No significant difference	No significant difference	No significant difference	No significant difference	No significant difference
All Data (no. of datapoints for each pollutant in parentheses)	Various		2001-2017	Various	No significant difference (66)	NMHC:No significant difference (42) THC:No significant difference (29) NMOG:No significant difference (24)	↓ (66)	No significant difference (24)	No significant difference (22)

Source: Table 7, California Multimedia Evaluation of Gasoline Ethanol Blends between E10 and E30, Tier 1 Report.

Clark et al. also highlight the issues associated with the analysis of emissions data from match blending studies like EPAct. In addition, they note the difficulties in assessing the impacts of changes in fuels, such as moving to E15 from E10, given that impacts vary from vehicle to vehicle based on the relatively small changes in emissions differences in vehicle technology and calibration strategies, the generally low emissions levels from vehicles, and the actual properties of fuels on which the vehicles would operate.

In addition to the EPAct models, EPA discusses the Coordinating Research Council (CRC) E-94-2 and E-94-3 studies with respect to the impact of the proposed rule on PM emissions. These studies investigated the impacts of ethanol at levels up to E10 and PM Index on exhaust emissions from MY 2010 to 2015 vehicles with GDI engines certified to EPA Tier 2 and/or CARB LEV II and LEV III standards, and found only statistically significant impacts of ethanol on PM emissions. EPA then assumes that the impacts on PM emissions observed from ethanol up to the E10 level can be linearly extrapolated to E15; based on this assumption, EPA concludes that PM emissions from GDI vehicles on E15 would increase by 10% relative to E10. Although EPA's focus on GDA vehicles is appropriate, given their increasing prevalence in the market, there are currently no data supporting EPA's hypothesis that the emissions observed from ethanol up to E10 can be linearly extrapolated from E10 to E15.

In fact, another study performed by "CE-CERT" on MY 2016 and 2017 vehicles certified to CARB LEV III and/or EPA Tier 3 standards that is briefly discussed by EPA found no statistically significant effects of E15 on exhaust emissions of NOx, NMHC, or PM emissions relative to E10. EPA appears to critique the validity of the results because T50, a variable found to be important in the EPAct Study, varied due to the addition of ethanol and there was no effort made to control it as in the EPAct study; however, T50 will in fact vary in the splash blending scenario expected for actual fuels in the real world. EPA provides no explanation for why refiners would seek to compensate by reformulating the base gasoline to counteract the effects of splash blending ethanol on T50, and real-world experience with E10 contradicts such an approach. In particular, given that this study actually investigated E15 impacts using fuel blending strategies representative of real-world fuels, EPA should focus on the results of this study on PM emissions, rather than speculation based on the CRC E-94-2 and E-94-3 studies, which did not include actual testing of E15. At the very least, EPA should acknowledge that the existence of PM emissions impacts due to E15 relative to E10 is uncertain and could depend on whether characteristics such as T50 change due to the addition of ethanol or whether refiners would compensate for the impact of adding ethanol on such characteristics by altering the base gasoline formulation.

Overall, although all of the available data, including the EPAct study and related models, reasonably establish that the exhaust emissions impacts will be at most slight, there is reason to suspect that there will not actually be any negative emissions impacts associated with the proposed rule. Given this, EPA should at least acknowledge that there is a question of whether there will be any adverse impacts on NOx or PM emissions resulting from the proposed rule.

Evaporative Emissions

In assessing the overall emissions impacts of its proposal, EPA also performs an analysis of the potential impact of the proposed rule on evaporative emissions. In its analysis, EPA assesses the impacts of E15 relative to E10 on the following six main "components" of evaporative emissions:

1. Diurnal emissions;
2. Refueling emissions;
3. Hot soak emissions;
4. Running loss emissions;
5. Permeation; and
6. Unintended leaks.[9]

EPA first concludes that E15 will not impact evaporative emissions arising from permeation, hot soak, or unintended leaks relative to E10. The agency then discusses impacts on diurnal, refueling, and running loss emissions in the context of potential E15 RVP levels in comparison to E10 RVP levels.

With respect to summertime E15 blends made from the same gasoline blendstocks as E10 that is currently subject to the 1 psi RVP tolerance, EPA concludes that the proposed rule will likely have no impact and may in fact slightly *decrease* diurnal, refueling, and running loss emissions. This conclusion is based on data showing that the actual RVP level of E15 at 10 psi is 0.1 psi lower than E10 at 10 psi.

In addition, EPA finds that evaporative emissions of the Mobile Source Air Toxic benzene may also be lower with E15 due to the additional dilution of the gasoline blendstock relative to E10. EPA similarly concludes that E15 at 9.0 psi RVP will not impact evaporative emissions relative to E10 at 9.0 psi RVP, since the volatility is the same. EPA's analysis and findings in these regards are appropriate as it is well-known that RVP is the key factor in determining the magnitude of evaporative emissions arising from these sources.

In addition to the above, EPA considers the impacts of E15 at 10.0 psi RVP relative to E15 and E10 at 9.0 psi RVP (even though E10 is subject to a 1 psi tolerance and is thus sold in the summer at 10 psi). For purposes of the sub sim analysis, the agency appropriately proposes to leave unchanged its historical approach to RVP in its current substantially similar interpretive rule and find that E15 is sub sim so long as its RVP is within the ASTM range. The agency notes in passing that "increasing fuel RVP from 9.0 psi to 10.0 psi increases fuel vapor generation significantly under summertime conditions, which can overwhelm a vehicle's evaporative control system and push it out of compliance." This is a significant over-generalization, and EPA should clarify in the final rule the narrow conditions under which such a difference in volatility can significantly affect evaporative emissions. Actual evaporative emissions from a given vehicle will depend on a number of factors and may be lower than expected based on certification test results, particularly for MY 2001 and later vehicles for which

[9] 84 Fed. Reg. 10,599 (Mar. 21, 2019).

E15 use has been approved. Factors affecting emissions from a particular vehicle include the following:

- Actual ambient temperatures experienced by a vehicle compared to those used in certification testing;

- The actual time between driving events that purge stored vapors from the evaporative emissions control system compared to the multi-day diurnals involved in certification testing; and

- The evaporative emissions control technology on the vehicle, including compliance margins that vehicle manufacturers have engineered into evaporative emission control systems.

First, to the extent that ambient temperatures are lower than those associated with certification testing, vapor generation and evaporative emissions will be reduced. In addition, it is well-known that vapor generation rates of ethanol blends are lower than those of gasoline not containing ethanol—where both are held to the same RVP—at temperatures below 100°F.[10] In other words, the "volatility increase" resulting from blending ethanol at 10-15% in terms of RVP is determined at 100°F and the amount of the increase in volatility is lower at temperatures below 100°F. Furthermore, more frequent driving reduces the amount of vapor stored in evaporative emission control systems relative to that during certification testing, again leading to lower emissions, as do manufacturer compliance margins. Therefore, although higher RVP levels generally lead to higher evaporative emissions, it is far from given that operation of a specific vehicle on a 10 psi RVP ethanol blend under summer conditions will either overwhelm its evaporative emission control system or push it out of compliance with applicable emission standards. EPA should acknowledge that such conditions are limited.

Air Toxics Impacts

EPA's analysis focuses on evaporative emissions of benzene. However, the proposed rule does have the potential to impact emissions of other exhaust emission toxic species such as benzene; 1,3 butadiene; formaldehyde; and acetaldehyde. The overall impact of the proposed rule when assessed using appropriate weightings based on risk factors such as those available from EPA's Integrated Risk Information System (IRIS)[11] is expected to be slight. The reason for this is that increases in emissions of one compound, such as acetaldehyde (a relatively less potent air toxic), will be offset by decreases in others, such as benzene and 1,3 butadiene (which are more potent air toxics).

[10] Reddy, S.R., "Prediction of Fuel Vapor Generation form a Vehicle Fuel Tank as a Function of Fuel RVP and Temperature," Society of Automotive Engineers Technical Paper Series, Paper No. 892089, 1989.
[11] https://www.epa.gov/iris. The mid-point of the IRIS range for inhalation risk for benzene was used in this analysis.

Materials Compatibility and Driveability

EPA's sub sim analysis also addresses materials compatibility and driveability of E15 as compared to E10 certification fuel. EPA refers back to its analysis in the 2010 and 2011 E15 waiver decisions that thoroughly explained the agency's findings that E15 would have no issues with respect to materials compatibility and driveability.[12] With respect to materials compatibility, EPA also notes that vehicle manufacturers have been using E15 as part of the new-vehicle certification process since at least MY 2014 to demonstrate the durability of emission control systems to conclude that impacts on newer vehicles are even less likely to be an issue.[13] EPA similarly finds that manufacturers are designing vehicles for operation on E15 and that fuel producers are ensuring that E15 complies with ASTM D4814–18c fuel specifications.[14] Accordingly, EPA appropriately finds that "E15 would have similar driveability characteristics to Tier 3 E10 certification fuel."[15] These conclusions apply equally to MY 2001 and later light-duty vehicles, including Tier 3 vehicles, as EPA documented in its earlier decisions providing partial waivers for E15 use in MY 2001 and later vehicles.

EPA's findings and analysis are supported by the fact that E15 has been in commercial use for a considerable period of time without any reports of issues with respect to either materials compatibility or driveability. In addition, the California Multimedia Evaluation includes a review of issues that could arise from use of gasoline ethanol blends above E10 and concludes that no materials compatibility impacts are expected to arise.

Comments Regarding Scope of "Sub Sim" Determinations for E15

As demonstrated above, the available data indicate that E15 will result in at most small, if any, increases in some exhaust pollutants and lower evaporative emissions than E10 blends at the same RVP standard across a wide spectrum of vehicle vintages (from MY 2001 forward), technologies, and certification standard levels. Indeed, EPA already approved E15 for use in *all* MY 2001 and later vehicles based on a thorough analysis of the emissions, materials compatibility and driveability impacts of the fuel in its partial waiver decisions, which compared E15 (with 15% ethanol) to E0 (with no ethanol). As shown in the DOE Catalyst Study[16] on which EPA relied heavily for the partial waiver decisions, the impacts of E10 and E15 on exhaust emissions were essentially the same.

As such, and given the historical approach EPA has consistently taken to require that a sub sim fuel meet the general fuel volatility specifications in the ASTM standard, there is no basis for EPA to limit its sub sim finding to constrain use of E15 to Tier 3 vehicles. EPA can reasonably find that E15 is sub sim to E10 (or E0) in all MY 2001 and later light-duty vehicles.

[12] 84 Fed. Reg. 10,600 – 10,601 (Mar. 21, 2019).
[13] *Id.* at 10,600.
[14] *Id.* at 10,601.
[15] *Id.*
[16] https://info.ornl.gov/sites/publications/Files/Pub31271.pdf.

Appendix A

California Multimedia Evaluation of Gasoline Ethanol Blends between E10 and E30, Tier 1 Report

Section 4, "Use of Gasoline-Ethanol Blends in Vehicles"

California Multimedia Evaluation of Gasoline-Ethanol Blends between E10 and E30
Tier I Report

Submitted to the Multimedia Working Group

February 14, 2019

I

4 Use of Gasoline-Ethanol Blends in Vehicles

As discussed in Section 1.2, since 2010, virtually all fuel sold in the United States, and all California RFG, has been E10 and few if any ill effects have been observed in the existing vehicle fleet. Given this, E10 is the appropriate basis for comparison with gasoline-ethanol blends in the E11 – E30 range. Since only

2001 and later model-year light-duty vehicles are approved to use gasoline-ethanol blends above E10 by U.S. EPA, older vehicles and non-vehicular engines, motorcycles, heavy-duty vehicles, as well as off-road vehicles such as boats and snowmobiles, which are prohibited by U.S. EPA from using higher ethanol content fuels are not considered here. Some portion of the flexible fuel vehicles (FFVs), which comprise between 5% and 10% of the on-road fleet (more than 20 million on the road in the United States[62]) that operate primarily on E10, may begin to operate on E15 and so may impact overall fleet emissions.

As is shown below, emissions and compatibility data related to the use of gasoline-ethanol blends above E20 in existing vehicles is limited. In addition, federal waivers allowing the use of blends above E15 would have to be granted by U.S. EPA in order to use blends above E15 in existing vehicles.

4.1 Vehicle Compatibility

4.1.1 Vehicle design

Virtually all new U.S. vehicles are warrantied for use with E15 (see Section 4.2) by the Original Equipment Manufacturers (OEMs) which ensures material compatibility of the fuel system and that all emissions requirements are met when new and at full useful life. However, to ensure that older vehicles are also compatible with higher gasoline-ethanol blends, two programs have tested relatively large numbers of older vehicles for extended times on E15 and E20. (There has been no significant published data on the use of E30 in recent-model or older vehicles.)

A study undertaken in 2006 at the University of Minnesota[63] included 40 pairs of vehicles, model years 2000-2006, with matched usage patterns. One of each pair used commercially available E0, while the second was fueled with E20, made from commercially available E10 splash blended with additional ethanol. During the test period, only two vehicles in the program had maintenance issues, with only one being fuel related, and that was in an E0-fueled vehicle. Thus, the data from this program suggest that these older vehicles would not have increased maintenance issues associated with the use of gasoline-ethanol blends above E10 and up to E20.

A far more intensive program[64], overseen by the Oak Ridge National Laboratory included 82 MY 2000-2009 vehicles. Eighteen vehicle models (each represented by three matched vehicles) were aged with E0, E15 and E20; five vehicle models (each represented by four matched vehicles) were aged with E0, E10, E15 and E20; and four vehicle pairs were aged with E0 and E15. The E0 was TOP-TIER^{TM}[65] retail E0 fuel, into which ethanol was splash blended to produce the other test fuels. Each vehicle was aged the equivalent of 50,000 to more than 100,000 miles on each test fuel. The testing was conducted at three different facilities, the Southwest Research Institute (SwRI), the Transportation Research Center (TRC) and Environmental Testing Corporation (ETC). ETC is located in the Denver area and was included to assess the potential for altitude related effects.

Unscheduled maintenance was recorded, and the affected equipment was removed and analyzed for potential fuel effects. Failures of certain components, including the transmission, spark plug and radiator which had no contact with the fuel, are not included here. Fuel system repairs that were required over the course of the testing included an evaporative emissions hose, believed to be made of nitrile rubber, which split on a 2002 Dodge Durango. No differences could be detected between the inside and the outside of

[62] https://www.afdc.energy.gov/vehicles/flexible_fuel.html, accessed August 23, 2018.
[63] Kittleson, D., A. Tan, D. Zarling, B. Evans, C. Jewitt, Demonstration and Driveability Project to Determine the Feasibility of Using E20 as a Motor Fuel, November 2008.
[64] West, B., Sluder, C.S., Knoll, K., Orban, J., Feng, J., Intermediate Ethanol Blends Catalyst Durability Program, ORNL/TM-2011/234, February 2012.
[65] TOP-TIER^{TM} is a fuel quality specification created and enforced by automakers. It is primarily intended to ensure that the fuel includes adequate level of detergents to avoid deposits on critical engine parts. More information can be found on the program website: www.toptiergas.com.

the hose, so the failure was attributed to general aging, rather than fuel effects. Two fuel pumps in 2006 MY vehicles (plus a fuel pump and a fuel level sender in a 2000 MY vehicle) were replaced when they failed, although the researchers determined that the failures were unrelated to fuel. In addition, all three (E0, E15 and E20) 2006 Chevrolet Impalas experienced canister vent solenoid failures.

Finally, a tear-down study[66] of the engines in eighteen of the vehicles (six makes and models from the model years 2006 to 2008, each run on E0, E15 and E20) showed an increase in intake valve deposits (IVD) in the E15 vehicles, relative to the E0 vehicles. The vehicles aged with E20 also showed an increase relative to both E15 and E0, although the results were not as consistent.
The authors hypothesize that the increase was due to the dilution of the normal detergent additives which are present in TOP TIER™ gasoline. However, these deposits were not found to result in either operational problems or increases in emissions.

Evaporative emission canister working capacities showed a slight decreasing trend with higher concentration ethanol blends for one-third of the six different models. The emissions systems of the eighteen aged vehicles were pressure checked, and all were found to have maintained their integrity. No fuel related differences were found in valve seat width, valve surface contours, fuel tanks, fuel lines and evaporative emissions lines. Fuel injector flow rates were equivalent to within +/- 3%. There were no statistically significant differences in oil consumption attributed to the ethanol level in the fuel.[67]

Emissions were measured using EPA certification E0 fuel on all vehicles at the start of the project, at one or two points, and at the end of scheduled aging. No discernible difference in aging effects from the different fuels could be found except that on those vehicles tested by ETC which showed slightly less catalyst deterioration with higher ethanol blends. One hypothesis suggested by the researchers was that the sulfur content of the fuel was lowered as the result of dilution by ethanol as the ethanol level increased, although this impact was not seen in other vehicle sets. Largely based on these test results, which showed no degradation in emissions at gasoline-ethanol blend levels up to E20, EPA has permitted the use of gasoline-ethanol blends of up to E15 in all 2001+ MY vehicles.

The CRC has conducted studies focused on finding and testing vehicles and components suspected of being most susceptible to damage from E15 and E20. One pump, identified only as Pump N, was shown to have a greater failure rate with E15 in comparison to standard E10.[68] However, confidentiality rules which limit CRC's ability to divulge the make and model of the pump, as well as the materials of which it is made, limit the usefulness of this information to the general scientific community.

In addition, the Minnesota Center for Automotive Research conducted a 30-day static soak test[69] followed by 4000-hour endurance tests[70] for eight different models of fuel pumps and three different models of sending units[71] using E20, E10 and E0 (a total of 24 pumps and 9 sending units). No fuel effects were identified during the soak test, but during the 4000 -hour endurance testing, four pumps out of the twenty-four failed – two using E10 and two using E0. The commutators[72] of several of the pumps tested in E0 wore substantially more than those tested in either E10 or E20. No evidence of negative effects of use of E20 on fuel pumps was found. All of the sending units failed during the 4000-hour endurance testing,

[66] Shoffner, B., Johnson, R., Heimrich, M., Lochte, M., Powertrain Component Inspection from Mid-Level Blends Vehicle Aging Study, ORNL/TM-2011/65, November 2010.
[67] West, B., Sluder, C.S. "Lubricating Oil Consumption on the Standard Road Cycle", SAE Technical Paper No. 2012-01-0884.
[68] CRC, Durability of Fuel Pumps and Fuel Level Senders in Neat and Aggressive E15, CRC Contract No AVFL-15a, January 2013.
[69] Mead, G., B. Jones, P. Steevens, N. Hanson, T. Devens, C. Rohde, A. Larson, The Effects of E20 on Automotive fuel Pumps and Sending Units, Minnesota Center for Automotive Research, February 21, 2008.
[70] Mead, G., B. Jones, P. Steevens, N. Hanson, J. Harrenstein, An Examination of Fuel Pumps and Sending Units During a 4000 Hour Endurance Test in E20, Minnesota Center for Automotive Research, March 25, 2009.
[71] The fuel sending unit is installed inside of the fuel tank. Its purpose is to measure the fuel level and send that information to the fuel gauge.
[72] A commutator is a moving part in certain types of electric motors or generators that can convert alternating current into direct current.

regardless of fuel. The authors reported no significant differences in performance or failure between the sending units as a function of test fuel.

One engine durability study was considered in this review[73] although its results were disregarded because of significant problems with its methodological and statistical approach. This study, and what we view as its methodological problems, is extensively discussed elsewhere.[74]

4.2 Manufacturer Warranty Limitations

FFVs are warrantied for the use of all levels of ethanol in fuel. Warranty information for use of gasoline-ethanol blends of up to E15 in non-FFVs is summarized in Figure 2 below. Other than the BMW Mini (warrantied for gasoline-ethanol blends up to E25), no past or current production vehicles have warranties allowing the use of fuels above E15.

[73] CRC, Intermediate-Level Ethanol Blends Engine Durability Study, CRC Project CM-136-09-1B, April 2012.
[74] McCormick, R.L, j. Yanowitz, M. Ratcliff, B. Zigler, Review and Evaluation of Studies on the Use of E15 in Light-Duty Vehicles, https://ethanolrfa.3cdn.net/b378858ac325c6e165_sgm6bknd4.pdf, accessed September 18, 2018.

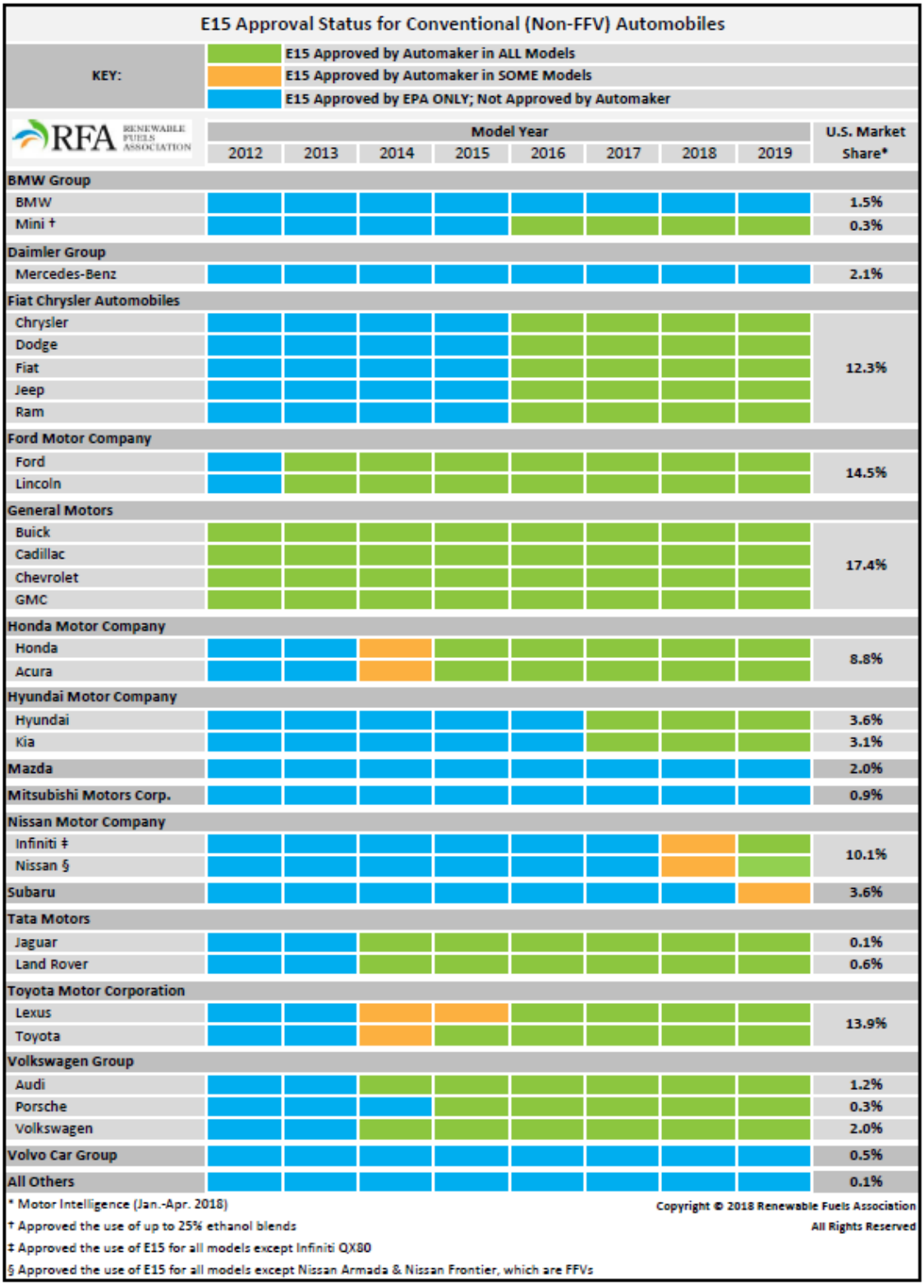

FIGURE 2. WARRANTY INFORMATION FOR USE OF E15 IN U.S. VEHICLES

4.3 Detailed Properties of Gasoline-Ethanol Blends Relevant to Use in Vehicles

The addition of ethanol to hydrocarbon gasoline changes the properties of the fuel, including its energy density, vapor pressure, octane, distillation properties and its impact on materials. Material compatibility of gasoline-ethanol blends with metals, elastomers and plastics that are used in vehicles and fuel infrastructure has been discussed in Section 3 above.

As noted in Section 1, ASTM Standard D4814-18d, specifies the properties of spark-ignition fuel and used by the Division of Measurement Standards (part of the California Department of Food and Agriculture) to set requirements for such fuels.[75] As present, this specification addresses blends up to E15 fuels so no changes would be required for CARB to approve fuels specifications covering those fuels. However, modifications would be needed for approval of blends above E15 up to E30.

The analysis of vapor pressure and octane below is based on results of a study in which the American Petroleum Institute (API) has tested a variety of fuel properties on 71 different gasolines with widely variant properties. Each gasoline was then blended with 10%, 12.5%, 15%, 20% and 30% ethanol and retested. Some of the gasolines were petroleum blendstocks intended to be used to make gasoline-ethanol blends (blendstocks for oxygenate blending or BOBs), others were intended for use without the addition of ethanol. These fuels were not selected to be representative of typical or average fuels, but rather to show the expected range of changes in properties that could occur due to the addition of ethanol to hydrocarbon fuels.

4.3.1 Energy Density

Ethanol has about 67% of the energy of gasoline on a volumetric basis.[76] Because the energy density of ethanol is lower than gasoline, fuel economy tends to decrease as the ethanol content in blends increases. Modern engines can take advantage of higher octane fuels to be slightly more efficient. Table 3 below shows the relative energy density of E15, E20 and E30, relative to E10.

TABLE 4. ENERGY DENSITY OF GASOLINE-ETHANOL BLENDS RELATIVE TO E10.

E15	97% of the energy of E10/gallon
E20	93% of the energy of E10/gallon
E30	90% of the energy of E10/gallon

4.3.2 Vapor Pressure

As noted in Section 3.5.1, at E10, the Reid Vapor Pressure (RVP) of the blended fuel is about 1 psi higher than that of the blendstock but is expected to decrease as the ethanol content increases as is shown in Figure 2, above.

As shown in Figures 5 and 6, the measured RVP at E15 and E20 was indistinguishable from that of an E10 using the same base gasoline blendstock using ASTM methods. Figure 7 shows that at E30, RVP is about one-half pound per square inch lower than that of an E10 made using the same gasoline blendstock.

[75] https://www.cdfa.ca.gov/dms/

[76] California Air Resources Board, Low Carbon Fuel Standard and Alternative Diesel Fuels Regulation 2018, Final Regulation Order, posted September 17, 2018, https://www.arb.ca.gov/regact/2018/lcfs18/fro.pdf accessed November 13, 2018.

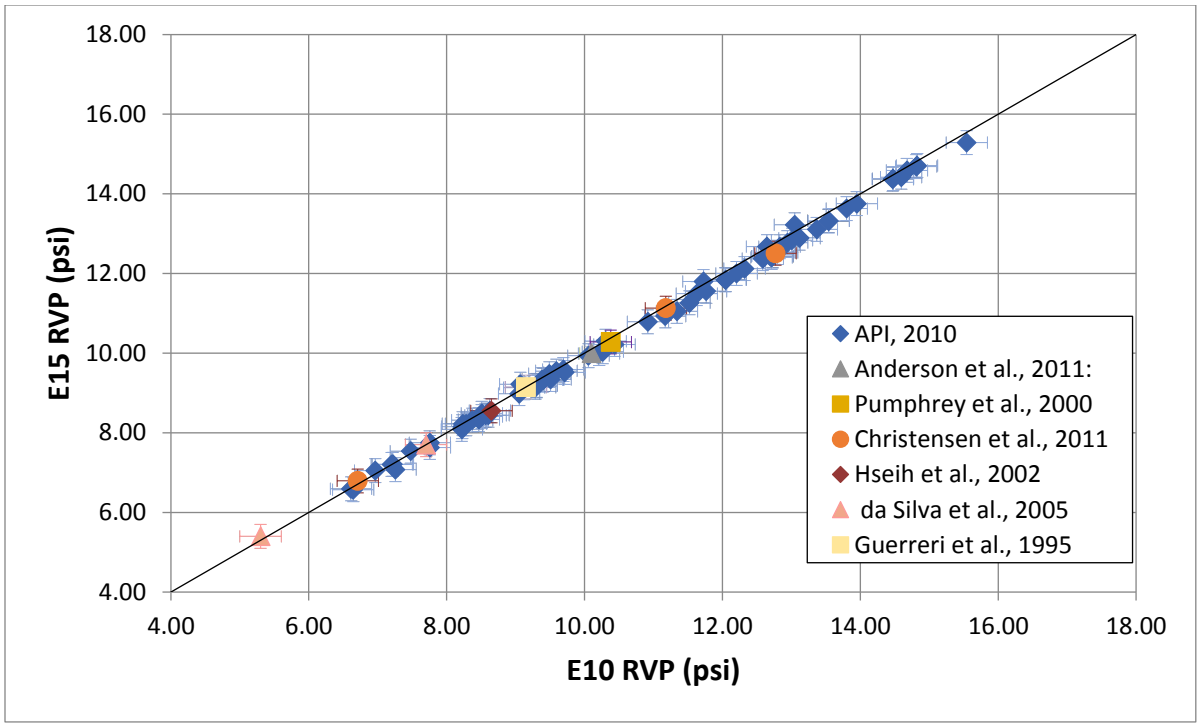

FIGURE 3. THE VAPOR PRESSURES OF E15 AND E10 BLENDS MADE USING THE SAME BASE GASOLINE BLENDSTOCK. THE ERROR BARS SHOW THE REPEATABILITY OF THE ASTM METHOD D5191 USED TO MEASURE REID VAPOR PRESSURE.

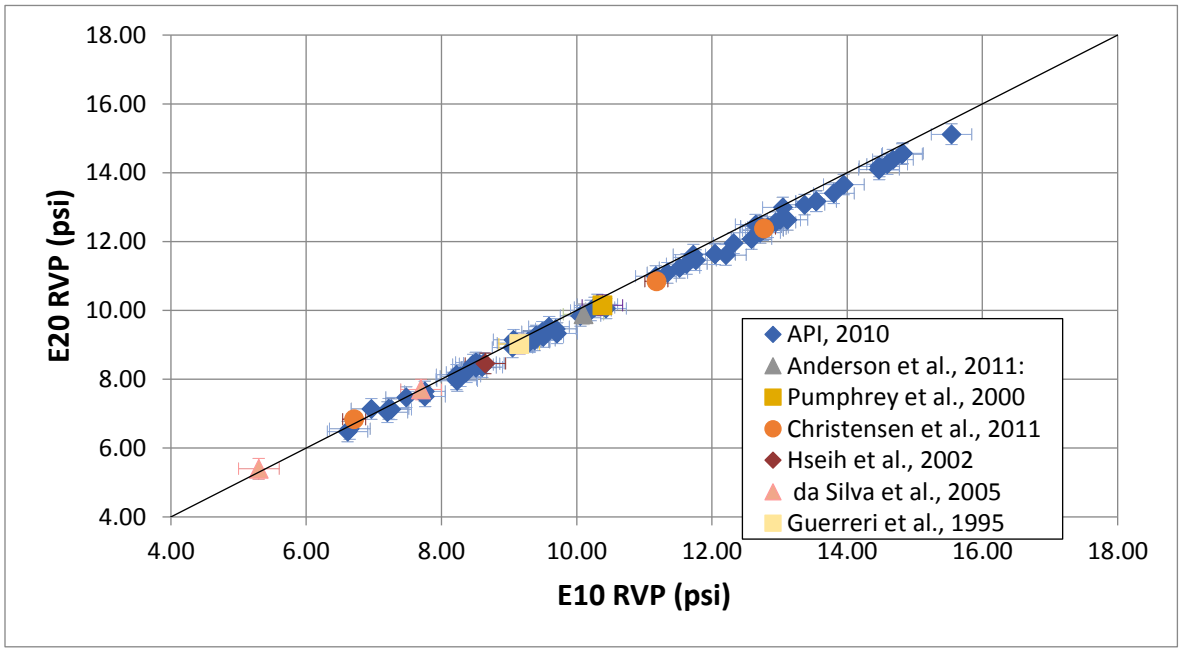

FIGURE 4. THE VAPOR PRESSURES OF E20 AND E10 BLENDS MADE USING THE SAME BASE GASOLINE BLENDSTOCK. THE ERROR BARS SHOW THE REPEATABILITY OF THE ASTM METHOD D5191 USED TO MEASURE REID VAPOR PRESSURE.

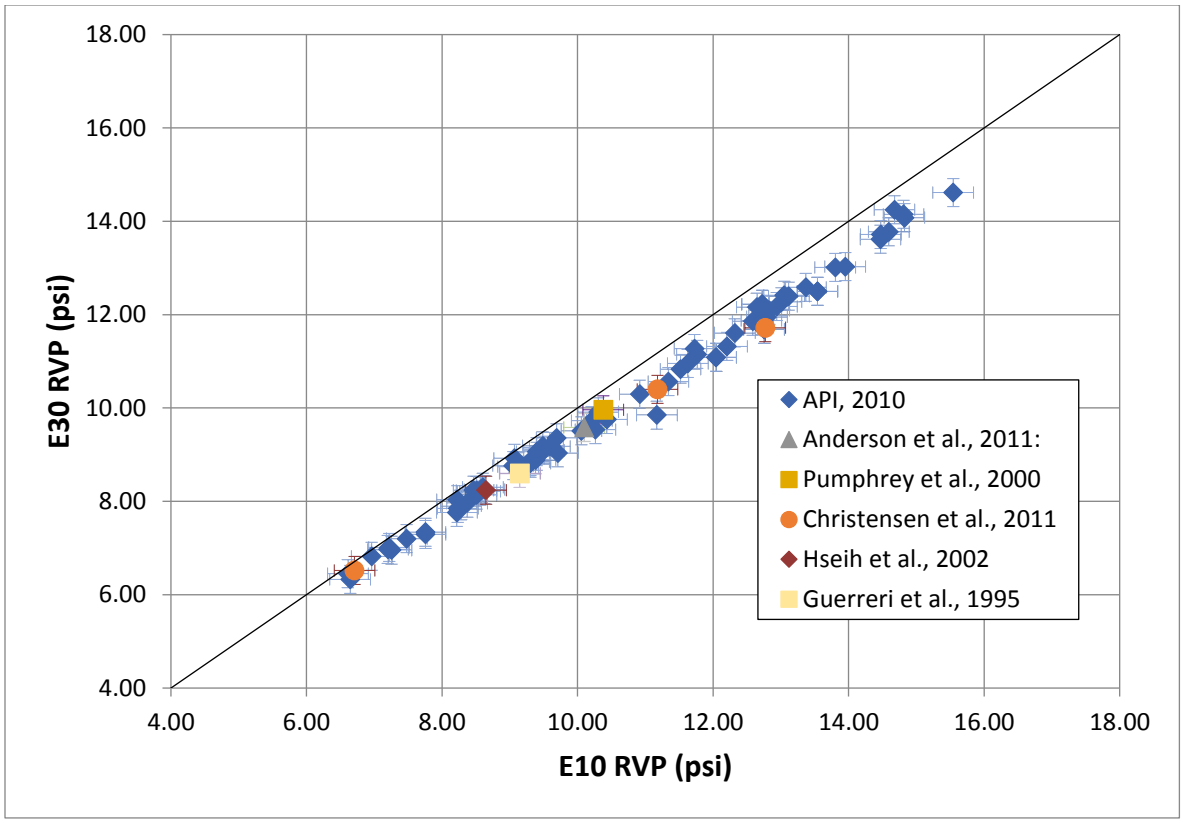

FIGURE 5. THE VAPOR PRESSURES OF E30 AND E10 BLENDS MADE USING THE SAME BASE GASOLINE BLENDSTOCK. THE ERROR BARS SHOW THE REPEATABILITY OF THE ASTM METHOD D5191 USED TO MEASURE REID VAPOR PRESSURE.

4.3.3 Octane

Inside the cylinder of an internal combustion engine the air/fuel mixture should ignite at a precise time in the piston's stroke. Engine knock occurs when pockets of the air/fuel mixture ignite earlier than they should. A minimum octane in fuel is required to prevent engine knocking. In comparison to retail gasoline, ethanol has a high octane number. Its AKI[77] (antiknock index) is 114 while gasoline is typically sold with an octane number of between 85 and 91. Adding additional ethanol to gasoline increases the octane number, as shown in Figure 6. As mentioned above, higher octane levels of ethanol blend fuels can also reduce fuel consumption in those vehicles which optimize fuel economy by advancing ignition timing to just below the knock limit offsetting to some degree the impacts of the lower energy content of those blends.

[77] AKI is equal to the average of the research octane number and the motor octane number, which are two different ways of measuring octane. The octane number posted at the retail fuel station is the AKI.

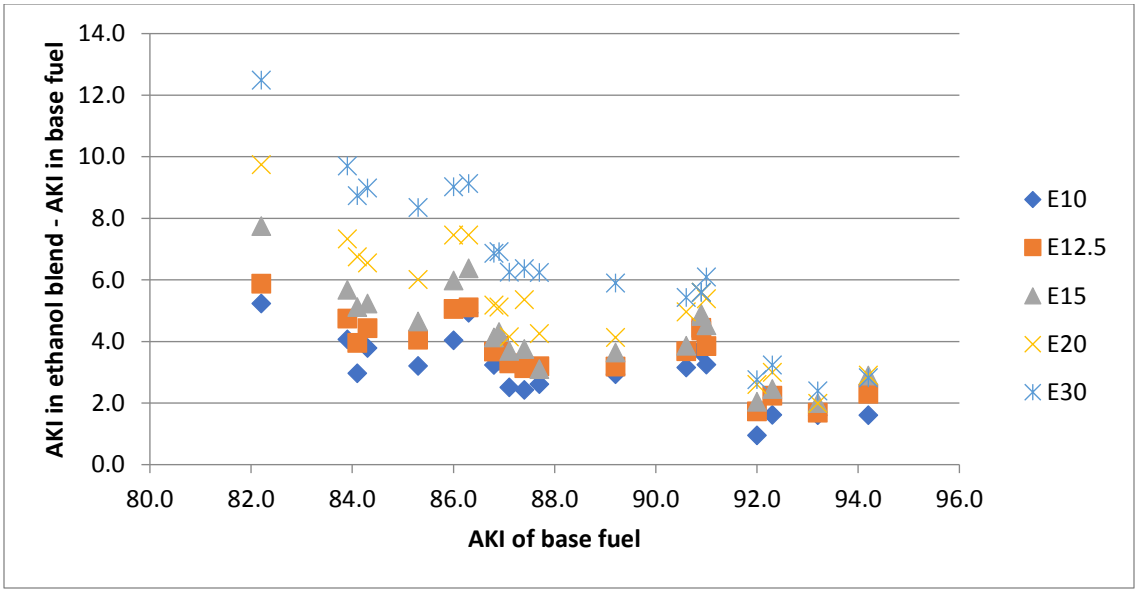

FIGURE 6. IMPACT OF INCREASING ETHANOL CONTENT ON 71 DIFFERENT BASE FUELS.[78]

4.3.4 Distillation Curve

Gasoline and oxygenate blendstocks are complex mixtures of hydrocarbon compounds with a range of boiling points. As a result, the distillation curves of these fuels typically rise steadily upward as temperature increases and individual compounds volatilize. As shown in Figure 7, the distillation curves of ethanol-containing blends start in the same way as pure hydrocarbon gasoline, but then plateau, at a relatively constant temperature as the azeotropes[79] that form between ethanol and various hydrocarbons distill. When the ethanol is gone, the curve shoots upward to rejoin the distillation curve of the base hydrocarbon fuel, thus T10 and T90 are largely unchanged by the addition of ethanol below 30 percent by volume. At higher ethanol concentrations, the length of the plateau increases, and typically impacts T50. Thus, one should expect the T50 of virtually all E15, E20 and E30 fuels to be 5 to 10 °C less than that of E10 blended with the same base fuel.

ASTM D4814-18d allows for the expected lower T50 with E15. Higher ethanol content (i.e., above E15) fuels will not result in significantly lower T50s.

[78] American Petroleum Institute, Determination of the Potential Property Ranges of Mid-Level Ethanol Blends, Final Report, April 23, 2010 https://www.api.org/~/media/Files/Policy/Fuels-and-Renewables/2016-Oct-RFS/The-Truth-About-E15/E10-Blending-Study-Final-Report.pdf

[79] An azeotrope is a mixture of two or more liquids that have the same concentration in the liquid and vapor phase and so cannot be separated by distillation.

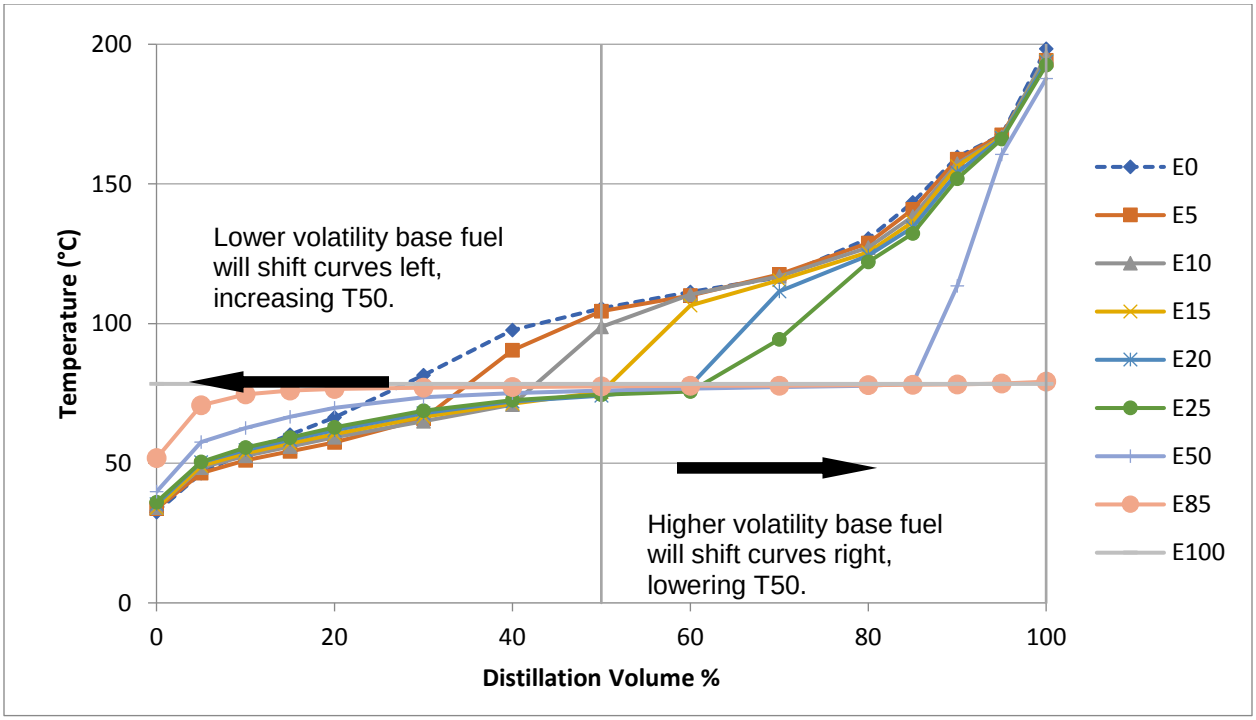

FIGURE 7. DISTILLATION CURVES OF ETHANOL IN CERTIFICATION GASOLINE FROM ANDERSON (2010)[80]

[80] V. F. Andersen, J. E. Anderson, T. J. Wallington, S. A. Mueller And O. J. Nielsen, Distillation Curves For Alcohol−Gasoline Blends, Energy Fuels, 2010, 24 (4), Pp 2683–2691.

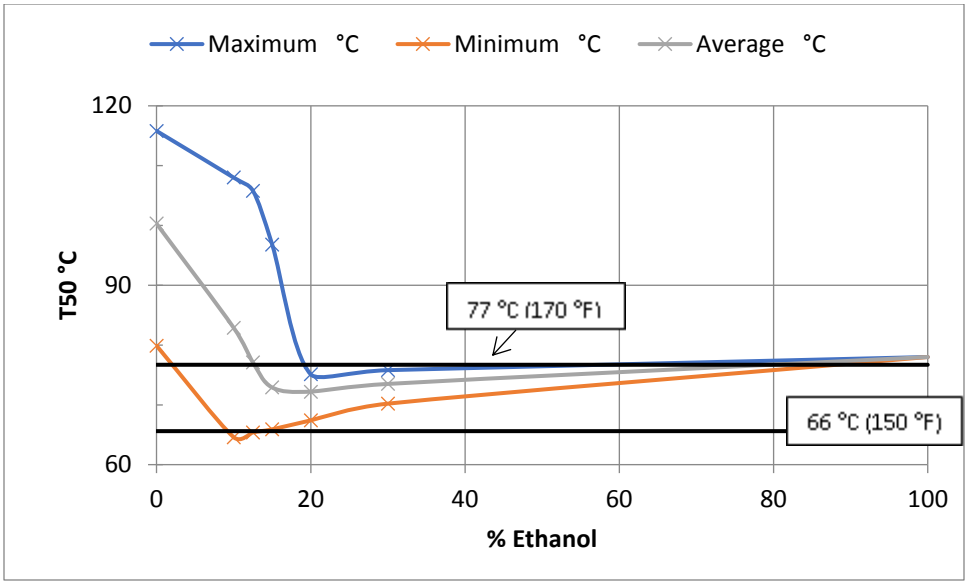

FIGURE 8. T50 RANGE FOR A VARIETY OF GASOLINES AT VARIOUS ETHANOL CONCENTRATIONS[81]

TABLE 5. T50 FOR A VARIETY OF GASOLINES, INCLUDING SOME BOBS, BLENDED WITH BETWEEN 10% AND 30% ETHANOL, AND EXTRAPOLATED TO BOILING POINT OF ETHANOL.[81]

T50 °C (°F)	E0 (straight gasoline)	E10	E12.5	E15	E20	E30	E100 (straight ethanol)
Average °C	100.3	82.9	77.1	72.9	72.2	73.5	78
°F	(212.6)	(181.2)	(170.8)	(163.2)	(161.9)	(164.3)	(173)
Std. Dev. °C	7.6	14.7	11.2	5.4	1.6	1.0	0
°F	(13.6)	(26.4)	(20.2)	(9.8)	(2.8)	(1.8)	(0)
Minimum °C	79.9	64.6	65.4	65.9	67.4	70.2	78
°F	(175.9)	(148.2)	(149.8)	(150.7)	(153.4)	(158.4)	(173)
Maximum °C	115.8	108.0	105.8	96.8	75.1	75.8	78
°F	(240.5)	(226.4)	(222.5)	(206.3)	(167.1)	(168.5)	(173)

4.4 Additive Requirements for Gasoline-Ethanol Blends

The U.S. EPA and CARB (California Title 13, Chapter 5, Article 1 section 2257) require detergent additives to be added to gasoline to control deposit formation at a minimum dosing rate. The detergents are tested using ASTM D5598 and ASTM D5500 to ensure that they perform adequately. Detergent is generally considered necessary for the purposes of reducing fuel injector deposits from the hydrocarbon portion of the fuel. In approving blends up to E15, U.S. EPA concluded that no changes were required relative to levels required for use with E10.[82] Given this, and the available data described above, use of additive levels consistent with those that apply in California for E10 would also be appropriate for blends

[81]From data in American Petroleum Institute, Determination of the Potential Property Ranges of Mid-Level Ethanol Blends, Final Report, April 23, 2010 https://www.api.org/~/media/Files/Policy/Fuels-and-Renewables/2016-Oct-RFS/The-Truth-About-E15/E10-Blending-Study-Final-Report.pdf

[82] US Government Accountability Office, BIOFUELS Challenges to the Transportation, Sale, and Use of Intermediate Ethanol Blends, June 2011.

of up to at least E15. Testing would be required to determine the appropriate detergent treat rate for E20 and E30 fuels.

4.5 Vehicle Emissions

This section evaluates the available emissions test data to assess the impacts of ethanol blends in the E11 – E30 range on air quality. Impacts on greenhouse gas emissions (GHGs) are addressed in Section 8. Since only vehicles that have been built since model year (MY) 2001 are permitted to use E15 under EPA regulations (in addition to specially designed FFVs which are permitted to use any ethanol concentrations of up to 85%) only data from testing of these vehicles are considered here and impacts are assessed relative to E10.

4.5.1 Test Fuels

All blends of ethanol and gasoline up to E10 sold in California must comply with CARB's California Reformulated Gasoline (CaRFG) regulations. This requirement imposes limits on the allowable properties of petroleum blendstocks for oxygenate blending (CARBOBs) used in preparing these compliant blends. The analysis presented below is focused on assessing the emission impacts associated with use of gasoline-ethanol blends above E10 that are created via splash blending of ethanol into a CARBOB that complies with CARB regulations for E10. Because of the limited number of studies done comparing nominal E15 and E20 blends to E10, this review will also describe testing performed to compare E15 and E20 to E0. Inclusion of these studies is conservative given that any observed differences in emission between E15 and E20 relative to E0 should be larger than those expected to exist between E15 and E20 relative to E10.

Further, the analysis also uses data from some studies involving what is known as "match blending" instead of splash blending. In match blending, the properties of the CARBOB or other blendstock are intentionally altered such that the properties of the blends being compared, E10 and E15, for example, are as close as possible except for the difference in ethanol content. The match characteristics vary but frequently include vapor pressure, and/or aromatic content and/or T50. Splash blending, by contrast, employs the same base hydrocarbon fuel for each blend regardless of ethanol content. Studies which employ splash blending are more representative than match blending studies of the changes that would occur should E11-E30 fuels be blended with the same CARBOBs that are used for E10, as is proposed for these new fuels.

There are many issues that need to be considered when using data from match blending studies to evaluate impacts of splash blending. These include:

- match blending for multiple fuel properties is difficult and rarely perfectly successful, because it is impossible to change one property without changing many of the other properties;
- despite extensive study it is not clear which fuel properties are most important with respect to emissions because the effects of correlated properties cannot be easily separated from each other by statistical analysis; and
- there are numerous properties that could conceivably have an impact on emissions[83] such that no match blending study could control for changes in all properties that could impacts emissions.

Given the differences in match and splash blending, it is not surprising that there are differences in the results from studies using the two approaches to evaluate the impact of ethanol content on emissions.

[83] See for example, "Analysis of EPAct Emission Data Using T70 as an Additional Predictor of PM emissions from Tier 2 Gasoline Vehicles," (Darlington, T. et al. SAE 2016-01-0996).

Of the studies considered only one,[84] by Karavalakis and colleagues at UC Riverside, used a base or test fuel that was specifically described as "CARB" fuel. In that case, the base CARB fuel included 6.6% ethanol by volume and was diluted to create E10 and E20 blends while maintaining constant RVP, and the fuel was tested on only one 2001+ vehicle. In other work conducted at UC Riverside [85] the fuel was described as follows:

> "The ethanol fuels were blended ……to represent ethanol fuels that would be utilized in California, in terms of properties such as aromatic content, Reid vapor pressure (RVP), and other properties."

RVP and other fuel volatility parameters were matched within certain limits. A third study, also conducted by Karavalakis and his colleagues at the UC Riverside, did not employ
fuel that was selected based on compliance with CARB regulations and included both splash blended and match blended fuels.

4.5.2 Criteria Pollutants

The criteria pollutants considered include nitrogen oxides, (NOx), carbon monoxide (CO), particulate matter (PM) and organic compounds. Organic compounds result from both combustion as well as fuel evaporation and can be characterized in a number of ways: total hydrocarbons (THC – which includes all hydrocarbons), non-methane hydrocarbons (NMHC - which includes all hydrocarbons except methane which is relatively non-reactive and thus not a significant predictor of ozone) or non-methane organic gases (NMOG – which include NMHC plus gases that may have an oxygen molecule, like ethanol, acetaldehyde or formaldehyde). In this document we report the organic emissions, in whatever form they were published in the relevant studies. The emissions data considered in this analysis are compiled in Appendix 2.

Emissions of organic compounds and NOx react in the atmosphere to form ozone, the primary component of smog in the presence of sunlight. Different organic molecules differ in their reactivity in the production of ozone. The total amount and composition of organic compounds emitted can be analyzed to provide a rough gauge of their ozone-forming potential. Thus studies which speciated or otherwise considered the reactivity of the specific organic compounds emitted during testing form a more reliable basis for assessing changes in the ozone- forming potential of changes in the ethanol content of blends.

4.5.3 Toxic Air Contaminants

In assessing emissions of toxic air contaminants (TACs) from spark-ignition vehicles, U.S. EPA and CARB have long focused on emissions of formaldehyde, acetaldehyde,1,3-butadiene and benzene. Based on extensive research, the state of California has developed risk factors for exposure to these and other compounds.[86] These risk factors have been used by CARB to evaluate the relative toxic "potency" of the four compounds listed above for the purpose of assessing the relative risk in changes in fuel composition on overall exposure to air toxics. CARB's Predictive Model has assigned the weighting factors listed in Table 6 to these pollutants, based on their relative toxicity. The potency-weighted toxicity is calculated as the sum of the concentration of each of these pollutants times the weighting factor.

TABLE 6. CARB TOXIC AIR CONTAMINANT POTENCY-WEIGHTING FACTORS

Pollutant	Weighting Factor
Benzene	0.170
1,3-butadiene	1.000
formaldehyde	0.035
acetaldehyde	0.016

[84] Karavalakis, G., T. Durbin, M. Shrivasastava, Z. Zheng, M. Villela, H. Jung. "Impacts of ethanol fuel level on emissions of regulated and unregulated pollutants from a fleet of gasoline light-duty vehicles," *Fuel* 93 (2012) 549-558.
[85] Karavalakis, G., D. Short, D. Vu, R. Russell, A. Asa-Awuku, T. Durbin, "A Complete Assessment of the Emissions Performance of ethanol blends and Iso-Butanol blends from a fleet of Nine PFI and GDI Vehicles," SAE 2015-01-0957, (2015).
[86] CARB, California Procedures for Evaluating Alternative Specifications for Phase 3 Reformulated Gasoline Using the California Predictive Model, Last Amended August 24, 2012.

4.5.4 Statistical Analysis

Because test procedures were different, each dataset was analyzed independently. All emissions are presented on a weight/mile basis and were transformed logarithmically prior to the statistical analysis to equalize the impact of high and low emitting vehicles in determining the statistical significance of changes. Logarithmic transform of data is common with emissions data. Results were considered to be statistically significant for p<=0.05 and marginally significant if p fell between 0.05 and 0.1.

Extensive statistical analyses were also performed by the researchers and reported in these studies. In many cases the original researchers analyzed overall impacts between E0 and the highest ethanol blend considered, assuming linear effects. Where possible the statistical analysis performed here was limited to consider only emission differences between E10 and the higher gasoline-ethanol blends, given E10 as the reference point for this evaluation. Ethanol impacts on other fuel properties that are often thought to impact emissions (T50 and RVP) are clearly non-linear between E0, E10 and higher ethanol blends.

In addition, in the UC Riverside-3 study, the scientists apply the Tukey-Kramer correction to their analyses of the statistical significance of pairwise t test comparison of the eight different fuels they consider. This correction is intended to account for the increased probability of a Type 1 error (false positive showing statistically significant difference where none exists) when conducting multiple pairwise comparisons. For eight different fuels, and the resultant 28 different pairwise comparisons, this correction is quite large, resulting in p-values almost ten times the uncorrected value. However, this correction was not made in this statistical evaluation, since only four pairwise comparisons were made, with markedly less potential for false positives. Thus, in contrast to the original study report, the statistical analysis presented here found a marginally significant decrease in NOx emissions, and significant decrease in NMHC, as well as some significant changes in toxic emissions that were not identified in the original report. This type of finding also applies to differences in results presented here versus those presented in other original studies. Where statistical results differ, this is not due to errors in either analysis, but to differences in analytical approaches.

4.5.5 Tailpipe Emissions

The total dataset considered here includes tailpipe emissions from a total of 61 vehicles, including one FFV. Twenty-five vehicles were tested on E10 and E15; twenty-four were tested on E0 and E15; twenty-three were tested on E10 and E20; twenty-four were tested on E0 and E20 (there were a number of vehicles that fell into multiple categories). There are no published data on the impact of blends above E20 on tailpipe emissions. A summary of the results is included in Table 7 and Table 8 and a more detailed summary of the average emissions from each vehicle/test cycle/fuel are included in Appendix 2.

FFVs are vehicles designed and permitted to use any ethanol fuel level up to E85, but many may fill up with conventional fuel and so may be impacted by a change in the availability of E15 in place of E10. According to IHS Automotive[87] there are nearly 20 million FFVs on US roads today, or somewhere around one-tenth of the total number of vehicles on the road. Only one has been tested on E15 and E10, and the results of that test are included in this analysis.

Table 7 (E15) and Table 8 (E20) summarize the results of our analyses of the individual studies which directly compared the air emissions impacts of higher and lower ethanol concentrations in hydrocarbon fuel. None of the E15 studies, whether done on California fuels or other US fuels found a statistically significant increase in any criteria pollutant. NOx, CO, PM mass emissions, or organic emissions (NMOG, THC, or NMHC depending on the study) were measured. Statistically significant decreases were found for NMHC, CO and potency weighted toxics, and a marginally significant decrease in NO_x emissions due to changes in ethanol content in the fuel.

[87] Cited by the US DOE, https://www.afdc.energy.gov/vehicles/flexible_fuel.html, accessed March 2, 2018.

For E20, organic emissions are reduced in several studies by a significant or marginally significant amount. A statistically significant reduction in CO is also found in one study and a marginally significant reduction in another study. A significant increase in NOx for E20 was found in a single study.

The results of the EPAct[88] study, a large EPA study of 15 vehicles and 27 fuels, is not explicitly included in this analysis because it does not provide emissions data for a set of lower and higher ethanol content fuels that are either match blended or splash blended, that could be analyzed in the manner we used for the other studies. The experimental design of the EPAct study included 27 different fuels, by blending for 5 specific properties in such a way that the full reasonable range of each property was explored, but not all the possible different combinations (which would have required 240 different fuels). EPA's analysis of the results of their emissions data suggest that the emissions of total hydrocarbon (THC), NMOG, NMHC, CH4, NOx, PM would increase, and CO would decrease with increasing ethanol content (between E0 and E20) should aromatic content, T50, T90 and vapor pressure be held constant. However, Section 4.3.4, shows that T50 is inversely correlated with ethanol content, as is aromatic content by simple dilution. Increasing aromatic content and T50 are also correlated with increasing THC, NMOG, NMHC, NOx, PM emissions, potentially confounding any increase in emissions due to ethanol alone.

4.5.6 Description of Studies

4.5.6.1 Coordinating Research Council Study E74-B

The Coordinating Research Council (a consortium of car and petroleum companies) conducted a study[89] in 2009 which included 15 vehicles, model years 1994 to 2006, tested over the Federal Test Procedure (FTP) cycle. The study was intended to separate the effects of vapor pressure, ethanol content and test temperature on CO exhaust emissions, but THC and NO_x emissions were also reported. Seven match blended[90] E0, E10 and E20 fuels were tested at several different vapor pressures. Because their study included vehicles older than the 2001 MY cutoff, and E0 fuels, the CRC statistical analysis is not considered directly applicable. Instead, for this analysis, the dataset has been limited to tests conducted on post 2001 MY vehicles, the E20 fuel and the only E10 fuel with the same vapor pressure.

The results showed that for vehicles using both E20 and E10, the higher ethanol content fuel yielded an increase in NO_x in 6 out of the 11 vehicles at 75 °F, and for 7 out of 11 vehicles at 50 °F. The 2006 Ford Taurus seemed to show an especially large sensitivity to ethanol content in both tests. However, when the wide variability between vehicles is taken into account, the change in NO_x is not statistically significant ($p=0.38$) and could be due to chance alone. Similarly, there was a decrease in THC emissions for E20 in 8 out of 11, and 6 out of 11 vehicles in the 75 °F and 50 °F tests respectively. For the 75 °F test, the difference between THC emissions using the two different fuels is statistically significant at the 95% level ($p <= 0.05$), but not for the 50 °F test. When the datasets at the two temperatures are combined, the reduction in THC is marginally significant ($p=.051$). Finally, for CO, 6 of the 11 vehicles saw a decrease at 75 °F, 7 out of 11 saw a decrease at 50 °F, but, statistically, this difference was not significant at either temperature.

Overall, there is little apparent difference in emissions between E10 and E20 from later model vehicles (2001+) for these criteria pollutants; given that differences between E10 and E15 should be smaller, the impact of changing from E10 to E15 would likely not cause any increase in emissions in these vehicles.

4.5.6.2 The Department of Energy (DOE) Study of Intermediate Blends on Legacy Vehicles

This study[91] included a number of vehicles older than 2001 and therefore the statistical analysis which accompanied the study is not applicable. Instead the data from the 2001+ MY vehicles were extracted

[88] EPA, Assessing the Effect of Five Gasoline properties on Exhaust Emissions from Light-Duty Vehicles Certified to Tier 2 Standards: Analysis of Data from EPAct Phase 3 (EPAct/V2/E-89), Final Report, April 26, 2013. https://www.epa.gov/moves/epactv2e-89-tier-2-gasoline-fuel-effects-study, accessed September 23, 2018.
[89] CRC E74-B, Effects of Vapor Pressure, Oxygen Content and Temperature on CO Exhaust emissions, May 2009.
[90] The fuels were blended to match four distillation points, octane values, and aromatic, benzene, olefin and sulfur content as close as practicable. For the E20 fuel, especially, a tight match was not possible.
[91] Knoll,K., B. West, W. Clark, R. Graves, J.Orban, S. Przesmitzki, T. Theiss , Effects of Intermediate Ethanol Blends on Legacy Vehicles and Small Non-Road Engines, Report 1 – Updated February 2009, NREL/TP-540-43543.

and analyzed. The base hydrocarbon fuel used was certification gasoline, and ethanol was fuel-grade per ASTM D4806. In this case we were able to compare splash-blended E15 with E10 and found NO_x increased in 7 out of 13 of 2001+ MY vehicles, and NMHC and CO decreased in 7 out of 13 vehicles, and 8 out of 13 vehicles, respectively. In comparison to the variability between the vehicles, the paired t-test conducted for each of these pollutants finds that the difference between the E15 results and the E10 results is not significant.

The same vehicles were tested on splash-blended E20. These showed a large (30%) and statistically significant increase in NOx (11 out of 13 vehicles), a marginally significant decrease of -5% in NMHC (9 out of 13 vehicles) and no statistically significant impact on CO emissions.

4.5.6.3 DOE Catalyst Study

The purpose of this study[92] was to determine if the use of higher ethanol content fuels for the full useful life of a vehicle (as defined in the EPA emissions standards) would adversely affect the emissions control systems and result in emissions which exceeded the EPA emissions standards. Retail top-tier E0 fuel was splash blended with ASTM D4806 ethanol to produce E10, E15 and E20 blends. This was the largest study and included 24 matched (make, model and approximate starting mileage) sets of vehicles which accumulated mileage on E0, E10, E15 or E20 and then were tested on different ethanol fuels. The vehicles aged on E15 were tested on E15 and E0, and the vehicles aged on E20 were tested on E0 and E20. No vehicle sets were tested on both E10 and E15, or E10 and E20 in this program.

Average emissions in the DOE Catalyst study show significant reductions in CO between E15 and E0 (-13%), and changes which are not statistically significant in NMOG and NO_x. The same make and model vehicles tested on E20 versus E0 showed no statistically significant change in NOx, and large significant reductions in NMOG (-16%) and CO (-22%). It is not clear how much of the difference between E0 and E15 occurs between E0 and E10 and what is due to the change between E10 and E15, or E10 and E20. However, the implication of this study is that changes in NOx emissions are likely to be non-detectable in these vehicles, and there is an apparent reduction in CO and NMOG.

4.5.6.4 UC Riverside-1 and UC Riverside-2

A total of 7 standard vehicles and one FFV MY 2001+, were tested by Karavalakis and his colleagues at UC Riverside using E10, E15 and E20 fuels that would likely be permissible in California should the higher ethanol fuels be legalized. Those results were reported in three different papers[93], and an extensive statistical analysis of the results from seven of those vehicles was made in a 2015 SAE paper. In addition, a single FFV, a 2007 Chevrolet Silverado, will be considered independently of the other vehicles because it is a different type of vehicle and also because it was not tested on E15 but was tested on E20 and E10. The data was provided in graphical form in the published papers, but this analysis of the 7 standard vehicles was based on the data in Excel form provided to us courtesy of Dr. Karavalakis. The graphic presentation of the Chevrolet Silverado results was on such a small scale that magnitude could not be accurately gauged and only the direction of change can be reported.

Considering only both E20, E15 and E10 emissions from the seven vehicles, Karavalakis and his colleagues found there were no significant differences in the weighted (cold start and running) emissions for PM, THC, NMHC, CO and NO_x emissions, although the cold start emissions were slightly higher for both THC and NMHC for E15, and the difference was statistically significant. They did not report any significant changes in PM mass and total particle number, between E15 and E10. Our analysis, in Table 7 generally supports these conclusions, although we found a marginally significant decrease in CO between E20 and E10. In addition, we calculated potency-weighted toxicity for the 7 vehicles and found

[92] West, B.H., C. S. Sluder, K.E. Knoll, J.E. Orban, J. Feng, Intermediate Ethanol Blends Catalyst Durability Program, February 2012, ORNL/TM-2011/234.

[93] Karavalakis, G., D. Short, D. Vu, R. Russell, A. Asa-Awuku, T. Durbin, " Evaluating the regulated emissions, air toxics, ultrafine particles, and black carbon from SI-PFI and si-di vehicles operating on different ethanol and iso-butanol blends," *Fuel* 128 (2014), 410-421.

no significant difference between these pollutants at either E15 or E20 and E10. The study also reported extensively on other pollutants including methane, carbon dioxide and a number of individual VOCs.

The single FFV (MY 2007) showed small reductions in all pollutants including CO, THC, NMHC and NO_x for E20 in comparison to E10, although none appear statistically significant in comparison to the standard deviations of the measurements as shown on the graph. Tests on higher ethanol concentrations suggest the trend is for reductions in CO, THC and NMHC at E20 and higher ethanol concentrations for this FFV. Taken together these CARB fuel studies show no evidence for any increase in emissions for potency-weighted toxicity, PM, CO, THC, NMHC or NO_x if E15 or E20 replaces E10 fuel in California.
The UC Riverside team performed this analysis for emissions from two 2012 model year vehicles and found that the ozone reactivity for emissions from E15 was less than those for E10 as shown in the figure below.

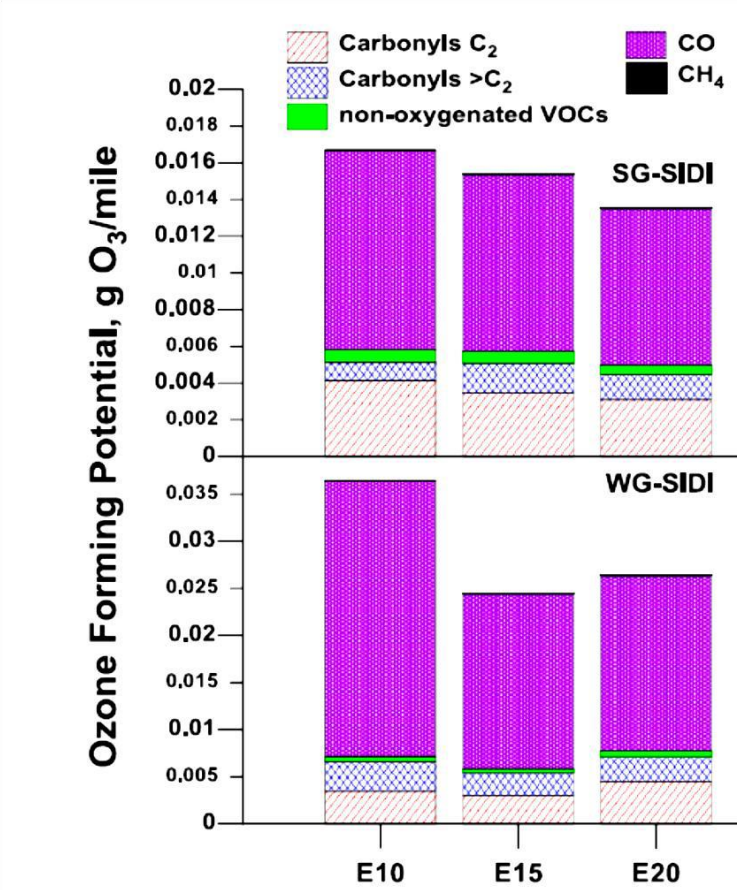

FIGURE 9. OZONE-FORMING POTENTIAL OF TAILPIPE EMISSIONS FROM VEHICLES USING E10, E15 AND E20.[94]

Because of the extremely limited data on the ozone-forming potential of E15 versus E10 the impact of both higher and lower ethanol contents on ozone-forming potential will be briefly mentioned, although this may not be representative of the change between E15 and E10. In their extensive study of FFV vehicle emissions from E6, E32, E59 and E85 fuels the CRC[95] found that the average ozone-forming potential

[94] Karavalakis, G., D. Short, D. Vu, R. Russell, A. Asa-Awuku, H. Jung, K.C. Johnson, T. Durbin, "The impact of ethanol and iso-butanol blends on gaseous and particulate emissions from two passenger cars equipped with spray-guided and wall-guided direct injection SI (spark ignition) engines," *Energy* 82 (2015) 168-179.
[95] CRC E-80, Exhaust and Evaporative Emissions Testing of Flexible-Fuel Vehicles, Final Report, August 2011.

decreased with increasing ethanol content of the fuels on the cold start FTP. There were mixed results on the US06 and Unified Cycle tests. Wang and colleagues[96] in China found a slight improvement in ozone-forming potential calculated from MIR values when E10 was compared to E0 in a Euro 4 vehicle. Taken together, these results suggest that there will be no increase in ozone-forming potential with higher ethanol content fuel.

4.5.6.5 UC Riverside-3

In another study conducted by UC Riverside[97] five 2016 and 2017 MY vehicles were tested on match-blended (E0, E10 and E15, at both high and low aromatic content) and splash-blended (E10, E15 and E20) fuels. The results of the study found that the splash blended E15 caused significant reduction in NMHC, THC and potency weighted-toxics, and marginally significant reductions in NOx. However, these reductions were not found in the splash blended E20 when compared to E10. The vehicles tested with match blended E10 and E15 showed no statistically significant differences at either low or high aromatic content.

In addition, the tailpipe emissions from one vehicle tested on the eight different fuels was injected into an atmospheric chamber to determine the potential for these emissions to form secondary aerosols in the environment. Secondary aerosol formation showed a weak negative correlation with increased ethanol content from E0 to E20, suggesting that higher concentrations of ethanol in fuel will lead to less secondary aerosols.

[96] Wang, X, Y. ge, C. Zhang, J. Liu, Z. Peng, H. Gong., Estimating Ozone Potential of Pipe-out Emissions from euro-3 to euro-5 Passenger cars Fueled with gasoline, Alcohol-Gasoline, Methanol and Compressed Natural Gas, SAE 2010-01-1009.
[97] Karavalakis, G, T.D. Durbin, J. Yang, P. Roth, Impacts of Aromatics and Ethanol Content on Exhaust Emissions from Gasoline Direct Injection (GDI) Vehicles, April 2018.

TABLE 7. TAILPIPE EMISSIONS STUDIES ON E15 VERSUS EITHER E10 OR E0 AS BASE FUEL[98]

Study Name	Test Cycle	No. of Vehicles	Vehicle Model Years	Base Fuel and Blending Strategy	NO_x	Organic Emissions	CO	PM mass emissions	Potency Weighted Toxics[99]
DOE Intermediate Fuel Blends	LA-92	13	2001-2007	E10 splash blend	No significant difference	No significant difference[100]	No significant difference	Not tested	Not tested
DOE Catalyst Study	FTP	24	2003-2009	E0 splash blend	No significant difference	No significant difference[101]	↓	Not tested	Not tested
UC Riverside -1	UC and FTP	7	2007-2012	E10 match blend	No significant difference	No significant difference[102]	No significant difference	No significant difference	No significant difference
UC Riverside -3	LA-92	5	2016-2017	E10 low aromatics splash	↓	[100] ↓	No significant difference	No significant difference	↓
UC Riverside -3	LA-92	5	2016-2017	E10 low aromatics match blend	No significant difference	No significant difference[100]	No significant difference	No significant difference	No significant difference
UC- Riverside-3	LA-92	5	2016-2017	E10 high aromatics match blend	No significant difference	No significant difference[100]	No significant difference	No significant difference	No significant difference
All Data (no. of datapoints for each pollutant in parentheses)	Various		2001-2017	Various	No significant difference (66)	NMHC:No significant difference (42) THC:No significant difference (29) NMOG:No significant difference (24)	↓ (66)	No significant difference (24)	No significant difference (22)

[98] Solid arrows represent p values <.05, textured arrows represent p values between 0.05 and 0.1, for paired, two-tailed t-test.
[99] Calculated using CARB factors in California Procedures for Evaluating Alternative Specification for Phase 3 Reformulated Gasoline Using the California Predictive Model, Last Amended August 24, 2012
[100] Non-methane hydrocarbons, NMHC
[101] Non-methane organic gases, NMOG
[102] Total hydrocarbon and non-methane organic gases, THC and NMHC both measured with same statistical conclusion

TABLE 8. TAILPIPE EMISSION STUDIES ON E20 EITHER E10 OR E0 AS BASE FUEL[103]

Study Name	Test Cycle	No. of Vehicles	Vehicle Model Years	Fuels	NO_x	Organic Emissions	CO	PM mass emissions	Potency Weighted Toxics[104]
CRC E74B	FTP	11 (at two different temps)	2001-2006	E10 match blend	No significant difference	[105] 	No significant difference	Not tested	Not tested
DOE Intermediate Fuel Blends	LA-92	13	2001-2007	E10 splash blend		[106] 	No significant difference	Not tested	Not tested
DOE Catalyst Study	FTP	24	2003-2009	E0 splash blend	No significant difference	[107] 		Not tested	Not tested
UC Riverside-1	UC and FTP	7	2007-2012	E10 match blend	No significant difference	No significant difference[108]		No significant difference	No significant difference
UC Riverside-2	FTP	1 FFV	2007	E10 match blend	E20 emissions less than E10	E20 emissions less than E10[106]	E20 emissions less than E10	Not tested	Reported on graph, E20 is slightly less than E10
UC Riverside -3	LA-92	5	2016-2017	E10 low aromatics splash	No significant difference	No significant difference[106]	No significant difference	No significant difference	No significant difference
All Data (no. of datapoints for each pollutant in parentheses)	Various		2001-2017	Various	 (77)	NMHC: No significant difference (32) THC: No significant difference (41) NMOG: (24) 	 (78)	No significant difference (15)	No significant difference (12)

[103] Solid arrows represent p values <.05, textured arrows represent p values between 0.05 and 0.1, for paired, two-tailed t-test.
[104] Calculated using CARB factors in California Procedures for Evaluating Alternative Specification for Phase 3 Reformulated Gasoline Using the California Predictive Model, Last Amended August 24, 2012
[105] Total hydrocarbon, THC
[106] Non-methane hydrocarbons, NMHC
[107] Non-methane organic gases, NMOG
[108] Total hydrocarbon and non-methane organic gases, THC and NMHC both measured with same statistical conclusion

4.5.7 Evaporative Emissions

Evaporative emissions are volatile organic compounds which escape from the fuel system of the vehicle. Fuel systems are designed to be sealed off from the atmosphere, although emissions can occur due to system liquid leaks, vapor leaks through the air emissions control system and permeation of vapors through the materials that make up the fuel lines and other components of the fuel system.

Liquid leaks are rare but can result in large quantities of emissions. They are due to poorly maintained vehicles, or carelessness when fueling. The composition of the fuel is not believed to have any impact on the amount of liquid leaks.

Because this study is intended to evaluate E11-E30 generated from the blending of fuels into the same CARBOBs used for E10, California E10, E15 and E20 fuels would be expected to have roughly identical vapor pressures. (In many areas of the country E10 is permitted to have a vapor pressure that is 1 psi higher than either E0 or E15 fuel, but it is not expected to be permitted in California). E30 would slightly reduce the vapor pressure.

The quantity of evaporative emissions vented to the emissions control system, and the amount which escapes would be expected to be roughly the same for fuels with the same vapor pressure, thus we do not expect any differences due to splash blended E15 or E20 versus E10. E30 fuels would likely decrease these emissions by a small amount proportional to the reduction in vapor pressure. However, permeation emissions, in which fuels move through the fuel system materials are chemical specific and could be different for fuels with different chemical compositions. Two Coordinating Research Council studies were conducted to determine if higher ethanol content would affect permeation emissions.

Evaporative emissions of benzene are also of concern, but it should be noted that the other TACs of concern besides benzene are only of concern with respect to exhaust emissions. Unfortunately, no measurement of benzene emissions were reported in either of these two studies of E20 evaporative emissions. It seems likely that since benzene comes from the hydrocarbon portion of the ethanol-gasoline blend, diluting the hydrocarbon portion with additional ethanol would likely decrease the amount of benzene emissions by a roughly proportional amount.

TABLE 9. EVAPORATIVE EMISSION STUDIES ON E20

Study Name	Test Cycle	No. of Vehicles	Vehicle Model Years	Fuels	Organic Emissions	Ozone forming potential
CRC E-65-3	Diurnal	4	2001-2005	E10 match blend	No significant difference	No significant difference
CRC E-65-3	Steady-state	4	2001-2005	E10 match blend	No significant difference	No significant difference
CRC E-77-2	Static	6	2001-2006	E10 match blend	No significant difference	Not tested
CRC E-77-2	Running Loss	6	2001-2006	E10 match blend	No significant difference	Not tested
CRC E-77-2	Hot Soak	6	2001-2006	E10 match blend	No significant difference	Not tested
CRC E-77-2	Diurnal (3-day)	6	2001-2006	E10 match blend	No significant difference	Not tested

4.5.7.1 Description of Studies

4.5.7.1.1 Coordinating Research Council Study E-65-3

CRC E-65-3[109] was conducted using a number of fuels (E0, E6, E6 high aromatics, E10, E20 and E85), and five vehicles, but only the results of E10 and E20 (matched aromatic content) conducted on the four post 2001 MY vehicles are considered here. Neither E15 nor E30 were tested. The fuel systems were removed from the vehicles and the fuel rigs were tested over the 24-hour diurnal test in a Variable Temperature Sealed Housing Evaporative Determination (VT-SHED) using the California Enhanced Evaporative Testing rules. The fuel tanks and the canisters were vented to the outside of the SHED to limit measured emissions to permeation emissions alone. Test results in mg/day for the four vehicles are shown in Table 3 of the study. Two of the vehicles showed increases comparing E20 to E10, and two showed decreases, and the net change is not considered statistically significant. The specific reactivity of the emissions was measured and the ozone-forming potential was calculated. The result, in Table A- 8 of the study, shows that the ozone-forming potential of the permeation emissions from the two fuels were not statistically distinguishable.

4.5.7.1.2 Coordinating Research Council Study E-77-2

Similar permeation testing was conducted by Coordinating Research Council[110] in 2010 on six vehicles that were 2001+ MY. Again, the testing was conducted in a SHED to capture permeation emissions, with all of the emissions from the vehicle's activated carbon canister vented to the outside. The vehicles were tested on two E10 fuels, with vapor pressures of 7 psi and 10 psi, and a single match-blended E20 fuel (aromatic content held constant between the fuels) with a nominal vapor pressure of 9 psi, but which actually had a vapor pressure of 8.5 psi. The 10 psi E10 fuel was created from the 7 psi E10 fuel by adding butane. In order to equalize any impact of vapor pressure, the emissions results of the two E10 fuels were averaged to roughly estimate the emissions of an 8.5 psi fuel.

Measurements were made for the following tests:

- Static permeation: fuel system pressurized and monitored for vapor and fuel leaks at 86 °F
- Running loss: two cycles of the LA-92 test at 86 °F

[109] CRC E65-3 Fuel Permeation from Automotive Systems: E0, E6, E10, E20 AND E85, Final Report, December 2006.
[110] CRC E77-2 Enhanced Evaporative Emission Vehicles, March 2010.

- Hot soak: one hour immediately following LA-92 test
- Diurnal test: California 3-day test, in which temperature is varied between 65 °F and 105 °F.

None of the tests resulted in a statistically significant difference between the average of the E10 7 and 10 psi fuel results and the E20 8.5 psi fuel. Two of the tests showed an average increase in the higher ethanol content fuel, one showed almost no change, and one found a decrease.

Taken together, these results suggest that there is no trend in permeation emissions between E10 and E20 in these studies. There is no data specific to permeation emissions from E15 fuel, but these results suggest that they will not be significantly different than E10 emissions. There is no information on the impact of E30 on permeation emissions. A 2007 study[111] showed that permeation was strongly linked to aromatic content, with a 35% increase in permeation with every 10% increase in fuel aromatic content. Adding ethanol to the E10 in current use in California, as is proposed in this multimedia analysis, would decrease the aromatic concentration a small amount, and thus also potentially decrease the permeation emissions to a small extent.

4.5.8 Combined Analysis of All Emissions Data

Taken independently, these studies show no consistent, measurable difference between E10 and E15 or E10 and E20 tailpipe emissions of NO_x, organics, PM or toxic weighted potency, although a number of studies showed a tendency of lowered CO and organic emissions with both E15 and E20, and one study showed a statistically significant increase in NOx emissions with E20. Combining the data from all of the studies (Table 6 in Appendix 2) shows a statistically significant decrease in CO with both E15 (-7%, p value = 0.0009), and E20 (-9%, p value =0.0002), and a marginally significant increase (+11%, p value = 0.07) in NOx with E20. There is limited evidence that the organics emitted from the tailpipe will have a lower ozone forming potential with E15 in comparison to E10 for both California-specific fuels and other test fuels in the US and China.

The total mass of permeation emissions and the ozone-forming potential of those emissions from E20 and E10 are statistically indistinguishable, suggesting that the use of E15 or E20 in place of E10 will have no impact on permeation emissions. There has been no reported testing on benzene evaporative emissions. It seems likely that benzene emissions would decrease at higher ethanol content, since benzene is only present in the hydrocarbon portion of ethanol-gasoline blends.

These results are supported by tailpipe emissions data from 61 vehicles and permeation emissions data from 10 vehicles. There have been no emissions testing of 2001+ MY vehicles with E30.

4.6 Summary of Findings

The extensive existing emissions data shows that use of gasoline blends up to E15 as allowed by U.S. EPA in existing 2001 and later model-year vehicles and FFVs will not result in any increase in vehicle exhaust emissions of organic compounds or their ozone-forming potential, oxides of nitrogen, carbon monoxide, particulate matter, or potency-weighted toxic air contaminants relative to E10.

[111] Reddy, S. Understanding Fuel Effects on Hydrocarbon Permeation through Vehicle Fuel System Materials, SAE 2007-01-4089.

Growth Energy Comments on EPA's
Proposed Modifications to Fuel Regulations To Provide Flexibility for E15; Modifications to RFS RIN Market Regulations

Docket # EPA–HQ–OAR–2018-0775

Exhibit 2

April 29, 2019

The Honorable Andrew Wheeler
Administrator
U.S. Environmental Protection Agency
1200 Pennsylvania Ave NW
Washington, DC 20460

Re: Docket EPA-HQ-OAR-2018-0775

Dear Administrator Wheeler:

I write today regarding the pending rulemaking to provide RVP relief for E15, a fuel with 15 percent ethanol and 85 percent gasoline, and enable it to be sold year round across the entire country.

Sheetz is a family owned convenience store chain based in Altoona, Pennsylvania, operating stores in Pennsylvania, West Virginia, Maryland, Ohio, Virginia, and North Carolina. For more than 60 years, our mission at Sheetz has been to meet the needs of customers on the go. Of course, things have changed over those 60 plus years. Life is faster and busier, and customers expect us to be there when they need us most. One thing that hasn't changed is our commitment to our customers, our employees and the communities in which we operate.

In the spirit of offering products that help our customers, we started offering E15 in 2015 and today we're selling E15 at more than 260 stores, making Sheetz one of the largest E15 retailers in the country. What drew us to E15 was the value to the American driver. At our stations, we offer E15 with a price advantage of up to 10 cents under the price of standard gasoline, which already contains 10 percent ethanol. We believed our customers wanted not only more choices at the pump but a stronger value proposition and they have agreed. We've sold millions of gallons of E15 to thousands of customers who have driven over a billion miles without a problem.

Moreover, Sheetz guarantees all the fuel we sell. To date, we have not had a single customer say that E15 caused a problem for them. And we have not had a single case of E15-related misfuelling reported to us.

We want what's best for our customers and America, and therefore commend the president for his commitment to addressing this issue and the EPA for working to allow year-round sales of

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E15. This will finally fix an antiquated regulation and put E15 on a level playing field with all other grades of gasoline where it belongs.

While we strongly support allowing the sale of E15 year-round, we strongly caution EPA from making costly and counter-productive changes to the marketplace for Renewable Identification Numbers (RINs). In addition, the proposal details several possible additional measures beyond those already required to prevent misfuelling – a problem that absolutely does not exist in the E15 market – adding additional cost and burden that will do nothing to prevent misfuelling. On the contrary, the suggested changes offered by EPA serve to do nothing other than make the marketing of E15 more difficult, artificially reducing demand through an overly complex regulatory framework.

Even though the proposed rule clearly states that EPA has found no evidence of manipulation in the RIN marketplace, the proposal seeks to take a well-functioning, liquid market and turn it on its head to the benefit of a few in the petroleum supply chain. We are an active participant in the RIN market and we would strongly agree with EPA that there is no evidence of manipulation. The changes in the proposed rule are a solution looking for a problem.

As currently written, the RIN changes create an unfair marketplace giving midstream merchant oil refiners who have not prepared their business to comply with the RFS a clear advantage over retailers like Sheetz and others who have made the investment to offer higher biofuel blends. RINs were designed to verify and balance compliance and are functioning exactly as intended. Obligated parties have a choice when complying, to either buy RINs or invest in infrastructure to sell higher blends of ethanol like retailers such as ourselves. However, they continue to buy RINs presumably because this is their cheapest alternative.

Under this proposed rule, Sheetz, a non-obligated party, would be forced to dump all of their separated RINs every quarter or have them expire worthless. On the other hand, refineries would only need to fill 80 percent of their obligation, creating an unnatural supply/demand imbalance which clearly will drive RIN prices to rock bottom rather than being able to freely seek market equilibrium. Moreover, refiners would be permitted to delay full quarterly compliance up to 3 times throughout the year, while non-obligated parties in the fuel supply chain have no such latitude.

This rule should simply be about allowing retailers to offer a legally approved fuel year-round, just as we do with regular gasoline. The proposed RIN restrictions under this rule will dramatically harm a market which has been operating efficiency and fairly for more than a decade and should be dropped from a final rule.

EPA's proposed additional misfueling measures are also a solution in search of a problem. Sheetz has offered E15 at its retail locations for more than four years. During that time, we have

sold millions of gallons of the fuel, which has been driven over a billion miles by our customers. We have not heard a single complaint either regarding the performance of E15 in engines or confusion about refueling with it. The prominently-displayed label on the pump clearly informs customers that the fuel may not be used in certain vehicles, engines, and equipment. The label, coupled with the existing misfueling plans, more than adequately prevent misfueling; no physical barriers or additional hurdles to accessing E15 are necessary or appropriate.

In advance of moving forward with consideration of new and additional regulations regarding misfueling mitigation measures, EPA must clearly answer these questions: what specific problem are we trying to solve, and what is the cost to the market of any new regulations? In doing so, it must seek input not just from larger retailers offering E15, such as Sheetz, but from the thousands of single store owners to whom any new requirements would also apply. The impact of any new misfueling regulations would likely be felt more acutely by these smaller parties that may not have as new infrastructure or access to capital necessary to make changes to comply.

Specifically with respect to some of the proposed "physical barriers" to E15, Sheetz's view is that, because these measures entail no benefits and in some cases substantial costs, they cannot be justified. Further, multiple of these options are infeasible, and, if required, would undermine the millions of dollars of investment we have made in offering consumers additional choice at the pump with E15 as a lower-cost, higher-octane option.

- **Keypad Approval System for E15 Purchases.** In general, Sheetz's dispensers do have electronic screens that could be programmed to require a customer to acknowledge selection of E15. Even with screens such programming at each station offering E15 nationwide would still cost millions of dollars. However, it is important to note that most small retailers do *not* have pump infrastructure that could accommodate an electronic keypad approval requirement. Prohibitively costly upgrades would be necessary for all retailers that do not already have dispensers with electronic displays.

- **Different Fuel Pump Nozzle Size for E15.** As a practical matter, requiring a different nozzle size for E15 would amount to a ban of the fuel because vehicles aren't designed to accommodate a differently sized pump nozzle for E15. In terms of dispenser upgrade costs, in the absence of a specific proposal regarding pump nozzle size and information from pump manufacturers, it is difficult to estimate. Furthermore this would only work on multiple rather than single hose dispensers creating another issue that would be pretty widespread.

- **Fuel Pump Nozzle Grips for E15 Dispensers.** Although it is technically feasible for Sheetz to replace all of its E15 dispenser nozzle grips with new and differently-sized nozzle grips, there is not a shred of evidence that this would make a difference to consumers, who already read the pump signs and labels and understand their fuel selection. This would simply not work with single hose dispensers. Furthermore typically a different color grip is already employed for various grades of fuel.

- **Radio Frequency Identification (RFID) Technologies.** Retrofitting all existing E15 pumps with RFID technology and installing this technology in all pumps would likely cost in the millions. This is aside from costs to consumers of having to retrofit vehicles with the same technology or vehicle manufacturers that would be required to install the technology in new vehicles.

The bottom line, none of these options could possibly be considered cost-justified, even for a large retailer such as Sheetz, because there is not a misfueling "problem" that new regulations must address.

Sincerely,

Mike Lorenz
Executive Vice President of Petroleum Supply
Sheetz Inc.