

REQUEST FOR CORRECTION OF INFORMATION

submitted on behalf of

**THE STATE OF KANSAS, THE STATE OF NEBRASKA,
THE ENERGY FUTURE COALITION, and 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)

Docket ID Nos. EPA-420-R-13-002, FRL-9917-26-OAR

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INTRODUCTION

The Energy Future Coalition and Urban Air Initiative (Petitioners) respectfully petition the United States Environmental Protection Agency (EPA) for correction of information concerning motor vehicle fuel emissions represented in the Motor Vehicle Emissions Simulator model (MOVES2014) and the EPA/V2/E-89 fuel effects study (EPA/V2/E-89 study)¹ on which it is based. As described below, both the model and the study seriously mischaracterize the air pollution effects of blending ethanol into gasoline.

This is a story of data manipulated to produce a policy-driving scientific model whose results are precisely the opposite of what occurs in the real world. The key concept obscured by the EPA/V2/E-89 study and the resulting MOVES2014 model is that blending ethanol into ordinary gasoline reduces harmful emissions produced when gasoline combusts in an engine. Ethanol accomplishes this salutary effect both by diluting the most harmful components in gasoline with its own clean octane and by lowering the temperature at which various proportions of the fuel mixture combust, which further lowers pollution.

These proven facts about ethanol's emissions effects would have been confirmed by any study that simply added ethanol to an existing gasoline

¹ EPA, Assessing the Effect of Five Gasoline Properties on Exhaust Emissions from Light-Duty Vehicles Certified to Tier 2 Standards: Analysis of Data from EPA/V2/E-89, Final Report (Apr. 2013) (hereinafter "EPA/V2/E-89 Final Report"), <http://www.epa.gov/otaq/models/moves/documents/420r13002.pdf>.

blendstock as occurs at refineries across the country, allowing ethanol to dilute the fuel's hydrocarbon content and to lower its distillation profile.

Instead the EPAAct study's designers—which included a Chevron consultant—did the opposite. They artificially reversed the beneficial ethanol-blending effects described above, dumping in more of the most polluting fuel additives—high-boiling-point hydrocarbons—to restore the distillation profile of the ethanol-gasoline blends, though not required by any law or private standard. As a result, the EPAAct Study unfairly attributes to ethanol the emissions effects of the hydrocarbons used to elevate the targeted distillation temperatures. And now the MOVES2014 vehicular emissions model, which incorporates the EPAAct study's conclusions, requires States to adopt those same mistaken conclusions about the causes of vehicular air pollution when they decide how to come into compliance with EPA's air quality standards.

A. The EPAAct Study

The EPAAct study is an ambitious but misguided analysis of the emissions effects of five fuel parameters (ethanol content, aromatics content, Reid Vapor Pressure (RVP), T50, and T90) based on 15 vehicles and 27 test fuels including so-called straight gasoline (E0) and blends of gasoline with 10%, 15%, and 20% ethanol (E10, E15, and E20). EPA conducted the EPAAct study with the assistance

of Southwest Research Institute (SwRI) and the Coordinating Research Council (CRC), a non-profit organization supported by the American Petroleum Institute.

Instead of testing the emissions effects of mid-level ethanol blends by simply adding ethanol to commercial gasoline blendstocks (“splash blending”), the EPA study’s designers created novel fuels through a “match blending” process in which they first adjusted the gasoline blendstock to hold constant selected parameters, including T50 and T90—the “distillation temperatures” at which 50% and 90% of the contents of the fuel are vaporized. In order to match the T50 and T90 of fuels with varying ethanol concentrations, high distillate aromatic and saturated hydrocarbons were added to fuels with higher ethanol content to counteract ethanol’s beneficial effect of lowering T50 and T90.

The stated purpose of this perverse blending methodology was to match certain arbitrary distillation points across the various test fuels, specifically T50 and T90—the temperature at which 50% and 90% of the contents of a given fuel vaporize. But there is no good reason, law, or standard for holding T50 and T90 constant, and any semblance of uniformity among the test fuels is illusory, for the distillation profiles of blended fuels are not straight lines. The resulting test fuels deviated significantly from fuels available in the market—with some fuels exceeding legal limits on driveability (a measure of cold-start and warm up

performance) and others containing unrealistically high octane ratings, thanks to the addition of costly and harmful high-distillate hydrocarbons.

The result of this “match blending” was the EPAAct study’s conclusion that “other factors being equal, increasing ethanol is associated with an increase in emissions.”² This conclusion is misleading at best, because other factors are never equal in the real world.³ There is no regulatory, mechanical, or health justification for adding high-boiling-point hydrocarbons to test fuels for the purpose of measuring ethanol’s effect on tailpipe emissions.⁴ And that is the only way to account for the EPAAct study’s results: ethanol has been shown in numerous empirical studies to contribute to a *decrease* in emissions.

Even when one accounts for the other four fuel parameters (aromatics, T50, T90, and RVP), it is impossible to derive accurate results from the EPAAct study. The study fails to control for differences in the full range the test fuels’ distillation temperatures (other than T50 and T90). Because of ethanol’s non-linear effect on gasoline distillation, raising the T50 of higher ethanol blends to *match* the T50 of

² *Id.* at 7.

³ See Anderson et al., *Issues with T50 and T90 as Match Criteria for Ethanol-Gasoline Blends*, SAE 2014-01-9080, at 1034 (2014) (“[O]ther factors are not equal when ethanol is added to gasoline. Depending on the blendstock, the added ethanol reduces T50 due to near-azeotropic behavior and reduces T90 and aromatics content by dilution. Considered as a whole, these factors tend to reduce emissions with increasing ethanol.”).

⁴ *Id.* at 1030 (“[Blendstock] modifications should generally not be needed to control these parameters in studies evaluating the effects of ethanol content on emissions if starting with an E10 fuel or using an E10 intended [blendstock].”).

E0 and E10 blends results in elevated T60-80 distillation temperatures. And whenever more heat is required to vaporize fuel components, more emissions result. The EPAAct study also fails to account for differences in the speciation of the test fuels' hydrocarbon content. The high-distillate hydrocarbons used to raise T50 and T90 have the greatest effect on emissions, but for purposes of its match blending methodology, the EPAAct study treats all aromatics alike.⁵

B. The MOVES2014 Model

The MOVES model, developed by EPA's Office of Transportation and Air Quality (OTAQ), estimates emissions for mobile sources at the national, county, and project level for criteria pollutants, greenhouse gases, and air toxics. The Clean Air Act requires EPA to update its mobile source emissions models regularly. MOVES2014 is the latest such iteration and reflects the benefits of the Tier 3 rule and other recent rulemakings, new emissions data, and newly reported effects of fuel properties such as gasoline sulfur and ethanol. Pursuant to EPA's Official Release of the MOVES2014 model, States must immediately begin using MOVES2014 in the construction of their State Implementation Plans (SIPs) for compliance with the National Ambient Air Quality Standards (NAAQS).⁶

⁵ See *infra* at 31.

⁶ Official Release of the MOVES2014 Motor Vehicle Emissions Model for SIPs and Transportation Conformity, 79 Fed. Reg. 60343, 60344 (Oct. 7, 2014).

The MOVES2014 model incorporates the EPAAct study, and the model's negative treatment of the emissions resulting from ethanol blends is directly based on the conclusions of the EPAAct study.

Because the erroneous information at issue in this Request for Correction is the product of the EPAAct study's flawed design, Petitioners respectfully request that EPA withdraw the EPAAct study and the MOVES2014 model, so that an objective and accurate fuel effects study and emissions model may take their place following a meaningful opportunity for public comment.

II. PETITIONERS' INTEREST IN THE EPACT STUDY AND MOVES2014 MODEL

The States of Kansas and Nebraska are directly regulated by EPA's Official Release of the MOVES2014 model, which requires the States to use the model in constructing State Implementation Plans (SIPs) for compliance with the National Ambient Air Quality Standards (NAAQS). The challenged rule therefore imposes an administrative burden on the States. The MOVES2014 model also diminishes State revenues derived from Kansas and Nebraska's agricultural industries because it encourages all States to develop SIPs that limit the sale and consumption of ethanol in motor vehicle fuel.

The Energy Future Coalition is a bipartisan public policy initiative that brings together business, labor, and environmental leaders to address the challenges and opportunities of the transition to cleaner energy technologies. The