

Emissions Impacts of the Elimination of the 1-psi RVP Waiver for E10 in Eight States

April 15, 2022

Janet Yanowitz, P.E., Ph.D.
Ecoengineering, Inc.

The U.S. EPA Motor Vehicle Emissions Simulator (MOVES) Version 3.0.3 model has been used to estimate the impact on air emissions from both onroad and nonroad vehicles if the 1-psi Reid vapor pressure (RVP) waiver for 10% ethanol blends were to be eliminated. The model was run for a single July weekday in 2023 in each of 8 states. A summer day was chosen because the RVP limit of 10 psi for E10 fuels (9 psi for gasoline) is only applicable in the summer ozone season.

MOVES3 is a complex emission modeling system intended to estimate air pollution emissions from mobile sources in the United States. It is based on many individual physical processes, which are then scaled up on the basis of fleet-average emission factors, and a database which includes information on the use-rates of different types of vehicles and the properties of the fuel used in each region of the country.

For this work MOVES3 default values for all local data were used, including things like meteorology, source-type populations, age distributions, vehicle type VMT, etc. , with the exception of the fuels data. The default fuels data were used for the base runs, and then all 10 psi E10 fuels in the database were adjusted to 9 psi using the “Fuels Wizard” tool in MOVES3. When the user adjusts a specific fuel characteristic such as, in this case, RVP, the Fuels Wizard adjusts other fuel properties based on EPA’s refinery modeling.

The eight states evaluated were

1. Iowa,
2. Nebraska,
3. Kansas,
4. Wisconsin,
5. South Dakota,
6. Minnesota,
7. North Dakota, and
8. Illinois

The MOVES model showed that emissions of VOCs, NO_x, CO would be reduced in each one of these states by lowering the vapor pressure of summer E10 to 9 psi.

Table 1. Reduction in Emissions of CO, NO_x and VOCs from all onroad and nonroad MOVES3.0.1 sources for a July weekday in 2023.

	CO	NO _x	VOCs
Iowa	-0.4%	-0.1%	-1.8%
Kansas	-0.4%	-0.1%	-2.0%
Minnesota	-0.5%	-0.1%	-2.7%
Nebraska	-0.5%	-0.1%	-2.6%
North Dakota	-0.3%	0.0%	-2.2%
South Dakota	-0.5%	-0.1%	-2.9%
Wisconsin	-0.4%	-0.1%	-1.7%
Illinois	-0.2%	-0.2%	-0.9%