Mr. Randy Mosier
Chief of the Regulation Division
Air and Radiation Management Administration
Department of the Environment
1800 Washington Boulevard, Suite 730
Baltimore, Maryland 21230

Re: Notice of Proposed Action, Amendment of Regulation **.01**, **.01-1**, **.02**, **.03**, **.04**, and **.07** and adoption of new regulations **.03-1** under **COMAR 26.11.24 Vapor Recovery at Gasoline Dispensing Facilities**

Disclaimer: The opinions expressed herein are our own and do not necessarily reflect the views of The Johns Hopkins University.

Dear Mr. Mosier:

We are a multidisciplinary team of scientists from the Johns Hopkins University with a keen interest in the proposed action under consideration. Our collective expertise includes environmental science and engineering, environmental health, risk sciences, exposure measurement/science, epidemiology, toxicology, and economics. We are concerned about the proposed decommissioning of Stage II vapor recovery at gasoline dispensing facilities, and the construction of new gasoline dispensing facilities without Stage II vapor recovery. Based on the state of the scientific literature, we believe that movement away from utility of Stage II vapor recovery would result in additional unnecessary exposures among gas station employees, patrons and nearby residents to gasoline vapors. Components of these vapors have been linked to certain cancers, and we are concerned that adequate controls to mitigate exposures to these harmful components are not in place, were Stage II vapor recovery to be discontinued. Moreover, the proposed action is based on an economic analysis, which does not account for the public health burdens of the proposed decommissioning.

Additional details of our concerns are outlined below:

1. Fuels have historically contained large fractions of toxic and carcinogenic chemicals (Hilpert et al., 2015). In current gasoline formulations, benzene, toluene, ethylbenzene and xylene (BTEX) are the most studied chemicals and are currently believed to be of greatest health concern (EPA, 2015). Employees at service stations (such as pump attendants, on-site mechanics and garage workers) are among those with greatest exposure to benzene originating from gas stations (Karakitsios et al., 2007). Epidemiologic studies have reported statistical increases in leukemia and other cancer risks for gas station workers (Morton & Marjanovic, 1984; Schwartz, 1987; Lagorio, 1994; Lynge et al, 1997; Terry, 2005). The health risks faced by those living near gas stations have been poorly studied and are not well understood (Hilpert et al., 2015). It is known, however, that exposures to harmful fuel vapors do not only occur on gas station properties but also in their surroundings (Jo & Moon, 1999; Jo & Oh, 2001; Terrés et al., 2010).

2. Removal of Stage II vapor recovery will not allow collecting fuel vapors that are expelled into the atmosphere from vehicles without Onboard Refueling Vapor Recovery (ORVR). The remaining legacy fleet without ORVR and all motorcycles and boats (lacking ORVR) can produce significant emissions during vehicle refueling. For Maryland, it has been estimated that fuel consumption of non-ORVR equipped vehicles is about 10% in 2015 (Meszler Engineering Services, 2012). Adequate Stage II vapor recovery technology is necessary to prevent the release of fuel vapors from non-ORVR equipped vehicles and to prevent human exposures to the released fuel vapors.

3. Pollution prevention technology can effectively reduce volatile organic compounds (VOC) emissions at gas stations. A study sponsored by the Maryland Department of the Environment suggests that in 2020, VOC emissions in the Baltimore and Washington regions can be reduced by about 3 tons per day if suitable Stage II vapor recovery technology is employed (Meszler Engineering Services, 2012).

4. An incentive for the proposed action is that the Stage II vapor recovery technology that is currently installed in the Baltimore and Washington regions only leads to a reduction in VOC emission of about 0.17 tons per day (also in 2020 in the Baltimore and Washington regions). This reasoning does not account for the possibility of modifying (potentially gradually) installed Stage II vapor recovery technology (from the vacuum-assist to the balance technology) such that an emission reduction of 3 tons of VOC per day can be achieved.

5. Hydrocarbon releases at gas stations are, after vehicle exhaust emissions, one of the most important VOC sources, which adversely affect public health (Watson et al., 2001). EPA just lowered the ozone air standard from 75 ppb to 70 ppb. Attainment of the new standards might require enhanced vapor recovery at gas stations. Stage II vapor recovery at the nozzle requires vapor return lines from the nozzle to the underground storage tanks. Retrofitting new gas station that would under the proposed action be built without vapor return lines would be costly.

6. Employing efficient pollution prevention technology might be economically advantageous. The evaluation of economic benefits of pollution prevention technology needs to account not only for the cost of implementation and maintenance of such technology, but also for related health care costs (e.g., cancer treatment) due to released pollutants and energy saving benefits due to valuable hydrocarbons not wastefully released to the environment (Hilpert et al., 2015). The proposed action does therefore not account for a comprehensive cost analysis that is needed to guide benefit-cost analyses in support of policy decisions.

7. The adoption of suitable and potentially redundant pollution prevention technology will ultimately benefit not only the gas stations owners and workers who are exposed to the potential health risk, but also the consumers (that are exposed during refueling). In light of these benefits, consumers could help shoulder some of these adoption costs with the gas station owners. In fact, the apparent cost might be beneficial to customers, gas station workers, nearby residents, and other populations that spend significant amounts of time in the proximity of gas stations (e.g. children in nearby schools) (Hilpert et al., 2015).

8. Potential future changes in fuel composition might pose new environmental health challenges. Given the complexities of chemical fate and transport in the environment and

the history of insufficient toxicity testing (McGarity, 2004), using appropriate and redundant pollution prevention technology that minimizes release of chemicals with known and unknown adverse health effects during fuel storage and transfer seems a wise, long-term and cost effective idea given ever-changing fuel compositions (Hilpert et al., 2015).

In conclusion, we believe that the proposed decommissioning of Stage II vapor recovery is a public health concern because of the additional unnecessary human exposures to toxic and carcinogenic hydrocarbon vapors. Suitable Stage II vapor recovery technology should be used that does not negatively interfere with ORVR. For exampe, balance type systems could be used instead of the vacuum-assist method. At the very least, an economic analysis should be performed which also accounts for the public health burdens of the proposed decommissioning. We would be happy to assist you if you have any questions.

Sincerely,

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