

May 14, 2019

U.S. Department of Transportation
National Highway Traffic Safety Administration
1200 New Jersey Avenue SE, West Building Ground Floor, Room W12-140
Washington, DC 20590-0001

RE: The National Society of Professional Engineers' Public Comments on Docket ID No. NHTSA-2019-0016-0001, *General Motors, LLC-Petition for Temporary Exemption from Various Requirements of the Safety Standards for an All-Electric Vehicle with an Automated Driving System*

On behalf of the more than 31,000 members of the National Society of Professional Engineers, these comments are submitted in response to the National Highway Traffic Safety Administration's request for public comment to *General Motors, LLC-Petition for Temporary Exemption from Various Requirements of the Safety Standards for an All-Electric Vehicle with an Automated Driving System*.

As stated in NSPE's *Autonomous Vehicles: A Public Regulatory Policy Guide*, "licensed professional engineers should play a critical role as part of the autonomous vehicle design and manufacturing process...." Historically, professional engineers have been deeply involved in the safe development and deployment of new and emerging technologies. Because professional engineers have an ethical duty to protect the public, they are uniquely positioned to help usher in new technology while prioritizing public safety.

It is with this role in mind that the National Society of Professional Engineers urges General Motors, LLC to utilize the subject matter expertise of Professional Engineers in the design, construction and deployment of its Zero-Emission Autonomous Vehicle (ZEAV) and any subsequent autonomous vehicles.

In the Background section of NHTSA's request for comments, the agency states that one of its "key tasks" in preparing the regulatory standards for autonomous vehicles is to "ensure that those standards do not impose unnecessary obstacles to those vehicles." While this may be true, NSPE encourages NHTSA to first consider its obligation to protect the general public. NSPE agrees that FMVSS should not be overly-burdensome to the businesses investing in and developing autonomous vehicle technologies, however, public health and safety should be of primary concern.

It is the opinion of NSPE that several areas of General Motors' petition lack the detail necessary to ensure that public health and safety will not be placed unnecessarily at risk.

The GM petition does not specify the decision-making priorities being developed for the ZEAV. This raises both ethical and safety concerns. For example, it is unclear how the ADS would respond to an unavoidable situation in which it has to choose between either hitting an inanimate object – causing harm to the passengers - or hitting a pedestrian that unexpectedly crosses the vehicle’s path. NSPE strongly urges NHTSA to require a detailed explanation of the ZEAV decision-making framework, and both a risk assessment and an ethics compliance disclosure from General Motors that are similar to those found on pages 3 and 4 of NSPE’s [Policy Guide](#). Until NHTSA can determine, with a reasonable level of certainty, that ZEAV’s programming does in fact protect public safety, it should require General Motors to test a modified version of the ZEAV vehicle with a human driver present.

NSPE agrees with General Motors’ assertion that an Operations Center can provide an added layer of safety and protection for the general public. However, the petition is – again – lacking critical details. There are questions to which General Motors must provide more specific answers, such as;

- 1) Where will the operations center be located in relation to deployed ZEAVs?
- 2) Related to proximity – what is the expected lag time between when data transmitted from ZEAVs is received in the operations center, and vice-versa? It is critical that lag-time be minimal in the event of an impending collision or catastrophic mechanical or technological failure.
- 3) Is communication between ZEAVs and the operations center continuous? If not, how often will they communicate?
- 4) How will the operations center be staffed, and how many vehicles will each staff person be responsible for?

Finally, NSPE strongly urges NHTSA to require a detailed explanation regarding the cyber-security measures taken to prevent hacking or jamming of ZEAV’s. (See Recommendation 8: Security, on page 6 of NSPE’s [autonomous vehicle policy guide](#).)

With regards to NHTSA’s specific questions, NSPE submits the following responses:

Questions 6 – NSPE recommends that NHTSA consider how the ADS decision-making process will evolve over the full-service lifetime of the vehicle. An acceptable scope and standard must be determined. NSPE further recommends that NHTSA require real-world simulation testing, in which the ADS software is fed a variety of scenarios that pose a danger passengers, pedestrians and/or other drivers, and the results of those test be made public prior to NHTSA’s final decision on this petition.

Question 10 – NSPE agrees that testing which includes a human driver is preferred, however, NSPE recommends that NHTSA require General Motors to test a fully-

automated version of its ZEAV that includes human controls and a human driver. This is a logical step toward a fully-automated vehicle with no driver.

Question 13 – NSPE agrees that providing telltale information to passengers would serve a safety purpose, giving passengers an understanding of how the ZEAV is functioning, and allowing them to respond if a telltale indicates a problem. With regards to the weight given to an ADS' ability to respond appropriately to telltales, it would seem that is the very definition of “autonomous.” NSPE strongly urges NHTSA to deny the exemption request if General Motors cannot provide sufficiently-detailed data showing that the ZEAV ADS responds appropriately and in a timely manner to telltales.

Question 16 – Yes, it is both appropriate and necessary for the agency to evaluate the responsiveness and driving skills of the ADS in relation the respective FMVSS exemption request. As stated above, NSPE strongly urges NHTSA to require detailed data regarding ADS performance before providing any exemption.

Question 17 – No, the fact that ZEAVs for which General Motors is requesting an exemption will be petitioner-controlled does not justify accepting greater uncertainty, because the vehicles will be carrying passengers and operating on public streets. The ZEAVs will not be operating in a closed circuit, and therefore any uncertainty – and risks that come with the uncertainty – will not be borne exclusively by General Motors, but also by the public.

Question 19 – NSPE agrees that successful deployment of properly-functioning autonomous vehicles is in the public's best interest. However, what petitions like the one from General Motors fail to acknowledge is the gap between where technology is now versus where it has to be in order to achieve lofty goals like reducing vehicle-accident-related injuries and death. The assumption made in General Motors' petition is that putting AV technology on public roads will automatically and immediately reduce injuries and death because they reduce the possibility of human error. Yet, the technology itself is still incomplete and riddled with its own, potentially injurious, errors. Additionally, the general public needs time to adjust to the as-yet-unknown differences in the ways standard and autonomous vehicles interact with their environments. NSPE encourages NHTSA to take a measured approach, requiring AV-developers and builders to provide specifics with regards to public safety, and allowing the public time to learn how to safely move about an environment that includes autonomous vehicles.

Question 21 – Yes, NSPE strongly urges NHTSA to require General Motors to provide detailed information about how ZEAV would respond to the scenarios described here, in addition to other potential scenarios in which the sensors and LiDAR technology may not result in the desired or necessary response.

Question 23 – While General Motors’ petition contains information on how ZEAVs will track and respond to their environment, there is very little information on how they will communicate with their environment. NSPE encourages NHTSA to required detailed explanations for how ZEAVs will – for example – communicate to pedestrians and other vehicles at a four-way stop, where people generally look for visual cues before proceeding, or; indicate to passengers if a sudden start, stop or turn is imminent. Because the general public is not yet used to interacting with autonomous vehicles, the onus is on AV developers like General Motors to build communication systems into their vehicles that will help the public learn and understand how to function safely in and around AVs.

Question 27 – NSPE strongly urges NHTSA to require licensed professional engineers be included in the development, testing and deployment of autonomous vehicles. A professional engineer’s high level of technical proficiency, and years of education and experience make her a valuable asset. Additionally, professional engineers have an ethical requirement to prioritize public health and safety above all else, including corporate deadlines and shareholder profits. This commitment provides an additional layer of safety for an emerging industry that may lose sight of potential harms, in the rush to provide marketable products.

As the petition is currently written, NSPE cannot support the granting of the requested exemptions. General Motors’ petition it too vague, lacking important details regarding performance and safety. Should those details be provided, NSPE would gladly review the additional information and reconsider its position.

NSPE greatly appreciates this opportunity to provide comment on General Motors’ exemption petition. Any further questions, please contact Stephanie Hamilton, government relations manager, at shamilton@nspe.org.

Sincerely,



Michael Aitken,
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Cc: NSPE Board of Directors

ⁱ <https://www.nspe.org/sites/default/files/resources/pdfs/Autonomous-Vehicles-A-Public-Regulatory-Policy-Guide.pdf>