



Ms. Heidi R. King
Deputy Administrator
National Highway Traffic Safety Administration
1200 New Jersey Avenue, S.E.
Washington, D.C. 20590

RE: General Motors Petition for Temporary Exemption
NHTSA Docket 2019-0016

Dear Deputy Administrator King:

General Motors Company and its subsidiary GM Cruise Holdings LLC (collectively, “GM”) together submit the following comments in connection with the National Highway Traffic Safety Administration’s (“NHTSA” or the “Agency”) March 19, 2019, Request for Comments and Information regarding GM’s Petition for Temporary Exemption from certain applicable Federal Motor Vehicle Safety Standards (the “Exemption Petition”).

GM notes at the outset its appreciation for NHTSA’s careful consideration of the Exemption Petition, and the time and attention devoted to the detailed questions accompanying the Notice of Receipt of the Exemption Petition. GM agrees that the Agency’s consideration of this Exemption Petition “is an important case of first impression” that implicates a “variety of novel and important issues.” 84 Fed. Reg. at 10189. As such, GM supports the Agency’s desire to incorporate data and analysis from a variety of perspectives into its consideration.

Before turning to the particular themes emanating from the various questions posed by the Agency, GM reiterates the core aim animating its Exemption Petition: to promote the recognized safety benefits of automated driving systems (“ADS”). It is by now well understood that human error and/or behavior is responsible for the overwhelming majority of vehicle crashes. Latest figures promulgated by the U.S. Department of Transportation (“DOT”) indicate that there were an estimated 37,133 deaths from motor vehicle crashes in the United States in 2017. *See* DOT HS 812 603 (October 2018). Preliminary figures suggest that traffic-related fatalities in 2018 will be at similar levels.

As DOT has recognized, “Automated vehicles that accurately detect, recognize, anticipate, and respond to the movements of all transportation system users could lead to breakthrough gains in transportation safety.” *Preparing for the Future of Transportation: Automated Vehicles 3.0*, October 2018.

The zero-emission autonomous vehicles (“ZEAVs”) for which GM is seeking temporary exemption from various Federal Motor Vehicle Safety Standards (“FMVSS”) have the potential to mitigate the frequency and severity of injury-inducing crashes that occur each year. Quite simply, by substituting the ZEAV’s ADS for a human driver, the ZEAVs have the potential to eliminate human error in driving these vehicles and save lives. In addition to the potential safety advantages, GM believes its ZEAVs can provide further societal benefits, including expanding mobility options for seniors, persons with disabilities or those without access to more affordable

transportation, helping to reduce harmful GHG emissions in the transportation sector, and expanding public access to electric vehicles through rideshare fleets.

The potential benefits offered by ADS technology are significant, and while development, progress, and maturity of the technology is considerable and tangible, the technology is unique in that it is forever dynamically improving. Such improvements are nourished by data gathered from test track, real world, and simulated experiences. Similarly, if this Exemption Petition is granted, any additional data generated will aid NHTSA's future evaluation of this technology and increase the public's understanding and confidence in GM's ZEAVs.

GM's ZEAV may be used in various commercial endeavors, including a GM-controlled ride share program, all of which will provide invaluable additional experience to the Agency and GM. Perhaps most immediately, this program will yield vital real-world data that will enable GM and NHTSA to assess the performance of the technology in a controlled, real world urban mobility program. But perhaps just as important, this fleet of ZEAVs will play a vital role in providing public introduction to, and ultimately public acceptance of, ADS technology more broadly.

It is in this context that GM provides its comments below. GM remains committed to working with NHTSA to provide further information the Agency believes necessary to grant the Exemption Petition.

Statutory Bases for Exemption

Chapter 301 of title 49, United States Code ("the Vehicle Safety Act") authorizes the Secretary of Transportation, acting through NHTSA, to grant a temporary exemption to a vehicle manufacturer to build a certain number of vehicles that do not comply with all applicable FMVSS or the bumper standard. The statute authorizes the exemption upon the Secretary's finding that the exemption is consistent with the public interest and with the objectives of the Vehicle Safety Act. In addition, the Secretary must find that the petition qualifies under one of four statutory categories:

1. Compliance would cause substantial economic hardship
2. Exemption would facilitate the development or field evaluation of a new motor vehicle safety feature that provides an equivalent level of safety as compared with the standard from which an exemption is sought;
3. Exemption would facilitate the development or field evaluation of a low emission vehicle without unreasonably lowering the safety level of the vehicle; and
4. Compliance would prevent the manufacturer from selling a vehicle with an overall safety level at least equal to the overall safety level of nonexempt vehicles.

GM initially sought its exemption in the alternative under Category 2 (facilitate new motor vehicle safety feature) or Category 3 (facilitate demonstration of low emission vehicle). NHTSA sought comment on several questions related to the statutory bases for a temporary exemption, including whether either of these two categories is more appropriate than the other. NHTSA also sought comment on whether the Exemption Petition should instead be considered under Category Four (overall level of safety).

At the outset, GM wishes to affirm that it is willing to have its exemption petition evaluated under Category Four, if NHTSA believes that Category Four is more appropriate for considering autonomous vehicle technology exemptions. GM believes that the information in its petition already meets the substantive requirements of Part 555 for a Category Four petition and does not believe that any additional information is required to support a Category Four exemption grant. More specifically, the information already submitted by GM strongly supports a finding that the overall safety level of the proposed exempted vehicles will at least meet the overall safety level of nonexempt vehicles.

Turning to the two specific categories that GM identified in its petition, GM notes that nearly all the exemption petitions granted by NHTSA in the past decade have been granted under Category Three (low emission vehicle). These recent precedents identify what NHTSA is looking for in such petitions and explain NHTSA's rationale for approving them. The Exemption Petition fully meets the requirements for Category Three petitions as outlined in Part 555, consistent with these numerous recent precedents, and GM continues to support its petition on Category Three grounds.

Category Two petitions have been rare in recent years. In the past twelve years, NHTSA has granted only one Category Two petition, but subsequently denied renewal of it. It is GM's understanding that there are some Category Two petitions pending but have not yet been acted upon. Thus, there is little recent precedent for NHTSA (or GM) to rely upon in evaluating the suitability of this Category for GM's petition. Nevertheless, GM has provided extensive information about each of the 16 standards from which GM is seeking exemptions in its Exemption Petition and has explained how the exempted vehicles will provide a level of safety at least equivalent to the level of safety provided by a non-exempted vehicle. GM also continues to support its petition on Category Two grounds.

Data Submissions & Testing Demonstrating Compliance With Exemption Standards

NHTSA poses several important questions regarding the studies, data, assumptions and scientific reasoning that might be submitted to establish that the vehicles for which exemptions are sought are meeting the applicable standard(s) described above—for example, Question No. 8, addressing whether “the ADS provides safety at least equal to the standards for which an exemption is sought.” GM stands by its commitment to work with NHTSA in developing appropriate data submission and protocols to substantiate the safe performance of GM's ZEAV. GM views practical, meaningful collaboration with the Agency as integral to securing public acceptance of ADS-technology more broadly, and to facilitating the Agency's determination to find that granting the exemption for GM's ZEAV is in the public interest more specifically.

In developing any data requirements, particularly those involving the ZEAV's ADS, such submissions should be reasonable in scope, and should recognize that there are additional mechanisms to ensure that GM will take responsibility for the safety of the vehicles it introduces into interstate commerce, including NHTSA's authority acting through the Office of Defect Investigations. As GM noted in its Exemption Petition, NHTSA does not generally impose additional restrictions, like onerous data requirements, when evaluating petitions under Part 555. GM can show the safety of the ZEAV's ADS, even though there are no federal standards for ADS

technology yet. Indeed, the Exemption Petition describes GM's development of the ZEAV's ADS-specific safety features. See, e.g., Section II.A. NHTSA granting the Exemption Petition would not impact GM's duty under the Vehicle Safety Act to introduce a safe vehicle into interstate commerce. Safety of vehicle parts and systems not covered by any FMVSS, including new technologies like the ADS, are regulated under the manufacturer's Vehicle Safety Act obligation to investigate and remedy safety-related defects, and the established and proven legal and regulatory tools supporting that obligation. Specifically, NHTSA has full authority to consider ADS performance through its recall authority, which is maintained regardless of whether there is an established safety standard.

NHTSA similarly introduces the possibility that computer simulation might be used as one of the methods to demonstrate compliance with the exemption standards (specifically, equivalent safety). GM agrees that simulation is a valuable development and verification tool; however, these simulations must be both informed by and augmented by real world data to fully address the integrated product's performance in the ODD and validate its performance as safe.

NHTSA also raises several questions regarding testing, and whether compliance tests should be conducted with human driver/controls or a programmed driver. GM currently intends to use several methodologies to meet the safety purpose and intent of the standard, including bench testing, surrogate testing, design analysis, full vehicle testing, human controlled testing, and simulation.

Comparative Assessments of Human Drivers and the ZEAV

NHTSA poses a number of questions premised on potential comparisons between non-exempt vehicles controlled by a driver and the ZEAV's ADS. Both vehicles are built with the intent of enabling the driver to control the vehicle adequately to perform maneuvers on public roadways. As such, in general terms, GM suggests that comparing a FMVSS-compliant vehicle and the ZEAV should be accomplished by demonstrating adequate control over the trajectory and velocity of a vehicle necessary for executing object and event detection and response (OEDR) actions within the desired operational design domain (ODD). GM evaluates this controllability with a combination of closed course testing of paths the ZEAV should be capable of controlling, consistent with the desired OEDR and ODD, real-world exposure data of successful vehicle control, and execution of all necessary FMVSS testing (e.g., FMVSS 135) with appropriate modifications to the test procedures as needed to accommodate the lack of traditional vehicle controls in the ZEAV. The paths chosen for closed course testing are a set of standard maneuvers necessary for real world driving (e.g., right turns, left turns, stopping at a desired location, etc.), and extremes of controllability on surfaces with split friction and varying gradients and quality (e.g., potholes, speedbumps, etc.). These extremes are designed to measure appropriate activation of ABS, traction control, stability control and any other stability assist features present in the base vehicle to ensure end-to-end integration of the technologies. These extremes are chosen from the OEDR specified for the ZEAV's driving software to make the challenge realistic vis-à-vis how the ZEAV is intended to drive.

NHTSA is also interested in how to evaluate the ZEAV's ADS functionality in relation to tasks or actions normally accomplished by human drivers, including decision-making, especially as those tasks or actions relate the component, system, test procedure, or performance requirement

from which an FMVSS exemption is sought. The Exemption Petition is not directed to the decision-making aspects of human driving; rather, it seeks exemption from requiring the mechanisms necessary for a human to control the trajectory and velocity of a vehicle. As such, GM assumes that the ZEAVs will need to demonstrate at least equivalent control of the vehicle without the actuator mechanisms present during appropriate tests, which could include some of the testing contemplated by NHTSA in Question No. 5. Similarly, ZEAVs will be required to respond to unusual situations (i.e., cross the yellow line to pass a stopped vehicle blocking the way forward for a prolonged period of time) requiring adaptation usually performed by a human driver. The examples set forth above are operating maneuvers that the ADS in the ZEAV will need to conduct as part of its driving task.

The paths necessary to accomplish these and other typical maneuvers are part of the ZEAV's OEDR and as such, are part of the overall evaluation GM has conducted to assess the ability of the ADS to control the ZEAV's trajectory. GM understands that NHTSA will need to understand that those paths do, in fact, work as intended, and will work to provide NHTSA with additional information, if needed.

Terms & Conditions

As part of a grant of the Exemption Petition, GM respects that some reporting of data is necessary to further ensure practical, meaningful oversight for NHTSA to monitor the performance and progress of GM's ZEAVs and its safety features, and to promote awareness and acceptance by the public of such vehicles. However, data requirements must be carefully calibrated to ensure that they provide sufficient information to allow oversight by NHTSA, but at the same time are not so onerous that they discourage this critical activity. As such, in imposing data-based conditions, NHTSA's approach should incorporate appropriate flexibility that accounts for the specifics of GM's operation of ZEAVs in a commercial fleet.

GM looks forward to the opportunity to work with the Agency in formulating some baseline reporting requirements. GM also expects that data relating to the exempted vehicles will result in ad hoc requests from the Agency, and GM would of course be willing to cooperate with any such reasonable request. At the same time, GM anticipates that certain types of data, including raw data captured by the vehicles' sensors, would be protected from reporting requirements.

Alternative Approaches to Assessing the Exemption Petition

GM welcomes NHTSA's acknowledgement that innovative technologies, such as automated driving systems, do not fit neatly into the four exemption categories in the Vehicle Safety Act.

NHTSA has the inherent authority under Section 30113 of the Vehicle Safety Act to consider additional information and evidence, including information developed by the Agency itself, to make the statutory findings necessary to grant the Exemption Petition if the Agency chooses to do so. Nothing in the Vehicle Safety Act restricts the Agency to the information provided by the petitioner, particularly with respect to the public interest finding.

NHTSA also has authority under Section 30114 of the Vehicle Safety Act to grant exemptions on “terms the Secretary decides are necessary for research, investigations, demonstrations, training, competitive racing events, show, or display.” NHTSA has recently announced that it is considering the possibility of a Pilot Program that would exercise this authority in the context of collaborative research on motor vehicles with high or full driving automation (83 Fed. Reg. 50872, October 10, 2018). GM filed comments strongly supporting the Pilot Program and continues to believe that Section 30114 provides NHTSA with substantial authority and discretion to grant exemptions to facilitate the development and deployment of its ZEAVs and ADS technology more broadly.

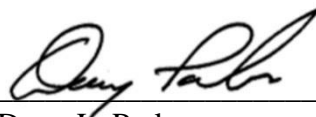
Section 30114 has an advantage over Section 30113 in that the Agency is not restricted in the numbers of vehicles it can exempt, as long as the Agency can make the required findings that the terms of the exemption are necessary for research, investigations, demonstrations or one of the other specified purposes. Granting an exemption for a volume greater than 2,500 vehicles would, aside from having some commercial value to GM, permit the collection of more data faster than is possible under a traditional Section 30113 exemption that is limited to 2,500 vehicles per year.

NHTSA also sought comment on a possible approach to stakeholder engagement that would go beyond written public comments. For example, NHTSA discussed the possibility of holding public meetings or other forms of transparent public engagement in the communities where the exempted vehicles would be operating, based on their Operational Design Domain. GM shares and applauds NHTSA's focus on public engagement and actively engages, educates and seeks to hear from community stakeholders in each ODD where its current fleet of ADS-equipped test vehicles are being operated. Outreach in this context includes, but is not limited to, public safety officials, community groups, neighborhood and merchant associations, pedestrian and bicycle advocates, State regulators and others. GM is also involved in an initiative known as Partners for AV Education (PAVE) that brings together industry, academia and community groups in an effort to educate the public about both the promise and current technological status of self-driving technology. GM would welcome the opportunity to work with NHTSA to continue engaging these and other stakeholders in an effort to build public support for its ZEAVs and ADS technology more broadly.

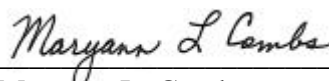
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GM appreciates the thoughtful, prudent approach reflected in NHTSA's requests for comment. NHTSA's careful consideration of the Exemption Petition and the many issues it implicates will shape the course of the continued development and implementation of autonomous driving technology for the foreseeable future. Given the unprecedented potential for this technology to reduce motor vehicle crashes and save lives, GM agrees that the investment of time and effort now will pay immeasurable dividends in the future.

Sincerely,



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