



ADVOCATES
FOR HIGHWAY
& AUTO SAFETY

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**Nuro, Inc.; Receipt of Petition for Temporary Exemption
for an Electric Vehicle With an Automated Driving System
Notice of receipt of petition for temporary exemption; request for public comment
84 Federal Register 10172, March 19, 2019**

Advocates for Highway and Auto Safety (Advocates) files these comments in response to the National Highway Traffic Safety Administration's (NHTSA, Agency) notice of receipt of petition for temporary exemption (Petition) and request for public comment from Nuro, Inc. (Nuro).¹ Advocates opposes the granting of the petition as it fails to meet the statutory requirements for petitions for exemption from the Federal Motor Vehicle Safety Standards (FMVSS). Granting this petition would enable Nuro to place vehicles which fail to meet the safety needs addressed by the FMVSS into commerce and onto U.S. roads.

Requirements for Petition for Exemption

Motor vehicle safety standards are by definition “a minimum standard for motor vehicle or motor vehicle equipment performance.”² These standards must be “practicable, meet the need for motor vehicle safety, and be stated in objective terms.”³ In light of these guiding principles, consideration of any exemption from a FMVSS should be examined closely and evaluated with the understanding that these standards require only the minimum level of protection required for the motoring public. Any exemption which does not ensure that the safety need met by an FMVSS is addressed would expose the public to unreasonable risks of crashes, injuries, or death.

The requirements for applications for exemption are specified clearly in the U.S. Code (USC) and the corresponding Code of Federal Regulations (CFR). In the case of the present petition, Nuro is applying for exemption under the basis that “the exemption would make the development or field evaluation of a low-emission motor vehicle easier and would not

¹ Nuro, Inc.; Receipt of Petition for Temporary Exemption for an Electric Vehicle With an Automated Driving System, NHTSA, 84 FR 10172, March, 19, 2019, NHTSA-2019-0017. (Notice)

² 49 USC 30102 (a)(10), Definitions.

³ 49 USC 30111 (a), Standards

unreasonably lower the safety level of that vehicle”.⁴ The USC enumerates the contents of the application. Under the exemption basis of developing or evaluating a low-emission vehicle, the application must include “a record of the research, development, and testing establishing...that the safety level of the vehicle is not lowered unreasonably by exemption from the standards.”⁵

Likewise, the enabling regulations specify what information is required in applications for exemption under the different bases. For exemptions on the basis “that the exemption would make the development or field evaluation of a low-emission vehicle easier and would not unreasonably lower the safety or impact protection level of that vehicle”⁶ the application must include:

- (2) Research, development, and testing documentation establishing that a temporary exemption would not unreasonably degrade the safety or impact protection of the vehicle, including –
 - (i) A detailed description of how the motor vehicle equipped with the low emission engine would, if exempted, differ from one that complies with the standard;
 - (ii) If the applicant is presently manufacturing a vehicle conforming to the standard, the results of tests conducted to substantiate certification to the standard;
 - (iii) The results of any tests conducted on the vehicle that demonstrate its failure to meet the standard, expressed as comparative performance levels; and
 - (iv) Reasons why the failure to meet the standard does not unreasonably degrade the safety or impact protection of the vehicle.⁷

The USC and the CFR clearly define how petitions for exemption should be considered and the statutory and regulatory language which establishes the need to protect the public from unreasonable risk of crashes, injuries, and death. The statutory and regulatory language specifies that applications must be detailed and contain documentation supporting claims that an equivalent level of safety has been achieved or the safety levels have not been unreasonably lowered. This includes documentation of research, analysis and testing. In short, actual proof to support the claims made in the application. The petition submitted by Nuro fails to meet these requirements.

Basis For Exemption

Nuro states in their petition for exemption⁸ that they are applying on the basis that the exemption will make the development or field evaluation of a low-emission motor vehicle easier and would not unreasonably lower the safety level of that vehicle.⁹

⁴ 49 USC 30113 (b)(3)(B)(iii).

⁵ 49 USC 30113 (c)(3)

⁶ 49 CFR 555.6 (c).

⁷ 49 CFR 555.6 (c) (1-2).

⁸ Nuro Inc. – Petition for Exemption, October 19, 2018, NHTSA-2019-0017-0002. (Petition).

⁹ Petition, p. 1.

Nuro's choice to apply for the exemption under the basis of making easier the development and field evaluation of a low emission vehicle raises substantial issues as to whether the application is invalid on its face. The NHTSA notes specifically that a question exists as to whether the Petition is in line with the "original purpose of 30113(b)(3)(B)(iii), which was to encourage the development of vehicles with low-emission propulsion technologies."¹⁰ The NHTSA also includes in the notice an extensive footnote summarizing the history of the statutes giving rise to this exemption basis and notes that "the purpose of the basis was to encourage the development of new vehicle propulsion technologies."¹¹ Advocates agrees with NHTSA's analysis and notes that Nuro has not provided enough detail to identify the proposed vehicle's propulsion system as a new low-emission vehicle propulsion technology. This question is significant as the basis under which the application is made establishes the safety level requirements for vehicles exempted. Exemptions requested under other bases require proof that the vehicle or feature provides a safety level at least equal to the safety level of the standard or nonexempt vehicle.¹²

FMVSS Specific Responses

The following are Advocates' comments on Nuro's description of the exemption being sought by the specific FMVSS.

FMVSS 500 S5(b)(8) [FMVSS 205 Glazing Materials]

The Petition indicates that the proposed vehicle would not require a compliant windshield as the vehicle does not have a driver. In support of this exemption, the Petition states that:

With respect to a windshield conforming to glazing standards in 49 CFR 571.205, Nuro seeks an exemption from this low-speed vehicle mandate on the basis that (1) R2X possesses no operational (driver or passenger) need for a forward windshield to provide the front visibility, passenger ejection, or passenger impact safety benefits intended with this mandate; (2) the inclusion of a compliant windshield (e.g. glass) would introduce avoidable risk in the event of a collision if instead R2X is able to (3) introduce a new and superior safety system designed to minimize the force of any impact, the testing of which would be in the public interest. If exempted, R2X would differ from a vehicle that complies with the standard because it would not have a windshield conforming to glazing standards and would have a new and superior front-end safety system, including rounded contouring, softer materials, and a "crumple zone."¹³

Nuro further states that the vehicle would "have a new and superior front-end system, including rounded contouring, softer materials, and a 'crumple zone'".¹⁴ The statute requires "a record of the research, development, and testing establishing...that the safety level of the vehicle is not

¹⁰ Notice, 84 FR 10181.

¹¹ Notice, 84 FR 10176, footnote 21.

¹² 49 USC 30113(b)(3)(B).

¹³ Petition, p. 10

¹⁴ Petition, p. 10

lowered unreasonably by exemption from the standards”¹⁵ be included in the application. Nuro has not provided any such evidence. This is a serious defect in the application as research has indicated that pedestrians have a 25% risk of severe injury and 10% risk of death when impacted by a vehicle at 23 mph,¹⁶ well within the operational range of the proposed vehicle so Nuro must demonstrate their vehicle design does not increase risk to pedestrians as opposed to traditional vehicles. Given that no specific FMVSS presently exists to ensure that automated driving systems (ADS) do not strike pedestrians and other vulnerable road users, it is incumbent on the NHTSA to ensure that the safety benefits claimed by Nuro are supported by documented research and testing.

FMVSS 500 S6.2 [FMVSS 111: Rearview Visibility]

Nuro claims that the proposed vehicle “has a comprehensive sensing system capable of providing a ‘clear and reasonably unobstructed view’ to the rear of the vehicle.”¹⁷ Nuro further states that “[t]he vehicle also will not reverse if the autonomy system or remote operator detects a person, animal, or object behind the vehicle.”¹⁸ While it is commendable that Nuro recognizes that the driver reaction, in this case applying the brakes and avoiding the collision, is part of meeting the safety need of the FMVSS, the statute and regulations require documentation of research and testing to demonstrate the safety level of the vehicle.

Operational Design Domain

Noticeably absent from the petition is any specific definition of the operational design domain (ODD) of the proposed vehicles. While Nuro mentions that the vehicle is designed for “neighborhood driving” and “pre-mapped surface streets”,¹⁹ no specific definition of where the vehicle will be operated and to what conditions it would be limited is provided. Again, statutory and regulatory language requires research, documentation and testing to prove that the level of safety will be maintained or not unreasonably lowered. NHTSA cannot approve an application for an ADS with no specifically defined ODD in which to verify the claims made by Nuro. Moreover, Nuro cannot be allowed to expand the ODD of the vehicle without filing an additional petition for another exemption which must include the necessary documentation and testing to prove that the vehicle will meet the safety requirements in the expanded ODD.

Advocates opposes the granting of Nuro’s petition for exemption. As discussed, Nuro has failed to meet the statutory and regulatory requirements for petition for exemption and as such the petition must be denied.

¹⁵ 49 USC 30113 (c)(3)

¹⁶ Impact Speed and a Pedestrian’s Risk of Severe Injury or Death, AAA Foundation for Traffic Safety, Sep. 2011.

¹⁷ Petition, p. 12.

¹⁸ Petition, p. 12.

¹⁹ Petition, p. 8.

Request for Comments and Information from the NHTSA

The following are responses to specific questions posed by the NHTSA at the end of the notice and not addressed by previous comments.

4. Independent of the agency's disposition of this petition, NHTSA seeks comment on whether, and if so how, the agency should also consider creating a new vehicle classification category for light and/or low-speed passengerless ADS vehicles like the R2X to which a subset of FMVSS requirements would apply.

Advocates is concerned that manufacturers may see the creation of a light / low-speed passenger-less vehicle as a means of testing ADSs without having to meet all of the FMVSS. In addition, when developing these vehicles manufacturers must consider the overall impact that the operation of these vehicles could have on safety. Regardless of these vehicle not transporting human passengers, they present safety concerns. For example, another vehicle striking an errant low speed ADS driven vehicle weighing up to 3,000 pounds, even at speeds in a "neighborhood environment", could still result in significant risks to other road users.

5. Nuro contends that an exemption is necessary [sic] facilitate the development of and [sic] LEV [low emission vehicle] because it has "exhausted the safety gains that can accrue" from its current testing. Does the petition provide sufficient information to enable the agency to determine whether exempting the vehicle would make the development or field evaluation of a low-emission motor vehicle easier? If not, what additional information should the agency seek prior to rendering its final determination and why?

Advocates is concerned with the implication that the proposed exemptions are being sought for the expansion of testing. This implies that Nuro is unable to prove the safety level of the vehicle under the proposed exemptions and is preparing to use the public as unwitting participants in their experiments. The exemptions being sought are not for testing but are for sale and introduction into commerce and thus their evaluation should be given careful consideration due to the potential impact on public safety. Manufacturers and developers seeking to test unproven vehicles on public roads should be subject to an institutional review board process to ensure that combinations of decisions, such as those made resulting in the Uber crash in Tempe, Arizona that occurred in March 2018, do not result in unreasonable risk to the public.

33. If NHTSA were to grant Nuro's petition, what would be the potential utility of NHTSA's placing terms requiring the submission of the following categories of data?

The NHTSA should establish terms and conditions in the exemption process for the sharing of data with the agency. As much as possible, the agency should seek to make this data public and available for review by the public and researchers. If rapid improvement on on-road safety is the true intent of the introduction of these vehicles,

there is no better means of increasing that process than through the dissemination of data and transparency.

35. If the agency were to require the reporting of data, for what period should the agency require it to be reported—the two-year exemption period, the R2X's entire normal service life, or a time period in between?

Data should be reported for the life of the vehicle. While the exemption allows the production of vehicles for introduction into commerce for the two years, it does not prohibit the continued use of those vehicles and as such should be subject to reporting and any other requirements.

36. Given estimates that vehicles with high and full driving automation would generate terabytes of data per vehicle per day, how should the need for data be appropriately balanced with the burden on manufacturers of providing and maintaining it and with the ability of the agency to absorb and use it effectively?

The NHTSA should establish data retention requirements for vehicles subject to the exemption and establish requirements for access by NHTSA and any other appropriate agencies, such as NTSB.

37. If supporting information (including analysis, methodology, data, and computer simulation results involving proprietary systems or specialized computer programs) is submitted by a petitioner under a request for confidential treatment and relied upon by the agency in its determination whether to grant or deny a petition, how can the public be provided with an evaluation and a justification for the determination that are transparent, readily understandable and persuasive?

All information submitted to the Agency should be made publicly available unless NHTSA determines that it constitutes confidential business information. Determinations by NHTSA regarding whether such information is in fact confidential should start with the premise that information submitted to the agency should be made public.

38. Are there any mechanisms that may help further mitigate the underlying safety risks, if any, presented by this petition? For example, what additional safety and engineering redundancies, if any, should NHTSA consider requiring as a condition to granting the exemption?

While the Nuro petition and the exemption process generally address compliance with existing requirements, the possible failures of the ADS or its components presents an unknown. While Nuro mentions system redundancy, among other methods, of ensuring a fail-safe or fail-operational system, the Agency should confirm that these systems exist and will perform as described. Overall safety of ADS will be improved by the establishment of a functional safety standard to help ensure all systems perform as intended. Recent Boeing crashes and surrounding controversy are indicative of the

catastrophic results that can come from the misclassification of a hazard relating to the failure of a component, or the failure to inform operators about the performance of a system and how to disable it. In the end, if failures during the development of AVs endanger the public and cause injuries or loss of life, and the public turns against the technology, the safety benefits of the technology could be lost for years. The Agency should keep this in mind and establish requirements for redundancy as necessary to avoid the introduction of unreasonable risk and the preservation of public safety.

39. In the absence of information demonstrating the safe real-world operation of the Nuro vehicle, would it be prudent for NHTSA to place terms on the exemption to protect public safety? If so, what terms would be appropriate? In addition, what terms, if any, should the agency consider placing on an exemption to facilitate agency efforts to monitor the operations of exempted vehicles, and maximize the learning opportunities presented by the on-road experience of the exempted vehicles during the exemption period and thereafter?

Advocates supports the Agency's use of the exemption process to increase their understanding of AV operations through the monitoring of operations of exempted vehicles. Requiring data sharing would likewise contribute to this process. At all times however, the public must be protected from unreasonable risks through thorough review of petitions, oversight of vehicle deployment, and verification of compliance with the limitations of the exemption.

Conclusion

Advocates opposes the granting of Nuro's petition for exemption. As discussed, Nuro has failed to meet the statutory and regulatory requirements for petition for exemption and as such the petition must be denied. In light of this petition and the issues raised by it, Advocates once again calls upon the NHTSA to develop FMVSS that apply to automated driving systems to ensure public safety.



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