INFORMATION REDACTED PURSUANT TOTHE FREEDOM
OF INFORMATION ACT (FOIA), 5 U.S.C.552(B)(6)

June 22, 2022

This sets forth the reasons for the denial of a petition submitted to NHTSA on September 14, 2021, requesting that the agency investigate whether a defect related to motor vehicle safety exists in van-type or box semi-trailers due to a lack of side underride guards. On November 17, 2021, NHTSA opened Defect Petition DP21-004 to evaluate petitioners' request. After a review of the petition and other information, NHTSA has concluded that the issues presented by the petitioners will be examined in work undertaken pursuant to congressional direction under the Bipartisan Infrastructure Law. Accordingly, the agency has denied the petition.

In a letter dated September 14, 2021, Marianne and Jerry Karth, Eric Hein, and Lois Durso (petitioners) petitioned the National Highway Traffic Safety Administration (NHTSA) to initiate a defect investigation into van-type or box semi-trailers for a lack of side underride guards (SUGs). NHTSA's Office of Defects Investigation (ODI) assessed the information provided by the petitioners, as well as additional information that ODI gathered from other relevant sources.

The petitioners allege there is a known safety hazard and defect where passenger vehicles or other vulnerable road users (pedestrians, bicyclists, or motorcyclists) collide with van-type or box semi-trailers resulting in death and significant injuries due to a lack of SUGs. The petitioners state that at least 500 deaths and 5,000 serious injuries occur annually due to side underride crashes. They also say that a known solution is currently available.

The subject vehicles are van-type or box semi-trailers operated in the United States. The trailers range from twenty-eight feet (28') to fifty-three feet (53') in length. They are typically eight feet (8') to eight and a half feet (8.5') wide and up to thirteen and a half feet (13.5') tall. Most have one fixed axle, or two axles mounted in tandem on a sliding rail system at the rear. This allows for proper axle weight distribution as per U.S. Bridge Laws, as well as increased maneuverability when needed. Gross Vehicle Weight Ratings (GVWR) are typically up to

68,000 pounds. All subject vehicles are currently required to have rear underride protection as per Federal Motor Vehicle Safety Standard (FMVSS) 224. The load floor height is approximately four feet (4') above the ground. The space between the ground and floor is often used for sliding tandems (axles), fuel tanks, air hoses, spare tire carriers, and other optional fixtures. Additionally, many trailers are now equipped with lightweight skirts to improve aerodynamics to increase fuel efficiency.

SUGs are intended to prevent a vehicle from underriding the trailer in the event of a collision (an "underride" crash).[1] The concept is that a barrier of sufficient strength extends downward from the trailer side to fill the space between the trailer floor and the ground.

ODI has received three (3) complaints, other than those from the petitioners, related to trailer underride. All three of these additional complaints involve vehicles older than Model Year 2006 and were submitted by the same individual more than 11 years ago. Although NHTSA's Early Warning Reporting (EWR) regulations do not have a specific code for underride, searching the Death and Injury (D&I) EWR data identified five (5) reports citing underride. The following table summarizes the report year and the Model Year of the semi-trailer involved.

Year Reported to NHTSA	Model Year of Trailer
2021	2019
2021	2015
2013	2007
2006	1998
2018	Unknown

[1] While petitioners allege that a lack of SUGs also poses a safety hazard to vulnerable road users (*e.g.*, pedestrians), that results in death and injury, SUGs—the lack of which petitioners assert constitutes a defect here—are devices that are specifically intended to prevent a vehicle (not necessarily a vulnerable road user) from underriding a trailer.

In early December 2021, ODI sent an Information Request letter to eight (8) manufacturers asking for information related to side underride. Letters were sent to the following trailer manufacturers: Great Dane; Hyundai Translead; Kentucky Trailer; Stoughton; Strick Trailers; Utility Trailer Manufacturing; Vanguard; and Wabash. ODI received separate responses from each manufacturer by January 14, 2022, and a supplemental response from Hyundai Translead on April 14, 2022.

Each manufacturer was asked about its market share of the subject vehicles. Most replied with a range, as the share varies from year to year. ODI concluded that the eight manufacturers surveyed represent nearly 100% of the subject vehicle population. Additionally, ODI asked each manufacturer for its assessment of the current in-service subject vehicle population. Based on the responses, the total vehicle population is estimated to be 2.45 million trailers.

The responses from the eight manufacturers identified over 20 events that may relate to underride from 2006 to 2022, including events that involved death or injury. ODI was able to locate 19 of the events within its databases. Title 49 of the Code of Federal Regulations (CFR) Part 579 requires the trailer manufacturers to report whenever they receive an allegation that a defect resulted in a death or injury. The manufacturers responded that they are typically unaware of underride events unless legal action is brought against them, or as in one case, the trailer is brought in for repairs.

ODI reviewed additional sources to better understand the petitioners' claim that at least 500 deaths and 5,000 injuries occur annually due to side underride crashes. A 2012 article by Matthew Brumbelow titled "Potential Benefits of Underride Guards in Large Truck Side Crashes" included a statistical analysis of Trucks Involved in Fatal Accidents (TIFA).[2] Between

[2] Matthew L. Brumbelow, *Potential benefits of underride guards in large truck side crashes*, 13 Traffic Inj. Prevention 592–99 (2012).

2006 and 2008, 7,250 passenger vehicle occupant deaths were recorded in two-vehicle crashes with large trucks (tractor-trailers and single unit trucks). Using the 2006-2008 TIFA data, Brumbelow estimated that approximately 530 passenger vehicle occupants died annually in two-vehicle crashes in which the passenger vehicle struck the side of a large truck. Brumbelow noted that 20 percent of the side-impacted trucks were straight trucks, and those remaining were tractor-trailers or tractors without trailers. However, TIFA data files did not provide information on the impact location (impact with tractor, between tractor and trailer, between front and rear axles of the trailer, or behind the trailer rear wheels) and whether the passenger vehicle underrode the truck. Brumbelow noted that not all fatalities and injuries were due to vehicle underride and that not all injuries in crashes with side underride could be mitigated by side underride guards, because of the impact location, lack of restraint use, high deceleration levels, and other factors. Using 2008-2017 fatal crash data, NHTSA estimated that there were 212 light passenger vehicle occupant fatalities annually in crashes into the sides of tractor-trailers.

In their petition, petitioners identify patents for side underride guards held by two semi-trailer manufacturers that they state indicates that the industry has already designed and tested a solution to the alleged defect. The petitioners further state that another underride guard, designed outside of the industry, has been successfully crash tested and proven to stop a car from going under a semi-trailer in a collision up to 40 mph. Multiple manufacturers have conducted testing of various SUG devices, and some of the manufacturers queried by NHTSA tested that guard on their trailers. According to the manufacturers, in certain cases, either the trailers and/or the guard experienced structural damage when the guard was fitted to a trailer and subjected to the manufacturer's validation testing. The guard failed the validation test, in other words. In one case, the testing was limited to a floor endurance test as defined by the Truck Trailer

Manufacturers Association (TTMA) Recommended Practice 37-07 (RP 37-07). The manufacturer reported that, while the guard-equipped trailer passed two of the three tests, it failed the overload portion. This manufacturer has had three customer inquiries about SUGs in the past ten years. The manufacturer stated that at a customer's request it would install an SUG. One other manufacturer noted that it offers a prototypical side-impact guard as optional equipment where specifications are consistent with a side-impact guard and it is determined the guard will not result in an unsafe condition.

Multiple manufacturers also reviewed the IIHS crash test of the guard to which petitioners refer. Manufacturers expressed concerns over various aspects of testing. Manufacturer responses indicated that the trailer was not loaded in a typical manner, in that the load on the trailer was concentrated in the back instead of being evenly distributed across the entire floor (as it would be in a real-world operation). For comparison, FMVSS 223 testing for rear underride requires the test structure/trailer to be fixed so that it does not move. One manufacturer conducted a separate crash test of the guard on what it described as a properly loaded trailer, and noted the trailer was displaced approximately three inches (3") compared to over one foot (12") in the IIHS test scenario with the same make/model crash vehicle and impact speed. The manufacturer described that in the IIHS test, energy was dissipated when the trailer flexed and slid (reducing the amount absorbed by the guard). The manufacturer had reservations about performance of the guard, given that the weighting and loading criteria in the IIHS test was not the same as that used for IIHS rear-impact tests, and also expressed concern about exposure to real-world conditions, including with regard to damage to the trailer and attendant safety risks. One manufacturer also noted that the IIHS test involved only a perpendicular impact at the center of the SUG. For comparison, FMVSS 223/224 requires testing along multiple locations of the

rear guard. Crash data also shows a significant number of real-world events involve collisions at acute and obtuse angles, and no such tests are known to have been conducted with this guard.

The petitioners claim that since 2010, this guard has been installed on a small number of semi-trailers that logged over one million miles of use delivering loads without negative road clearance issues, structural deficiencies or issues with loading or unloading at docks. A manufacturer response indicated that this statement is based on one trailer operating a dedicated route. This is typical mileage for such an operation, as most trucks average 100,000 miles per year. A dedicated route means the trailer sees the same loading and unloading facilities and travels the same terrain. Furthermore, this manufacturer response stated that this unit is part of a multi-trailer fleet, and that the fleet has not added more of these guards to the rest of its trailers.

More broadly, certain manufacturers noted that SUGs may be compatible with some trailer and fleet operations, although there was the suggestion that a "one size fits all" approach is not possible in the U.S. commercial vehicle market, where vehicles are designed and purchased for specific operations or for versatility necessitated by the fleet's operation. Multiple manufacturers are working on SUG designs, and several manufacturers have filed patents for their designs, although trailer manufacturers pointed out challenges. One manufacturer noted it had not, to date, identified a feasible design to prevent underride while not compromising the structural or operational capabilities of the trailer. Another manufacturer developing a prototype observed that testing is scheduled, but cited potential material shortages and shipping delays. Furthermore, it appears there is a hesitancy on the part of at least some manufacturers in the industry to develop SUGs without research from NHTSA on their effectiveness and cost.

NHTSA is authorized to issue an order requiring notification and remedy of a defect if the agency's investigation shows a defect in the design, construction, or performance of a motor

vehicle that presents an unreasonable risk to safety. 49 U.S.C. §§ 30102(a)(9), 30118. Factors the agency may consider when deciding whether to grant or deny a defect petition "include, among others, allocation of agency resources, agency priorities and the likelihood of success in litigation which might arise from the order." 49 C.F.R. § 552.8. The above discussion illustrates that the complex issues that the petitioners present would benefit from additional information and data. NHTSA does not prescribe a specific remedy even where a safety defect is identified, but the agency may set performance standards for equipment—and recognizing a need for further research and evaluation of SUGs, Congress included in section 23011 of the Bipartisan Infrastructure Law (BIL) (November 15, 2021) several provisions that relate to side underride issues.

Among these is a requirement that the Secretary of Transportation "complete additional research on side underride guards to better understand the overall effectiveness of side underride guards" and, "if warranted, develop performance standards for side underride guards." The Secretary is also required to publish findings of an assessment of the "feasibility, benefits, and costs of, and any impacts on intermodal equipment, freight mobility (including port operations), and freight capacity associated with, installing side underride guards on newly manufactured trailers and semitrailers with a gross vehicle weight rating of 10,000 pounds or more," and after taking public comment, submit to Congress a report that includes, among other things, "a determination as to whether the Secretary intends to develop performance requirements for side underride guards, including any analysis that led to that determination." In addition, the Secretary must establish an Advisory Committee on Underride Protection "to provide advice and recommendations to the Secretary on safety regulations to reduce underride crashes and fatalities relating to underride crashes."

Based on the available information and agency experience, ODI believes the issues raised by the petitioners are best addressed through the congressionally-directed evaluation of SUGs under section 23011 of the BIL. As the issues presented by the petitioners are being addressed pursuant to such direction, NHTSA has decided not to open a defect investigation, and the petition is denied. The denial of this petition does not foreclose the agency from taking further action if warranted or making a future finding that a safety-related defect exists based upon additional information the agency may receive.