

Natural Gas Emissions through Venting

According to 49 C.F.R. § 173.318(e), the temperature of LNG in an MC-338 cargo tank should be sufficiently cold at the start of travel that the set pressure for the required pressure relief valve will not be met in less time than the marked rated holding time for LNG. Additionally, 49 C.F.R. § 173.319 provides requirements intended to prevent venting of rail tank cars carrying cryogenic liquids, with reporting requirements for tank cars that are not delivered within 20 days. Thus, no emissions due to warming of the LNG are anticipated during regular transport via rail or motor vehicle.

No emissions are expected during routine transport, as more than 99.99% of hazmat moved by rail reaches its destination and carrier operating restrictions exist which are intended to prevent venting during routine transport.^{17,18} However, emissions of LNG can potentially occur if the tank car: (i) is involved in an accident; or (ii) is left unattended for an extended duration in transport, such as a lost tank car. All LNG transport containers are equipped with PRDs for venting of natural gas if such a situation occurs. If a venting event occurs during transport, there are safety mechanisms in place to limit the impacts. For a cryogenically transported DOT-113C120W tank car that has not arrived within 20 days of shipment, the FRA must be immediately notified.¹⁹ The additional safety precaution in place is the design of the tank car. DOT-113C120W tank cars are designed to provide 40 days of transportation without venting. A train carrying cryogenic materials such as LNG is unlikely to require 40 days to reach its destination under normal circumstances because of the notification requirement and the likely follow-up. Thus, the ability of the DOT-113C120W to hold LNG without venting for twice the time necessitated by the regulation for notification to FRA affords extra protections against any environmental impacts associated with venting while in transit.

LNG may be transported on the highway through MC-338 cargo tanks with gross capacities up to 16,300 gallons,²⁰ subject to applicable restrictions on vehicle weight. If the requested special permit is granted, then LNG may be transported via rail in DOT-113C120W rail tank cars with a gross capacity of 30,680 gallons,²¹ around twice the capacity of the cargo tanks. In the event of an accident or insulation system failure or extended duration in transport, with no puncture of the tank, pressure in the container may rise slowly as the LNG warms due to heat leakage into the container. A spring-loaded and self-resetting PRD may temporarily open and vent some natural gas, which will reduce the pressure back to an acceptable level. The device will then reclose and prohibit the emission of additional natural gas unless experiencing pressure build-up again. The short duration of venting also provides some cooling to the LNG. This cycle will repeat until the

¹⁷ Fronczak, Robert E. Robert E. Fronczak to Record Center Pipeline and Hazardous Materials Safety Administration Department of Transportation, 2017. Letter. *Re: Special Permit Application Number 20534-N*. October 13, 2017.

¹⁸ Fronczak, Robert E. Associate of American Railroads to Pipeline and Hazardous Materials Safety Administration. Petition for Rulemaking to allow methane, refrigerated liquid to be transported in rail car. P-1697. January 17, 2017.

¹⁹ 49 CFR § 173.319(a)(3).

²⁰ Chart ST-16300 LNG Transport Trailer, PN 14722928, 2013.

²¹ Chart SR-603 LNG Tank Car, PN 14722936, 2013.