8.2 Comparison with LPG Transportation

The risks associated with handling and transporting LNG ISOs were benchmarked against the risks associated with transporting liquefied petroleum gas (also known as propane or LPG under the UN1075 designation) rail cars. LPG was chosen as a comparison flammable hazardous material due to its shipping history in the general rail industry and at FECR and because it is similar to LNG. LPG does not behave identically to LNG since LPG is a pressurized liquefied gas whereas LNG is a refrigerated liquefied gas, but it provides a useful HAZMAT commodity comparison. In 2015, (b) (4) [redacted]. For the analysis here, the highest risk section of mainline transport (corresponding to a population density of 11,800 people/mile^2) and highest risk yard/intermodal facility (Hialeah Yard) were used to provide a consistent basis for comparison. The risk posed by an energy-equivalent quantity of LPG was analyzed for these cases.

The LPG rail cars were assumed to be transported in DOT-112 pressurized rail cars (nominal volume of 34,000 gallons); hence, the Lift On/Lift Off activities associated with LNG ISOs were not applicable to the LPG rail cars. To compare the LNG ISOs to LPG rail cars on an energy-equivalent basis, it was estimated that approximately (b) [redacted] 34,000 gallon LPG rail cars have the same energy content as (b) [redacted] 10,000 gallon LNG ISOs.[66] The accident rate methodologies developed in Section 3.1 were applied here to estimate the LPG car derailment rates and the LOC probabilities. The LPG event accident, derailment, and release event trees can be found in Appendix D.

8.2.1 LNG versus LPG Mainline Risks

The baseline train configuration C-1 was considered for the LNG ISOs along with a similar configuration for the LPG rail cars ((b) [redacted] cars blocked in a sequence starting at train position (b) [redacted]. A summary of the risk metrics for the LNG and LPG mainline movement cases is provided in Table 46. Overall, the analysis indicates that the risks for shipping an energy-equivalent quantity of LNG on the mainline are similar to those posed by LPG. The SR Integral for LPG is approximately twice the value of that for LNG for both low speed and high speed cases. There is no Zone 3 - 3×10^{-7} yr^{-1} IR contour for the LNG ISO mainline movement at train speeds less than 25 mph (whereas for LPG, a Zone 3 contour exists and the distance is 323-feet) and the distance to the 3×10^{-7} yr^{-1} IR contour is 612-feet for LPG compared to just 243-feet for LNG for train speeds between 25 mph and 60 mph.

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[66] The energy-equivalent amount of LPG relative to (b) [redacted] 10,000 gallon LNG ISOs was estimated to be (b) (4) [redacted] gallons of LPG. Assumptions: density of LNG = 440 kg/m^3, density of LPG = 500 kg/m^3, specific energy of LNG = 55.5 MJ/kg, and specific energy of LPG = 46.4 MJ/kg.