using only one baseline train configuration: all three LPG cars are assumed to be in series starting at train position 11. This configuration is consistent with the LNG train configuration 1 (C-1). As with the LNG ISO cars, three cases (yard, low speed, and high speed) were considered for determining the probability of LPG car involvement in the event of a train accident with derailment.

The probability of first car derailed as a function of position-in-train was then calculated for the three cases using the 21-year FRA data. This data was then analyzed using the average number of cars derailed for each case to calculate the probability of having from one to three LPG rail cars derail. A summary of the calculated probabilities is provided in Table 14.

Table 14.   Probability of having X number of LPG rail cars derailing in the event of a train accident with derailment, where X is the number of LPG rail cars involved.

# of LPG Rail Cars Derailed	Probability of X Number of LPG Rail Cars Derailing		
	Mainline ≥ 25 & ≤ 60 mph	Mainline < 25 mph	Yard
▮	▮	▮	▮
▮	▮	▮	▮
▮	▮	▮	▮
▮	▮	▮	▮

3.1.5 ISO LOC Probabilities

The prior sections detailed the development of accident rate and derailment probability estimates for LNG ISO cars. Not every accident will lead to an LOC of LNG. The specific dynamics of an individual accident will dictate whether and to what extent an LOC may occur. This section discusses the development of LOC and release size probability estimates for the QRA model based on industry data and guidelines.

LOC probability data for LNG ISO containers does not exist, so general rail industry data was used, and reasonable engineering assumptions were made as necessary. Pressure tank cars and cryogenic tank cars have an extensive history of operation with corresponding accident data, and with some engineering judgement, this type of accident data was applied to shipping LNG ISOs. A flow chart supplementing the following discussion is provided in Figure 27 at the end of this section. The Pipeline and Hazardous Materials Safety Administration (PHMSA) maintains an online database that provides historical LOC data for rail tank cars, among other transportation vessels.[29] The database complements the FRA database in that the PHMSA

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[29] Accessible via hazmatonline.phmsa.dot.gov/IncidentReportsSearch/search.aspx.