

- Surface Cover (Vegetation, Structures)
- Soil (Dirt, Clay, Sand)

As stated previously, hazard distance of a vapor cloud dispersion of LNG is difficult to predict. Local weather conditions, terrain, surface cover (i.e., vegetation, trees, and buildings) will influence how a vapor cloud disperses, and how rapidly it diffuses.

Similarly, the actual distance that radiant heat effects from a pool fire of LNG would impact is dependent on the same factors that influence a vapor cloud, including very significantly on the size of the liquid pool formed (topography related) and the volume of LNG spilled. Additionally, the impact of radiant heat effects from a fire on occupied structures will be influenced by local building codes that govern building setback requirements from railroad right-of-way. Depending on the jurisdiction, setbacks for occupied structures could be within fifty (50) feet of either side of a railroad track.

Regardless of the scenario, the recommended protective action distances identified in the PHMSA Emergency Response Guidebook (ERG) for LNG would be appropriate for the initial protection of the public during an incident involving LNG. However, these protective distances may encompass occupied structures along rail tracks, depending on the location of a failure and the proximity of occupied structures to a breached tank car.

Cascading Failure of Multiple DOT-113 Tank Cars

As stated previously, the unique design and materials used to construct DOT-113 specification tank cars used for the transportation of cryogenic liquids provide an inherently more robust tank car when compared to other specification tank cars due to their unique design, and materials of construction, and their specific purpose to transport cryogenic liquids.

In the scenario where multiple DOT-113 specification tank cars are transported in a block or in a unit train configuration, there are two (2) stresses, fire/radiant heat exposure, or cryogenic temperature exposure, that could potentially lead to failure of otherwise undamaged tank cars and consequent release of the material. The DOT-113's double wall design reduces the probability of cascading failures of multiple other undamaged DOT-113 specification tank cars in a consist, either as a block in manifest train or in unit train configuration.

Fire/Radiant Heat Exposure

In a scenario involving fire/radiant heat exposure, an undamaged DOT-113 specification tank car exposed to a radiant heat source would eventually build pressure that would trigger the activation of the tank car's PRD.

As stated previously, this scenario would result in the controlled venting of LNG vapor to the environment. Immediate ignition of these vapors could occur if an ignition source is present. The fire would be relatively small and will be contained to the proximity of the release point of the vapors from the tank car. Additionally, as stated previously, it is highly unlikely that an undamaged DOT-113 tank car involved in a derailment would result in explosion due to a BLEVE. This event is highly unlikely due to the design of the tank car, the loading pressure