contamination on or in common urban surfaces."[25] LOC of LNG is expected to have a similar negligible impact on soil or groundwater quality following evaporation. Due to their nature, cryogenic liquefied gas spills have much less impact to the environment compared to other flammable materials such as gasoline or crude oil with respect to leaching into the soil or waterways.

When considering a potential LOC event involving LNG, any LNG released would behave similarly regardless of whether the release event involved LNG from MC-338 cargo tanks or from a DOT-113C120W tank car. DOT-113C120W tank cars have a larger capacity than MC-338 cargo tanks and a unit train will transport multiple DOT-113C120W tank cars.

Indirect Effects and Cumulative Impacts

The longevity of locomotives versus motor vehicles plays an impact in the environment due to the lifespan of the equipment associated with each transportation mode. A locomotive has a lifespan of approximately 30 years with freight cars having a lifespan of 50–65 years.[26] Motor vehicles have a lifespan of 2–7 years, and their trailers have around 8 years of life. The lifecycle of multiple vehicles transporting the same amount of LNG would have a larger environmental impact due to the longevity of the different transport methods.

The frequency of highway cargo tanks transporting LNG will be 2 to 4 times that of a rail tank car for a given capacity of LNG; thus, the mileage for highway cargo tanks will be considerably higher than that of rail tank cars. The higher number of trips results in a higher baseline representative risk to the public for the highway transport of LNG when compared to rail transport of an equal quantity of LNG along a similar route. In addition to the increased trips resulting in increased risk, motor vehicle transport could increase the congestion on the highway. Conversely, a unit train may have impacts on highway congestion in areas in which the rail tracks cross the highway at grade, therefore halting traffic in certain areas for the duration of the train crossing. Given the baseline case of LNG movement presented here—700 motor vehicles or 2–4 unit trains per day—the impact on traffic for rail transport could be significantly lower on the local, state, and national road systems.

Greenhouse gas (GHG) emissions from diesel engines are directly related to fuel consumption, and as such a shift from highway to rail transportation of freight can decrease the GHG emissions per ton-mile by more than 85%.[27] While trains may not be able to get from door to door, a combined effort is underway by the EPA to increase the use of rail freight transportation in order to decrease GHG emissions. The EPA SmartWay Transport Partnership encourages intermodal

---

[25] Whitmire, M. & Schneider, J. *Evaluation of portable x-ray fluorescence for the determination of chlorine in the environment after chlorine releases at jack rabbit II*. US Department of Homeland Security, Chemical Safety Analysis Center. CSAC-16-004. February 2016.

[26] Accessed via http://railtec.illinois.edu/wp/wp-content/uploads/pdf-archive/9.1.pdf on February 25, 2019.

[27] Frey, Christopher, and P. Kuo. "Assessment of potential reduction in greenhouse gas (GHG) emissions in freight transportation." *Proceedings, International Emission Inventory Conference, US Environmental Protection Agency, Raleigh, NC*. Vol. 15. 2007.