Alternative. The risks that would increase with the selection of the No Action Alternative are increased trips (because of lower volume transported per cargo tank), thereby increasing opportunity for an incident, higher accident rate for highway traffic as compared with rail traffic, and closer proximity to people and inhabited structures on roadways as compared to rail rights of way. On the other hand, a larger quantity LNG loaded into each rail tank car, along with the risks that result from multiple tank cars moving together, could lead to higher consequences. A failure of either an MC-338 or a DOT-113 could cause injury, death, property destruction and environmental harm. The likelihood of failure of MC-338 is higher, but the scope of potential of injury and death, could be greater in a populated area for a DOT-113 failure because of higher volumes of LNG carried in each tank car (by about a factor of 3) compared to that in a MC-338 transport.

Fuel Efficiency

Fuel efficiency for transport of LNG can be calculated by two methods: (1) miles per gallon of fuel and (2) ton-miles per gallon of fuel. Miles per gallon gives the fuel efficiency of the transportation method, nonspecific to the cargo load. For example, a tractor-trailer with 46,000 pounds of payload, which corresponds to approximately 15,000 gallons of LNG,[12] may be expected to have 19.5 gallons diesel consumption per 100 miles.[13] While this method is commonly used with personal cars, it provides no information on how the efficiency is affected by the cargo load. A more standardized and accurate method for comparing the fuel efficiency across all trains and all freight trucks transporting cargo is in the method of ton-miles per gallon of fuel. This method takes the sum of annual ton-miles of freight transported divided by the annual fuel usage to result in ton-miles per gallon (stated as the miles a transportation method can transport 1 ton of freight on a gallon of fuel). An example calculation would be of a heavy-duty diesel truck transporting 19 tons of freight a distance of 500 miles on 71 gallons of diesel fuel. This would result in

$$(19 \text{ tons} * 500 \text{ miles})/_{71 \text{ gallons}} = 134 \text{ ton-miles per gallon}$$

for a freight truck. Although the example is of a smaller cargo transportation, the 134 ton-miles per gallon is the value associated with overall freight trucks for their fuel efficiency.[14] For a locomotive, fuel efficiency is 471 ton-miles per gallon[14] resulting in trains having a fuel efficiency around 3.5 times more efficient at hauling freight than trucks.

Denial of the proposed special permit/selection of the No Action Alternative could result in ETS shipping larger quantities of LNG over the highway via cargo tank motor vehicle. A larger reliance on transportation via cargo tank motor vehicle would result in more fuel use and emissions, due to inferior fuel efficiency of highway transportation compared to rail. Issuance of

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

13 Accessed via https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/812146-commercialmdhd-truckfuelefficiencytechstudy-v2.pdf, pgs. 61-65, on February 20, 2019.

14 Accessed via https://www.csx.com/index.cfm/about-us/the-csx-advantage/fuel-efficiency/ on February 20, 2019.