The DOT-113C120W design provides an increased crashworthiness when compared to a single vessel-wall design rail tank car of wall thickness equal to the sum of inner and outer tank wall thicknesses of DOT-113C. The tank car insulation is required to be designed to ensure that the heat transfer from the ambient air to LNG in the tank does not result in a pressure rise of over 3 psig/day, on an average. See 49 C.F.R., § 173.319(c). The start-to-discharge-pressure of the pressure relief valve is set at a sufficiently high value (generally 75 psig; 49 C.F.R. § 179.401-1) to ensure, at least, a 20-day transit time from the day of filling the tank car. See 49 C.F.R. § 173.319(a)(3).

The hazardous properties (flammability and pressure build up) of LNG and liquefied ethylene (for comparison of a flammable cryogenic material already authorized in a DOT-113C120W tank car) are virtually identical when the parameters for filling the tank car are adjusted for the specific physical properties of the two materials. The safety profiles of transporting a single tank car of LNG in a DOT-113C120W and single tank car of cryogenic ethylene in a DOT-113 would be very similar except that ethylene vapor burns in both lower and higher concentrations in air. Nonetheless, the applicant states that, depending on demand, it may offer into transportation up to 100 tank cars at a time once its project reaches full capacity. As with any hazardous material offered into rail transportation, each additional tank car containing a hazardous material such as LNG in the train consist, increases the likelihood that a derailment could result in one or more hazardous material releases. LNG poses potential cryogenic temperature exposure hazards as well as fire and explosion hazards. Due to a large difference in temperature, the rapid transfer of heat from an object into the cryogenic liquid can cause burns if direct contact of liquid with skin occurs or if Personal Protective Equipment (PPE) is inadequate to prevent cold-temperature injury during an exposure. Additionally, large spills of the liquid onto metal structures that are not designed to withstand cryogenic temperatures can cause embrittlement and fracturing. Methane is odorless and LNG contains no odorant (unlike odorized residential natural gas supplies), making detection of a release difficult without a detector device. Vapor generated by the evaporation of LNG, comprised primarily of methane, is flammable when mixed with air in vapor concentrations between, approximately, 5% to 15% by volume; outside of this range, the vapor fuel will not burn. By comparison, the flammable ranges in air of ethylene is much broader, at 2.7–36%. Releases of LNG due to venting or to accidents, without immediate ignition, involving either a MC-338 cargo tank, an ISO portable tank, or a DOT-113C120W have the potential to create flammable clouds of natural gas. Large releases of LNG due to the breach of the inner tank of these transport vessels could result in a pool fire, vapor fire, and explosion hazards if methane vapors become confined. These flammability hazards pose the highest potential impacts when compared to localized cryogenic hazards.

In analyzing whether to allow transportation of LNG in DOT-113C12W tank cars, PHMSA is reviewing past performance of DOT-113s in general, which are used for transportation of cryogenic materials. The HMR currently authorizes transportation of "ethylene, refrigerated liquid," a cryogenic flammable gas in DOT-113C120W rail cars.

PHMSA has collected data on the safety history of DOT-113 from its own incident database and from AAR, which compiles data provided by FRA.