

# 1 Introduction

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Exponent conducted a Quantitative Risk Assessment (QRA) for movement of liquefied natural gas (LNG) in (b) (4) ISO tank containers by rail on the Florida East Coast Railway (FECR). The objective of the study was to determine the level of risk associated with the shipping of the LNG ISO containers along three potential routes in Florida. The analysis incorporated aspects of prior LNG-related rail transportation risk analyses and hazard identification studies by FECR. The QRA included typical accidental release scenarios that may lead to a loss of containment from LNG ISO containers including consideration of ISO container Lift On/Lift Off (i.e. lifting) at intermodal facilities.

The Federal Rail Administration (FRA) provided the following requirements for risk analysis of LNG shipping by rail, which were addressed through this study:<sup>3</sup>

A detailed risk analysis of the proposed operation along with appropriate mitigating measures. At a minimum, this risk analysis must include:

- a. Risks to the public and railroad workers from the proposed transportation of LNG, considering volumes transported, routes, operations on main lines, passenger rail operations on the proposed transportation lines, yards, Lift On and Lift Off areas, types of trains used, and any other relevant risk factors.
- b. Analysis of the specific structural characteristics (e.g., susceptibility, strength, ability to withstand exposure to heat) of the portable tanks proposed to be used, the number of tanks in a train, train speed, and position in train.
- c. Analysis of the thermophysical properties of LNG and its vapor, and expected multifaceted behavior of released LNG (fires, confinement-caused explosions, vapor fires, unconfined vapor cloud explosions, etc.) and the magnitudes of the different types of hazards presented by these properties.
- d. Considerations of the population density, critical infrastructures, and sensitive assets (e.g., schools, churches, playgrounds, sports arenas, elderly care/nursing homes, Emergency Medical Services, police stations, hospitals, power stations) along the routes proposed.
- e. Assessment of both societal risks and individual risk to persons in the vicinity of the transportation routes and who may be adversely affected by an accident or incident involving a train transporting LNG.

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<sup>3</sup> Guidance for Preparing an Application under Title 49 Code of Federal Regulations Section 174.63 for Approval by the Federal Railroad Administration to Transport Liquefied Natural Gas by Rail in Portable Tanks.