LNG Facility Siting – An Alternative Approach

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The siting of Marine LNG facilities in the United States requires application of the codes 49 CFR Part 193 (Liquefied Natural Gas Facilities: Federal Safety Standards), 33 CFR Part 127 (Waterfront Facilities Handling Liquefied Natural Gas and Liquefied Hazardous Gas), and NFPA 59A – 2001 Edition (Standard for the Production, Storage, and Handling of Liquefied Natural Gas). In addition, the guidance for LNG siting application available in the PHMSA (US DOT Pipeline and Hazardous Materials Safety Administration) web site is also required.

One of the most important items for LNG facility siting is the Hazards Analysis, which consists in the identification of the SALS (Single Accidental Leakage Source) by analyzing all piping in the facility. The SALS’s for conventional piping are defined based on the size and length of the lines and the application of a failure rate table provided by PHMSA. This methodology may generate large flammable gas clouds, especially for long lines such as the LNG loading line and rundown line. Vapor barriers are typically used to prevent vapor clouds from reaching a property that could be built upon.

This paper presents the application of Pipe-in-Pipe (PiP) technology for the LNG rundown and loading lines, which consists of an inner pipe designed for the process conditions of the particular service, insulation material wrapping the inner pipe, and an outer pipe. The outer pipe is designed to provide full containment in the unlikely event of a leak from the inner pipe and to withstand any thermal deformation due to exposure to cryogenic temperatures.

With the application PiP technology for the LNG loading line and rundown line, any potential leaks will be contained by the outer pipe. If approved by FERC and USCG, this technology will allow proposed LNG projects potential for reduced flammable gas clouds, reducing the need for vapor barriers. Another advantage of the PiP technology is that any leak in the marine area will be contained by the outer pipe, allowing the reduction of the liquid containment system for facilities with long trestles over water.

Keywords: LNG, Layout, Siting, Dispersion Modeling, Consequence Analysis, Hazards Assessment.