Risk assessment of LNG importation terminals using the Bayesian–LOPA methodology

GeunWoong Yuna, William J. Rogersa and M. Sam Mannan

Mary Kay O'Connor Process Safety Center
Artie McFerrin Department of Chemical Engineering
Texas A&M University System
College Station, TX 77843-3122, USA

ABSTRACT

In order to meet the fast growing LNG (Liquefied Natural Gas) demand, many LNG importation terminals are now in operation. Therefore, it is important to estimate potential risks of LNG terminals using LOPA (Layer of Protection Analysis), which can provide quantified results with less time and effort than other methods. For LOPA applications, failure data are essential to compute risk frequencies. However, available failure data from the LNG industry are sparse and often statistically unreliable. Therefore, Bayesian estimation, which can update generic failure data with plant-specific failure data, was used to compensate for insufficient LNG system failure data. This paper shows the need for the Bayesian–LOPA methodology, how to develop the method, and a case study to demonstrate application of the method. Finally, this paper proposes that the Bayesian–LOPA method is a powerful tool for risk assessment of not only the LNG industry but also in other industries, such as petrochemical, nuclear, and aerospace.