13th Chemical Process Safety Sharing, Thailand

Presenter Bio data & Abstract

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Presentation Topic : Addressing LOPC Risks in Brownfield Projects

Presentation Abstract: Attached

Addressing LOPC Risks in Brownfield Projects

The rising demand for oil and gas products around the world, along with fluctuating margins, have led to many companies opting for revamping existing plants or building new trains within the existing plant boundary (referred as brownfield project) instead of building a new grassroots complex (referred as greenfield project). As a result, in many such expansion projects, spacing between equipment within a unit, between adjacent process units and also spacing between adjoining processing facilities within an industrial zone are impacted, while optimizing the use of existing plot. This can increase the risk of escalation, which is the subject of this presentation.

A small leak when not detected and isolated quickly, can potentially lead to failure of adjacent equipment or structure (supporting other equipment) thereby causing escalation. Hence identifying and addressing such escalation risks during Feasibility Stage through a proper assessment can help in deciding the feasibility of expansion project or incorporating appropriate mitigation measures in early stages of design.

Escalation risks can be assessed following a consequence-based approach or a risk-based approach incorporating both frequency and consequence estimation, to assess fire and explosion risks. While consequence-based analysis is a simple and easy tool to use, based on the selection of credible failure scenarios (1” or 2” hole size), the risk-based approach will model all leak sizes to determine the cumulative likelihood of a damaging fire or explosion event. The risk criteria for escalation is typically offset at 1E-4 per year. This presentation discusses the approaches adopted by the industry and also by some of the regulatory authorities to address escalation risks.

In addition to escalation risk, the incremental risk to the existing occupied buildings, operator shelters and risk to personnel beyond the boundary limits increases significantly due to Expansion Projects. Estimating risk only for the new unit or the revamped unit without integrating with the risk from other existing operating units can lead to underestimation.

In this presentation, the author will discuss the current approaches to identify and quantify escalation and incremental risk and how adopting such approaches can help minimize LOPC events in brownfield projects. A few case studies will be presented addressing the challenges faced along with potential mitigation measures that can be adopted.