Use of KPIs for Process Safety

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Abstract

In recent years, the concept of Key Performance Indicators (KPI) and their application to Process Safety has taken prominence following incidents like the ones at BP Texas City Refinery in the USA and Buncefield Oil terminal in the UK.

KPIs could be leading or lagging indicators and their proper usage could help prevent incidents involving hazardous materials and manage Process Risk.

The intent of this paper is to briefly walk though the concepts of KPIs, define and explain Leading and Lagging indicators, explanation of the Four Tiers for Process Safety Events (PSE) as identified in API RP 754, usage of Tier 1 and 2 PSE KPIs to assess Company performance, and Tier 3 and 4 PSE KPI’s, to monitor weaknesses in Independent Protection Layers (IPL) with the help of Pro-active and Reactive KPIs and application of these KPIs during the lifecycle management of Safety systems.

An example from the Process industry will be used to explain the concepts and how the KPIs could be identified and optimally used to reduce and manage the Process Safety Events in a Process plant. In particular, for Safety Instrumented Systems (SIS) designed based on IEC61511 / ISA84.01, the paper will indicate how such KPIs help measure the ‘real’ performance at any given time, rather than theoretical performance based on reliability calculations during the design phase, at both the Plant and Corporate level.

Use of Key Performance Indicators (KPI) to reduce all levels of Process Safety Events (PSE) is gaining a lot of importance globally. It is understood that this will lead to reduction in Process related accidents and reduce harm to Personnel and the Environment. This paper hopes to reiterate this message.