Residual Risk Removal by Brownfield HAZOP Application, Knowledge Management and Related Aspects - Creating a Safer Future from Current Studies and Past Experience

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ABSTRACT

The development and use of the fundamental risk assessment process, the HAZOP (Hazards and Operability Study), while originated in the 1960’s by Trevor Kletz at ICI Industries in Great Britain, has been a developing process both in its content and the extensiveness of its application during the last 50 years. The origin and development of the HAZOP has been presented at Texas A&M by Trevor Kletz, who is also a Texas A&M Adjunct Professor, and in particular, Kletz has pointed the essential nature of this process to risk reduction in the process and related industries. In particular, the HAZOP process has evolved to applied at different stages of design and execution such that industry would specifically apply the process to its older (Brownfield terminology) facilities where they can show significant reduction in chemical related incidents with use of the HAZOP process in their mature plants. This demonstrates the existence of a latent risk in these facilities which can occur for several reasons but which is reduced by a HAZOP process. When this is juxtaposed vis-à-vis with the concept of lowered risk acceptance criteria beyond the current state, there should be a lively debate as to an issue being a latent or induced cause compared to an initial lower risk acceptance criteria to compensate for these factors or to lower the public outcry if a loss of containment event should occur.

The authors’ use career experiences and recommended practices to advocate the HAZOP in the operations phase which is also known as the OESR, the Operational, Environmental and Safety Review while illustrating through case histories the use of this tool. Conclusions and recommendations are offered for further application and risk reduction in operational facilities. In this context the use of knowledge management is essential and a concrete base from which to structure programs, activities and tasks for risk reduction.

Knowledge management includes a library of understanding of the modes of failure such as corrosion, erosion, loss of material properties, cracking, fatigue, other failure modes and related aspects which are critical in deepwater projects. This is due to repair, retrofit, or re-habilitation being costly or impossible. The application of early detection and an inspection program identification of issues and areas of further study is critical.