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Process Safety KPIs - Tailoring API RP 754 Concept for Gas Transmission Companies

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ABSTRACT

Introduction

Globally, numerous guidelines exist for developing process safety key performance indicators (KPIs). However, none are specifically tailored to the unique needs of gas transmission companies. This abstract outline Epic's journey in adapting the tiered approach of the American Petroleum Institute's Recommended Practice (API RP 754) to the gas transmission sector. It highlights the challenges encountered and the lessons learned during KPI development and implementation.

Background

API RP 754 uses a tiered approach for process safety KPIs. Tier 1 and Tier 2 are lagging indicators based on loss of containment events, with threshold quantities designed for refineries and petrochemical plants. These thresholds are not suitable for gas transmission systems, where large high pressure inventories would classify many events as Tier 1 unnecessarily. Therefore, these thresholds quantities need to be tailored for the gas transmission.

Tier 3 and Tier 4 are leading indicators that measure the performance of safety critical controls and PSM systems. Because gas transmission relies on fundamentally different controls such as third party interference management, cathodic protection, pigging, and dig outs etc, a distinct KPI set is needed to effectively monitor process safety performance.

Method

Epic process safety KPIs are developed utilising the API RP 754 tier-based approach but expanded to include asset integrity and reliability metrics. Epic believes that asset integrity, equipment reliability and process safety are closely interlinked with each other and process safety objectives can't be achieved without focusing on asset integrity and reliability in a broader picture.

Challenges

Epic faced several challenges during developing and implementing KPIs:

- Identify and set KPIs for immature process safety management elements.*
- Classification of relief valve activations as Tier 2 or Tier 3 considering ultimate*

consequences.

- *Reliance on less robust indicators due to data limitations.*
- *Double reporting of KPIs through other management systems and reporting mechanisms.*
- *Concise the list of KPIs and make it more effective.*
- *Implementing and reporting KPIs where data cannot be generated monthly.*

Result

Epic's tailored process safety scorecard has a good combination of leading and lagging KPIs. While rooted in API RP 754, the tailored approach has improved visibility of risk, strengthened decision making, and created a more realistic representation of process safety performance for gas transmission operations.

Conclusion

Epic continues to refine its KPIs as process safety maturity increases, but the adapted approach already demonstrates the value of customising API RP 754 for pipeline environments.

KEY WORDS

APR RP 754, Process Safety KPIs, Asset Integrity, Equipment Reliability, Gas Transmission

BIOGRAPHY

Usman Azhar is a Chemical Engineer with 19 years of extensive experience across major hazard facilities, chemical manufacturing, and energy infrastructure companies. He is a Chartered Professional Engineer (CPEng) and Certified Process Safety Professional from CCPS, USA. He specialises in risk assessment, HAZOP, LOPA, SIL, bow-tie analysis, incident investigation, and developing robust process safety management systems. With a strong background in process safety, he has implemented process safety frameworks, audits, KPIs, and complex hazard studies across diverse industries. Usman is committed to zero-harm culture, continuous improvement, and safeguarding people and assets through effective risk management.

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