

Maintaining Energy Security in Natural Gas Pipeline Operations by Empowering Process Safety Principles Through Alarm Management Applications

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Abstract : Process Safety Management is a disciplined framework for managing the integrity of systems and processes that handle hazardous substances. It relies on good design principles, well-implemented automation systems, and operating and maintenance practices. Alarm Management Systems play a critically important role in the safe and efficient operation of modern industrial plants. In that respect, Alarm Management is one of the critical factors feeding the safe operations of the plants in the manner of applying effective process safety principles. Trans Anatolian Natural Gas Pipeline (TANAP) is part of the Southern Gas Corridor, which extends from the Caspian Sea to Italy. TANAP transports Natural Gas from the Shah Deniz gas field of Azerbaijan, and possibly from other neighboring countries, to Turkey and through Trans Adriatic Pipeline (TAP) Pipeline to Europe. TANAP plays a crucial role in maintaining Energy Security for the region and Europe. In that respect, the application of Process Safety principles is vital to deliver safe, reliable and efficient Natural Gas delivery to Shippers both in the region and Europe. Effective Alarm Management is one of those Process Safety principles which feeds safe operations of the TANAP pipeline. Alarm Philosophy was designed and implemented in TANAP Pipeline according to the relevant standards. However, it is essential to manage the alarms received in the control room effectively to maintain safe operations. In that respect, TANAP has commenced Alarm Management & Rationalization program as of February 2022 after transferring to Plateau Regime, reaching the design parameters. While Alarm Rationalization started, there were more than circa 2300 alarms received per hour from one of the compressor stations. After applying alarm management principles such as reviewing and removal of bad actors, standing, stale, chattering, fleeting alarms, comprehensive review and revision of alarm set points through a change management principle, conducting alarm audits/design verification and etc., it has been achieved to reduce down to circa 40 alarms per hour. After the successful implementation of alarm management principles as specified above, the number of alarms has been reduced to industry standards. That significantly improved operator vigilance to focus on mainly important and critical alarms to avoid any excursion beyond safe operating limits leading to any potential process safety events. Following the "What Gets Measured, Gets Managed" principle, TANAP has identified key Performance Indicators (KPIs) to manage Process Safety principles effectively, where Alarm Management has formed one of the key parameters of those KPIs. However, review and analysis of the alarms were performed manually. Without utilizing Alarm Management Software, achieving full compliance with international standards is almost infeasible. In that respect, TANAP has started using one of the industry-wide known Alarm Management Applications to maintain full review and analysis of alarms and define actions as required. That actually significantly empowered TANAP's process safety principles in terms of Alarm Management.

Keywords : process safety principles, energy security, natural gas pipeline operations, alarm rationalization, alarm management, alarm management application

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