Challenges with fire & gas detection and emergency shutdown systems for the modern LNG plants

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Abstract:

NFPA 59A, EN 1473, AS 3961, call for an automatic ESD systems which imitates following confirmed fire and gas detection in area. It is also mentioned that ESD activation shall neither cause a new hazard situation nor damage a machine or other equipment.

Detection of natural gas which consists of mainly methane in an open area is not easy. Spurious trips following the false alarms and inefficiency of gas detection system are interpreted are the “new hazard situation and unnecessary damage to machine and or other equipment”. Therefore, the new LNG plants are designed more and more without F&G ESD system. Fire & gas detectors initiate the sound and visual alarms and then operator decide how to initiate the emergency shutdown manually through the process shutdown facilities.

We believe that failure rates of $10^{-9}$ required for catastrophic events especially with the new designs could never be achieved where operator only is responsible for emergency shutdown of plant.

In this paper we share our experiences about how we used the results of our fire & explosion assessment to optimise the requirements for ESD, Emergency depressurisation and passive fire protection in a LNG plant.

Resume of the authors:

**Fabienne Salimi**

Fabienne F. Salimi is a senior HSE consultant and has more than 20 years of experience in process safety engineering in the petrochemical and oil and gas industries, both onshore and offshore. She has a particular expertise in risk-base design and identifying safety-critical systems and developing their performance standards for the life cycle of the major hazardous projects. Since March 1994, Dr. Fabienne has been the project manager of Multiplan R&F in France and later the ADEPP Academy in the UK. She is also the codeveloper and project manager for developing the ADEPP monitor, an online innovative tool for identifying safety-critical equipment and management of their performance standards. Dr. Salimi obtained her PhD in chemical engineering from “Ecole Centrale Paris” in 1996. Her main qualifications...
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Frederic Salimi has over twenty five years of Safety engineering, design of petrochemical, oil and gas industries both onshore and offshore.

Experience includes HSE management, Risk Base Design for EPC projects. Expertise also include Safety & Environmental code and standard compliance, pipeline Risk Assessment, Critical system identification, performance standard requirements, SIL assessment, HAZOP studies, Qualitative and Quantitative Risk Assessment (QRA). His main qualifications were obtained in Paris and he was member of American Institute of Chemical Engineers (AICHE).

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