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FIRE SAFETY IN SEVESO III EXISTING INSTALLATIONS: MOVING FROM THE "SAFETY REPORT" TOWARDS THE "FIRE CERTIFICATE"

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ABSTRACT

Control and mitigation of fires and explosions in Seveso plants is a key issue and a fundamental objective of the process safety management system.

They require a structured approach to the identification and the management of that aspect applied during design, construction, operation, inspection, maintenance and decommissioning of a facility. Seveso III requirements (enforced by the Italian specific Legislative Decree no. 105/2015) underline the importance of the fire safety as a specific issue to deal both during management of change (MOC) and during the submission of the "Safety Report" of the facility. Owner shall establish a sound Fire and Explosion Strategy (FES) and this should be contained in the facility risk assessment submitted to the authorities having jurisdiction and fire risk assessment should become an integral part of the process safety assessment.

FES should not be separately documented and relevant information (in particular findings) should be included as part of the management of all hazardous events on an installation. This applies to all existing installations since Seveso III affirms that the safety case is submitted to the AHJs also to obtain the Fire Certificate (that is part of the License to operate).

The strategies shall be updated whenever there is a change to the installation which affects the management of the fire and explosion hazardous events. The level of detail in a FES can vary depending on the scale and complexity of the installation and the stage in the installation life cycle when the risk management process is undertaken.

Complex installations are likely to require detailed studies to address the fire and explosion hazardous events. For simpler installations, incorporating limited process facilities, it can be possible to rely on application of recognized codes and standards as a suitable base which reflects industry experience for this type of facility.

For existing plants or for installations which are a repeat of earlier designs, evaluations undertaken for the original design can be reviewed to judge if they are sufficient to determine the measures needed to manage the fire and explosion hazardous events, considering new knowledge, new technology, the environment, layout characteristics and inherent safety considerations, etc.

For installations in the early design phases, the evaluations will be less detailed than those undertaken during later design phases.

The strategies shall describe the role and main functional requirements for each of the systems required to manage possible hazardous events on the installation. Based on the strategies, performance standards shall be developed considering the following: functional parameters of the particular system, e.g. essential duties that the system is expected to perform; integrity, reliability, and availability of the system; survivability of the system under the emergency conditions which might be present when it is required to fulfil its role; dependency on other systems or operational factors that might have an influence on the performance of the safety function when needed.

The performance of those critical safety systems shall be verified for the life of the installation in order to ensure that the strategies remain valid and to identify the need for any remedial action. This new requirement built a link among process safety (main concern of the Seveso II safety cases) and fire safety strategy assurance (governed in Italy by a specific regulation moving from the D.P.R. 151/2011). This link posed and still poses a threat for Owners that are requested to re-evaluate the FES of their existing and operating installations as well as identify FES requirements for new installations or modifications.

Nowadays assessment methods, calculation codes and tools become an invaluable resource to assess existing FESs and well as drive plant modifications as well as new plants in a coherent framework. Assessment framework should take into account a number of technical aspects: installation layout, emergency shutdown systems and blowdown, control of ignition, control of spills, emergency power systems, fire and gas detection systems, active fire protection (including fire hoses, nozzles and monitors as well as mobile and portable fire-fighting equipment), passive fire protection, explosion mitigation and protection measures.

Furthermore it should consider also managing aspects, not less important: response to fires and explosions, inspection, testing and maintenance activities, FES periodic auditing, fire safety management (periodic review against specific KPIs), human-machine interface considerations, etc.

This article intends to make clear the relationship between the elements of process safety (in the Safety Report) and the basic elements of the fire safety strategy in place (or designed) for obtaining the fire certificate with a guideline highlighting both the technical issues (with examples) and the administrative path for permitting purposes.

Specific attention will be paid to performance, integrity, availability and reliability standards for fire safety critical elements as core new concepts to assure the congruity of the Seveso quantitative risk assessment with the real fire and explosion risk level of the facility.