Safety Controls, Alarms, and Interlocks as IPLs

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**Abstract**

Layers of Protection Analysis (LOPA) evaluates the sequence of events that first initiate and then propagate to a hazardous event. This semi-quantitative risk assessment technique can expose the role that automation plays in causing initiating events and in responding to the resulting abnormal operation. Automation that is specifically designed to achieve or maintain a safe state of a process in response to a hazardous event is now referred to as safety controls, alarms, and interlocks (SCAI).

*Guidelines for Initiating Events and Independent Protection Layers* addresses four basic types of SCAI: safety controls, safety alarms, safety interlocks, and safety instrumented systems (SIS). This paper discusses the design, operation, maintenance, and testing practices necessary for SCAI to be considered as independent protection layers (IPL). It also provides guidance on claiming multiple layers of protection in the basic process control system.