Module 3—Process Risk and Protection Layers

Process risk derives from process miss-operation and is an inherent part of process design. This inherent risk must be reduced below internationally accepted risk criteria using Independent Protection Layers (IPLs) that are designed and managed to meet seven (7) core attributes.

Module 4—Establishing Risk Evaluation Criteria

The risk assessment phase is addressed in IEC 61511 Clauses 8 and 9. The initiating events for process hazards are identified, and the frequency and consequence severity of each potential event is estimated. Depending on the type of risk analysis, various conditional modifiers may also be considered when assessing the risk. Once the risk is understood, a risk reduction strategy can be developed.

Day 2: Risk Analysis to Design

Module 5—Layer of Protection Analysis

Layer of protection analysis (LOPA) is covered in the CCPS book, Layer of Protection Analysis: Simplified Process Risk Assessment. LOPA identifies the initiating events and their frequency, the consequences and their severity, the required risk reduction, and the protective functions implemented in each protection layer to achieve the required risk reduction.

Module 6—Safety Requirements Specification (SRS) Part 1

The SRS in IEC 61511 Clause 10 is a collection of information that specifies the SIS design basis required to ensure process safety during all operating modes. The SRS defines the functionality, integrity, reliability, operability, and maintainability requirements based on operational goals, intended operating modes, and process safety time limitations.

Module 7—Safety Requirements Specification Part 2

IEC 61511 Clause 11 provides many specific design requirements including the need for fault tolerance and separation of the SIS from the BPCS.

Module 8—Selection of Devices

SIS device selection is addressed in IEC 61511 Clause 11.5. ISA TR84.00.04 guidance is presented related to field devices and logic solvers. Emphasis is placed on demonstrating that the device is user-approved for safety based on a review of manufacturer information and actual field experience.