

## Layer of Protection Analysis Workshop (1 day)

This 1 day workshop is intended to take students through the fundamental principles of performing Layer of Protection Analysis (LOPA). It will provide clear guidance on Independent Protective Layers (IPL) and the rules for determining the 'independence of different' layers. Active, passive and procedural protective layers will be examined along with the required rules for taking credit for any risk reduction measure.

The rules for taking credit for basic process control systems (BPCS) loops will be explained along with taking credit for multiple BPCS loops. Examples of how to BPCS loops should be physically connected to form IPLs will also be provided.

The maintenance requirements for any IPL to comply with dependability rules will be covered.

The IEC 61511 Edition 2 - 10,000 times risk reduction limitations for instrumented layers will be thoroughly explained along and examples provided.

### Who should attend?

Engineers involved in safety integrity level (SIL) determination for risk assessment of safety instrumented functions.

### **The objectives of the workshop are to equip participants with:**

- An understanding of the concept and objectives of risk assessment;
- An understanding of the concept and objectives of risk reduction;
- An understanding of the ALARP principles;
- An understanding of the differences between risk prevention and risk mitigation;
- An understanding of the principles of LOPA;
- Independent Protection Layers (IPL);
- Rules for taking credit for IPLs;
- Basic Process Control System (BPCS) layers;
- Avoidance of risk reduction "double dipping";
- Scenario based consequence severities;
- Target Mitigated Event Likelihood (TMEL);
- Consequence equivalence tables;
- Prevention layers;
- Mitigation Layers;
- Conditional Modifiers;
- Limitations on instrumented layers of protection;
- The opportunity to participate in very practical LOPA risk assessment examples.

The workshop will use a number of practical LOPA examples and team exercises to stimulate a realistic risk assessment experience. The methodology will be based on *the international standards IEC 61508 and IEC 61511 and 'Layer of Protection Analysis Simplified Risk Analysis; American Institution of Chemical Engineering ISBN 0-8169-0811-7.*