TETRA TECH RPS ENERGY | TRAINING

N638: Fundamentals of the Safety Lifecycle

Instructor(s): Guillermo Pacanins

Format and Duration
Classroom - 2 Days

Summary

Over this 2-day course, participants will experience the Safety Lifecycle, starting from the conceptual phase of a project right through to operations. The course starts with a solid understanding of how to capture and present risk at your facility using software, then addresses using the results of your Process Hazard Analyses, SIL Determination (LOPA), as well as SIL Verification information, and ends by looking at ways of managing risk in real time during operations and maintenance. From a good P&ID to a great contingency safety plan for operations, many people are involved in this process and it's important to understand where the information is transferred and how each phase of the project relates to the next, all being managed with the use of dedicated software tools. The data collected in the initial stages of your new or existing project will ultimately have an impact on how your operators run the plant, and so it is important to know how to ensure nothing is missed or forgotten, so you can prevent hazardous scenarios from occurring. This course is not just for the experts but is a valuable overview for anyone involved in hazard prevention and risk management at any level. No knowledge of the IEC 61511 guidelines or other standards is required to participate. Past course participants have ranged from Vice Presidents to Project Managers and Engineers.

Learning Outcomes

Participants will learn to:

1. Expand and improve upon traditional understanding of the safety lifecycle in the process industry.
2. Discuss and evaluate the interaction between Process Hazard Analysis (PHA) and other PSM elements.
3. Develop a deeper insight into Process Safety Engineering, Construction and Validation.
4. Construct, propose and implement a pragmatic strategy to manage deviations from the intended operating philosophy and design.
5. Understand, clarify, and execute the concepts of Safety Integrity Level (SIL) Determination, SIL Verification, contingency planning and Safety Requirements Specification (SRS).

Training Method

Two classroom days providing 1.6 CEU (Continuing Education Credits) or 16 PDH (Professional Development Hours)

This course contains 12 technical hours and may be eligible for Continuous Maintenance points by The Board of Canadian Registered Safety Professionals (BCRSP)

Who Should Attend

Anyone who works in close proximity to hazardous processes such as Operations and Maintenance Personnel, Supervisors, Engineers and Safety Professionals who require a sound understanding of risk and risk management.Engineers involved in facility design and construction will especially benefit from this course.

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Course Content

Part One – Process Hazard Analysis, PHA.

1. Safety Lifecycle and Process Safety Management, PSM.
2. What is Risk? What is a Hazard?
3. Bow Tie concept / (Causes (likelihoods) – Safeguards (Probability of Failure) – Consequences (Severity) – Tolerable Frequency, (TF).
4. Risk Management process / Risk Decision / Risk Matrix – Risk Ranking – Risk Reduction. (Minimize Operating Risk Exposure)
5. What is HAZOP?
6. What are HAZOPs used for?
7. Why HAZOP?
8. When do we use HAZOP?
9. What do we do different today when facilitating a HAZOP?
10. Using the software to: Review a HAZOP session and show methodology and dynamics. Message in preparation for next software activity: connectivity with next phases of safety Lifecycle. Differences between LOPA and HAZOP, (introduction to next part).

Part Two– SafeGuard Profiler, Safety Integrity Level Verification / Validation.

1. What is SIL Verification?
2. Connection with LOPA and HAZOP, the Safety Lifecycle model.
3. Layer of Protection SIF, and where does it fits in an industrial process.
4. Bow Tie concept and Safety Instrumented Functions.
5. Probability of Failure on Demand, PFD, and parameters that influence the SIF performance.
6. Software for SIL Verification activities: Calculate the PFD of a SIF using SafeGuard Profiler.
Safety Requirement Specifications for the SIF.
7. Contingency Planning and Risk Exposure, What do we do different today? (Minimize Operating Risk Exposure)
8. How to use SafeGuard Profiler during Commissioning, Installation, and Testing.
9. Message in preparation for next lifecycle phase: connectivity with next part SafeGuard Sentinel, operating and maintenance phase of safety Lifecycle.

Part Three – SafeGuard Profiler: Layer of Protection Analysis, LOPA; (SIL Determination – Contingency Planning – Safety Requirement Specifications).

1. What is LOPA? What is SIL Determination?
2. The Bow Tie concept – Layer of Protection, (Safeguards).
3. Layer of Protection and contingencies.
4. Risk Reduction / Independent Layer of Protection, IPL.
5. Safety Requirement Specifications, (SRS), for Non-SIFs and SIFs.
6. Difference between Protection Layers and the SIF protection Layer.
7. LOPA method (Mitigating Frequency – Tolerable Frequency – Risk Reduction)
8. Contingencies for safeguards SIF and Non SIFs.
9. Safety requirement Specification for SIFs and non-SIFs

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10. What do we do different today to include Contingencies when facilitating a LOPA?
11. Awareness of situations that increase the tolerable Risk Level, leaving the facility exposed.
12. Activity: Review the results of a LOPA session to show methodology and dynamics of software use.
13. Activity: Review what is contingency planning.
14. Message in preparation for next life cycle phase: connectivity with part, Safety Instrumented Function Verification.

Part Four– SafeGuard Sentinel – (Real Time Risk Exposure) – (Minimize Operating Risk Exposure, MORE)

1. Risk Exposure Concept
2. What is SafeGuard Sentinel? Real Time Risk Exposure, (time variable).
3. Characteristics of Contingencies.
4. Example of situations that increase the tolerable Risk Level, leaving the facility exposed.
5. How do you deal with the loss of safeguards in time?
6. Connectivity of SafeGuard Sentinel with other systems – DCS, Management systems, etc.
7. Activity: Session in front of SafeGuard Sentinel console discussing contingencies with operations (operators).
8. Lifecycle Quad Model – Connectivity between all activities or phases, What-if scenarios simulations, etc.