



‘ONION RINGS’ of LAYERS OF PROTECTION

SILPro® –

Software for Integrated HAZOP, LOPA, and SIL Verification studies

- ✓ Automated transfer of Hazard Scenarios from HAZOP to LOPA
 - HAZOP consequences to LOPA Impact events -two-way editing-*in the blink of an eye*
 - HAZOP Causes to LOPA Initiating Events
 - HAZOP Safeguards to LOPA Protection Layers
- ✓ Reduced errors with access to s/w database
- ✓ Faster calculations, reduced session times
- ✓ Easier online access from anywhere, anytime
- ✓ Formatted and editable reports

‘Onion Rings’

Process control system:

Controls & associated (PCS) alarms

Process shut down system:

Trips & associated SD (PSS) actions.

Emergency shut down system: (ESD)

High reliability–no mechanical protection (HIPS)

Fire & Gas detection system:

F&G detection/action + Link with ESD system

Ultimate Safety System:

Back-up of essential ESD actions (USS)



HAZOP

Hazard Identification Study is a brainstorming session to identify process hazards

LOPA for SIL Assessment

Layer of Protection Analysis is a semi-quantitative method to ensure mitigation of high severity - high frequency hazards scenarios to ALARP

SIL Verification of SIS/SIF

Calculate Achieved SIL (PFD_{avg} , RRF) of the SIS/SIF vs Target SIL based on the device failure rates (λ_{DU} , λ_{DD} , λ_{SU} , λ_{SD}) and parameters: MTTR, PTI, Beta etc etc

TRAINING

HAZOP & LOPA

Pedagogical method includes workshops with industrial examples, mock sessions and hands-on software application



USP ENERGIES

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