SIL Training for Petrochemical Plants

Service Objectives

- Apply the IEC 61511 lifecycle end-to-end on petrochemical scenarios from hazard identification to operation, maintenance, and modification.
- Execute LOPA with auditable assumptions; set target SIL for thermal runaway, high-pressure releases, toxic/flammable gas accumulation, and tank overfill.
- Select architectures and components using credible OEM/prior-use data; design testable SIFs with proof-test coverage and bypass minimisation.
- Control common failure modes (e.g., solenoids, valve stiction, impulse line plugging, transmitter drift) and understand voting/diagnostics impacts.
- Verify SIL (e.g., PFDavg, SFF, mission time, common cause); align proof test intervals with TAR windows and defend strategies during audits.
- Maintain lifecycle documentation, competency, and change control so that SIL claims remain valid through ageing assets and modifications.

Who This Service Is For

- Control and instrumentation engineers, process safety engineers, operations/maintenance supervisors, reliability engineers.
- Project and turnaround planners; functional safety focal points working with BPCS, SIS/ESD, Fire & Gas, and interlocks.
- EPC design and commissioning teams requiring IEC 61511-aligned LOPA, SRS definition, and verification.
- Asset integrity and CMMS leads responsible for proof testing, bypass/override control, and impairment logging.
- Site leadership accountable for residual risk acceptance, SIL verification outcomes, and audit readiness.
- Petrochemical units including crackers, reformers, hydrotreaters, aromatics, polymer lines, tank farms, compressors, and loading terminals.

> UAE context: caselets and exercises reflect OSHAD, Dubai Municipality, and Dubai Civil Defence expectations while maintaining production targets.

Duration & Process Overview

- Standard delivery: 3 days on-site at the plant with unit-specific case studies.
- Focused delivery: 2 days remote + 1 day on-site practicals for multi-site teams.
- Extended coaching: 4–5 days to deepen LOPA, SIL verification, and proof-test programme development.

- Formats: on-site in the UAE or live-online/hybrid; shift-friendly split sessions; pre-work and post-course clinics; cohorts typically 10–16 delegates.

Methodology

Work-ready modules blend engineering rigour with hands-on practice using petrochemical SIF examples (e.g., reactor high-temperature trip, compressor anti-surge, tank overfill prevention, F&G voting).

> All materials and exercises are tailored to your units, drawings, and procedures to directly improve LOPA worksheets, SRS, proof-test instructions, and bypass/override governance.

Phase	Objective / What It Covers	Deliverable / Duration
Functional Safety Fundamentals	IEC 61511 lifecycle; roles; boundaries vs. BPCS and F&G in crackers/reformers.	Mapped SIF boundaries on furnace fuel trip P&ID; ~0.5 day.
LOPA and Target SIL	Initiating events; IPL independence; consequence categories for toxic/flammable risks.	LOPA for reactor high-temperature runaway; ~0.5 day.
Architecture & Device Selection	Voting, diagnostics, partial stroke, proof-test coverage, prior-use evidence.	Validated 2oo3 transmitters + 1oo2D valves for anti-surge; ~0.5 day.
SIL Verification	Data quality; PFDavg; SFF; mission time; common cause; bypass impacts.	PFDavg with/without partial-stroke testing; ~0.5 day.
Operations & Maintenance	Proof tests; overrides; impairment logs; TAR alignment; demand recording.	Proof test and bypass plan for tank overfill SIF; ~0.5 day.
Lifecycle Governance	Competency; documentation; MOC; audits; cybersecurity touchpoints (BPCS/SIS).	Lifecycle file index and competency matrix; ~0.5 day.