SIL Training for Power Generation Plants

Service Objectives

A power-plant–specific functional safety course aligned to IEC 61511/IEC 61508, NFPA 85/850, and UAE regulatory expectations, focused on SIS across turbine islands, boilers/HRSGs, fuel gas skids, and utilities.

- Translate HAZOP outputs into credible initiating events and IPLs for LOPA in power generation scenarios (fuel gas, furnace explosion prevention, steam drum level).
- Set tolerable risk targets consistent with ALARP policies and plant duty cycles (peaking vs baseload).
- Select and justify protection layers (BPCS, SIS SIFs, mechanical, relief, human response) to avoid under- or over-specification.
- Draft robust SRS for SIFs (e.g., turbine overspeed trip, boiler master fuel trip, main steam high pressure, ammonia offloading ESD) covering response time, voting, proof tests, bypasses.
- Perform PFDavg/RRF calculations, address diagnostics and CCF, and integrate fire and gas where it is a demand initiator or mitigative layer.

> Balanced risk and availability: defend SIL decisions to regulators and insurers while protecting people, equipment, and megawatts.

Who This Service Is For

For UAE power generation organisations operating combined-cycle, simple-cycle, cogeneration, and waste-to-energy units.

- I&C/control engineers on DCS/PLC/ESD; process engineers for fuel gas and water–steam balance; electrical/mechanical engineers for turbine/boiler protection.
- Maintenance planners (proof testing), operations supervisors (overrides/bypasses), and HSE/compliance officers (IEC 61511 alignment during audits).
- Project and turnaround teams aligning lifecycle tasks to outages and peak-demand windows.
- EPC consortia (early SRS alignment and verification requirements); owner-operators (LOPA during modifications); IPPs (policy standardisation across fleets).
- Hazards addressed include turbine overspeed, boiler furnace explosions, steam drum level excursions, hydrogen and ammonia handling, and black-start diesel fuel systems.

Duration & Process Overview

Flexible delivery aligned to outage calendars, shift patterns, and site-access constraints.

- Two days: lifecycle essentials, LOPA fundamentals, SRS principles via a combined-cycle case.
- Three days: adds reliability engineering, PFDavg labs, voting selection, and proof-test planning.
- Four days: expanded workshops with live SRS drafting and validation planning for your project scope.

- On-site, off-site, or hybrid; split shifts supported; typical cohorts 8–16; pre-course needs analysis with site P&IDs/C&E; templates and checklists provided.

Methodology

A structured path from lifecycle foundations to validation and operations, using power-plant scenarios and data-driven reliability practice.

Phase	Objective / What It Covers	Deliverable
IEC 61511 Lifecycle Foundations	SIS vs BPCS vs BMS; interfaces with NFPA 85/850; UAE audit expectations.	Lifecycle mapping of existing protections.
Hazard Analysis & LOPA	Initiating events/IPLs for fuel gas, furnace explosion prevention, steam drum level; turbine overspeed demand.	Completed LOPA worksheet for plant scenarios.
SRS Development	Response times, voting, setpoints, proof-test intervals, bypass governance.	SRS drafts for main fuel trip, ammonia ESD, overspeed trip.
Reliability & PFDavg	Failure rates, diagnostics, CCF, proof-test coverage; PFDavg/RRF calculations.	PFDavg calculations (e.g., 2oo3 drum level transmitters).
Validation & Operations	Loop checks, SIF validation, overrides, impairment rules, MOC alignment.	Proof-test procedure and impairment permit draft.
Assessment & Certification	Applied LOPA, PFDavg, and SRS excerpts defended in review-style sessions.	Certificate of Completion (input to internal authorisation).

Lifecycle Foundations

- Position SIS alongside BPCS/BMS; align with UAE audit practice.

Hazard Analysis & LOPA

- Use power-plant initiating events/IPLs; complete LOPA for HRSG and turbine scenarios.

SRS Development

- Write concise, testable requirements including response times, voting, and bypass rules.

Reliability & PFDavg

- Apply vendor data, diagnostics, and proof-test coverage to credible PFDavg/RRF outputs.

Validation & Operations

- Plan validation, manage overrides/impairments, and embed with PTW and MOC.

Assessment & Certification

- Practical assessment (LOPA, PFDavg, SRS excerpt); NPM issues Certificates of Completion.