



PSM Compliance

These are times of heightened process safety awareness. The OSHA National Emphasis Program (NEP) audits at refineries and chemical plants across the country are looking at more detail in Process Safety Management programs than ever. Past audits have found gaps in documentation and understanding of instrumented safety systems.

SIS-TECH Solutions has unique capabilities to help customers fill gaps in their PSM compliance programs and procedures in the areas of alarms, emergency shutdowns, and safety instrumented systems. SIS-TECH can help with:

- **PSM Audit assistance.** Round out your internal PSM audit team with SIS-TECH personnel who understand the Recognized and Generally Accepted Good Engineering Practices (RAGAGEP) associated with instrumentation, controls, and Safety Instrumented Systems (SIS).
- **Gap Analysis.** How do your Instrumented Safety Systems compare to current standards? Frequently several plant organizations/personnel are involved in compliance with the Safety Instrumented System lifecycle including identification (process engineering), design (project or control engineering), and proof testing (maintenance and reliability). SIS-TECH can analyze your systems and procedures and help devise a plan to move to compliance on a practical and coordinated path.
- **Procedures for risk analysis.** Identification and categorization of potential accident scenarios is a key part of any PSM program. SIS-TECH procedures let you confidently identify where safety instrumented systems or other layers of protection are needed. The required Safety Integrity Level (SIL) of each safety function is determined by employee teams similar to periodic PHA studies. Our procedure for Independent Protection Layer (IPL) analysis is a widely used proven implementation of Layer Of Protection Analysis (LOPA).
- **Risk identification and assessment meeting facilitation.** SIS-TECH personnel facilitate group meetings for PHA / HAZOP / What-if Checklist, Layer Of Protection Analysis (LOPA), and Procedural HAZOP. We can use your company's procedures and documentation system, or procedures developed by SIS-TECH such as our IPL Analysis procedure.

PSM Auditing Assistance

A SIS-TECH auditor will look beyond the simple Mechanical Integrity (MI) calibration issues and look into instrumentation related compliance in other applicable PSM elements including: Process Safety Information (PSI), Process Hazards Analysis (PHA), Operating Procedures, Training, Pre Start-up Safety Review (PSSR), Management of Change (MOC), and Incident Investigation.

Most PSM programs have a strong set of interrelated company requirements for mechanical equipment inspections – vessels, piping, relief valves, etc. – but frequently the high level requirements for process instrumentation and controls – alarms, emergency shutdowns, safety instrumented systems, etc. – are missing or vague. A SIS-TECH auditor will help identify these gaps. Some companies that have good high level corporate requirements in this area don't have the expertise to devote to PSM audit teams for follow through. Proper auditing will drill down through documentation and employee understanding to provide a good indication of the current level of compliance, as well as indicating areas for improvement.

SIS-TECH is well known in the industry for bringing expertise in Safety Instrumented Systems (SIS) to help customers in the process industries select, design, and implement safe and reliable instrumented protective systems. All these efforts are focused on improving real plant process safety and correctly documenting this for compliance with PSM. This focus brings a practical bias to auditing your safety instrumented systems.

Gap Analysis

Process safety risk mitigation often comes down to automatic interlocks. You need assurance that such Safety Instrumented Functions (SIF) are designed to the requirements of current standards or to internal requirements that provide the same or better level of protection as the current standard. System hardware (instruments, relays, and PLCs) installations are one aspect of compliance. Documentation and functional verification are equally important to compliance and ensuring the system will work as designed. The current applicable standard is ANSI/ISA S84.00.01 2004 - Functional safety: Safety Instrumented Systems for the process industry sector.

This standard is recognized by OSHA as a RAGAGEP describing the entire lifecycle of each SIF. It covers a broad scope from high level issues like identification down through many technical design details. SIS-TECH gap analysis will use this standard, and our knowledge of how the standard is implemented in a wide variety of processes to identify opportunities for improving your systems and procedures.

Gap Analysis includes:

- Roles and responsibilities
- Identification and documentation of SIFs
- Technical practice
 - Details of SIF specification and installation
 - Documentation of existing systems
- Operational and Mechanical Integrity Practice
 - Access control and Bypassing
 - Trip reporting
 - Proof testing
 - Inspection
 - Maintenance activities



Procedure for Risk Analysis

SIS-TECH's Independent Protection Layer Procedure is an implementation of the industry standard Layer Of Protection Analysis (LOPA). Identification and categorization of safety systems is an important early step in the safety lifecycle. Done well, considerable later effort is saved by identifying that subset of plant instrumentation and controls that are actually safety related and focusing documentation, maintenance, and testing effort on that equipment.

Too many companies treat all their instrumentation and control equipment the same, frequently creating more work than technicians can keep up with. Gaps may form in the way important safety equipment is tested and documented. Often such programs do not distinguish controls that are in place for operations or quality purposes from those that are in place for process safety purposes. Thorough risk analysis leads to clear requirements for documentation of the design and working status of safety controls.

Risk Identification and Assessment meeting facilitation.

SIS-TECH meeting facilitators, although experts on Safety Instrumented Systems, don't focus just on interlocks and instrumentation.

Facilitating Process Hazards Analysis (PHA) meetings using tools such as Hazard and Operability (HAZOP) and What-If Checklist analysis, SIS-TECH facilitators put their wide range of process knowledge and experience to help the teams identify and credit a full range of safeguards.



In the case of LOPA / IPL meetings, where the rules for crediting safeguards as Independent Protection Layers (IPL) are more restrictive, the facilitator will help the team to identify and credit existing IPLs wherever possible to avoid unnecessary additional equipment.

LOPA / IPL analysis is often a stand alone team meeting. It can draw on existing PHA documentation for the hazard scenarios or identify them independently. Alternatively the meetings can be combined with original or revalidation PHA meetings with considerable time and cost savings. The team personnel are typically identical, and after detailed discussion on a particular scenario in the PHA format, the IPL analysis can often be completed in a few minutes without the need for repeat discussion when separate sessions are scheduled.

Recent incidents have highlighted the importance of safe operating procedures. Procedural HAZOP is being adopted by operating companies as a means of focusing on possible hazards which are not properly addressed by operating procedures.

Using procedures from either SIS-TECH or your company, SIS-TECH personnel are experienced in leading teams to identify real hazards, assess risk, identify existing safeguards, and make recommendations for closing risk gaps in a consistent, conservative, and practical manner.

SERVICES OVERVIEW

In addition to the PSM consulting services described SIS-TECH can also help other departments in the facility do their part efficiently.

SIS-TECH's consultants and engineers have extensive experience in the design of instrumented systems. Our consultants have worked in industry, for industry - not just designing, but directing the installation, start-up, training, and long-term operation of these systems. At SIS-TECH Solutions we work closely with you to develop a complete design that covers the full lifecycle for oil, gas, chemical, or power generation instrumented systems. This design will meet the codes, recommended practices, and standards while maintaining your on-line production goals.



SIS-TECH offers complete instrumented system lifecycle support, including the following:

- hazard assessment,
- safety integrity level (SIL) assignment,
- safety requirements specification,
- detailed design,
- safety integrity level verification,
- programming,
- operation and maintenance procedures,
- testing procedures,
- pre-startup acceptance test supervision,
- functional safety assessment,
- hot cutover procedures and execution,
- management of change evaluation,
- training, and
- performance audits.



Cost effective design is not an oxymoron. SIS-TECH provides you with independent, knowledgeable experts to develop and implement a scope of work to fit your needs.

SAFETY TO THE 2ND ORDER



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