



Ask Dr. SIS

My company implements IEC 61511-2003 on new installations, but has grandfathered some existing SISs that were designed and managed in accordance with my company's internal standard. The grandfathered SISs are not in compliance with all of the 2003 requirements, but they do meet the required risk reduction. I have heard that the upcoming revision of IEC 61511 has major changes and contains a bunch of new requirements. What if my SISs do not comply with the recent changes? Does grandfathering apply to these SISs as well?

Answer

Outdated or under-performing equipment should not be hidden under the cloak of grandfathering, regardless of when a standard is published. All installed systems essentially become grandfathered from the moment they are validated, because it is through performance history that you approve an installed system as continuing to be fit for service. Validation requires that updated documentation, mechanical integrity plans, proof test records, and operator procedures be in place. The grandfather clause should be viewed as an opportunity to demonstrate through analysis of operating and maintenance records that the functional safety management system and existing SIS design are achieving the required risk reduction today. If you cannot do this, the SIS should not be grandfathered. If you can, it is acceptable to leave the SIS "as is."

Background

One of the new requirements in the IEC 61511-1 CDV concerns the evaluation of existing SIS equipment:

IEC 61511-1 CDV Clause 1x - For existing SIS designed and constructed in accordance with codes, standards, or practices prior to the issue of this standard the user shall determine that the equipment is designed, maintained, inspected, tested, and operating in a safe manner.

This "grandfather clause" is included in the US version of the standard, ANSI/ISA 84.00.01-2004, and guidance is provided in ISA TR84.00.04-2012 Clause 3 and Annex A. Management systems are not grandfathered, so it is important to implement the requirements of the functional safety management system (clauses 5 through 7) and the hazards and risk analysis (clauses 8 through 9), whether the installed SIS predates IEC 61511 or a later version. Grandfathering applies only to the existing SIS equipment.

Clearly, successful achievement of the target risk reduction is one of the most important criteria in judging the acceptability of an existing SIS. The standard, and a good measure of common sense, requires that the installed SIS equipment achieve the risk reduction in the operating environment for the life of the SIS. This demonstration relies on prior use information (historical performance) to show that the reliability parameters of the installed SIS are in accordance with



those assumed during the design (clause 5.2.5.3). This is also emphasized in the ISA 84 committee's guidance on the standard, ISA TR84.00.04-2012, which states that there are two essential steps to grandfathering:

- 1) Confirm that a hazards and risk analysis has been done to determine qualitatively or quantitatively the level of risk reduction needed for each Safety Instrumented Function (SIF) in the SIS.
- 2) Confirm that an assessment of the existing SIF has been performed to determine that it delivers the needed level of risk reduction.

Clauses 5 through 7 provide the framework for these steps across the SIS lifecycle. Step 1 should apply the revised requirements of Clauses 8 and 9 to determine the necessary risk reduction. Step 2 depends on an assessment of the process demand records, mechanical integrity records, and operating history. The assessment should consider human errors, equipment failures, and common cause failures and should demonstrate that the existing equipment meets or exceeds the required risk reduction.