



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS  
WASHINGTON, DC 20555 - 0001**

March 1, 2021

Ms. Margaret M. Doane  
Executive Director for Operations  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

**SUBJECT: PROPOSED DRAFT REGULATORY GUIDE 1.105, REVISION 4, SETPOINTS FOR SAFETY-RELATED INSTRUMENTATION**

Dear Ms. Doane:

During the 682<sup>nd</sup> meeting of the Advisory Committee on Reactor Safeguards, February 3 - 5, 2021, we reviewed "Proposed Draft Regulatory Guide (RG) 1.105, Revision 4, 'Setpoints for Safety-Related Instrumentation,' Draft Issued: January 2021." Our Digital Instrumentation and Control Systems Subcommittee also reviewed this matter on October 7, 2020. During this review, we had the benefit of discussions with representatives of the United States Nuclear Regulatory Commission (U.S. NRC) staff. We also had the benefit of the documents referenced.

**CONCLUSION AND RECOMMENDATION**

The approach to establishment of setpoints described in RG 1.105, Revision 4 is a significant improvement and should be issued.

**BACKGROUND**

The purpose of RG 1.105 is to provide guidance for meeting regulatory requirements to ensure that:

- a) setpoints for safety-related instrumentation are established to protect nuclear power plant safety and analytical limits, and
- b) the maintenance of instrument channels implementing these setpoints ensures they are functioning as required, consistent with the plant technical specifications.

RG 1.105, Revision 1, November 1976 was issued as a stand-alone document. It introduced a set of definitions and positions that identified methods for developing the appropriate setpoints and margins.

Subsequently, the methods described in Revision 1 to RG 1.105 and additional criteria on establishing and maintaining setpoints were incorporated into and issued as the industry consensus standard Instrument Society of America (ISA<sup>1</sup>)-S67.04-1982, "Setpoints for Nuclear Safety-Related Instrumentation Used in Nuclear Power Plants." The intent of the standard was to establish a consistent framework for identifying, estimating, and combining uncertainties occurring within safety-related instrument channels to ensure selected setpoints had sufficient margin to enable the automatic protective action to correct the most severe abnormal situation anticipated before a safety limit is exceeded.

RG 1.105, Revision 2, February 1986 was issued endorsing ISA-S67.04-1982 with clarifications.

## DISCUSSION

The current RG 1.105, Revision 3, December 1999, was issued endorsing Part I of the standard ISA-S67.04-1994, "Setpoints for Nuclear Safety-Related Instrumentation." This guide describes a method acceptable to the NRC staff for complying with the NRC's regulations for ensuring that setpoints for safety-related instrumentation are established and maintained within the technical specification limits.

The staff's endorsement of ISA-S67.04-1994 included four positions as follows:

- Clarifying the specific criterion, not just the methods, for combining uncertainties when determining a trip point and its allowable values.
- Clarifying how referenced standards were acceptable for or not for use to NRC staff.
- Clarifying that limiting safety system settings had to be specified as technical specification defined limits and not in plant procedures in order to satisfy the requirements of Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.36.
- Clarifying that the allowable value is the limiting value that the trip setpoint can have when tested periodically and that the allowable value relationship to the setpoint methodology and testing requirements in the technical specifications must be documented.

Subsequently, NRC issued Regulatory Issue Summary (RIS) 2006-017, "NRC Staff Position on the Requirements of 10 CFR 50.36, 'Technical Specifications,' regarding Limiting Safety System Settings during Periodic Testing and Calibration of Instrument Channels." The RIS discusses issues that could occur during testing of Limiting Safety System Settings and which may have an adverse effect on equipment operability. This RIS also presents an approach, found acceptable to the NRC staff, for addressing these issues for use in licensing actions that require prior NRC staff approval.

Also, Technical Specifications Task Force (TSTF) Traveler TSTF-493, Revision 4, Errata, dated May 11, 2010, "Clarify Application of Setpoint Methodology for Limiting Safety System Settings," was issued which identified that under 10 CFR 50.90, "Application for amendment of

---

<sup>1</sup> Before 2000, ISA stood for the "Instrument Society of America." Subsequently, the organization changed its name to the "International Society of Automation."

license, construction permit, or early site permit,” a licensee may submit a license amendment request that revises its technical specifications to implement a setpoint control program, as described in TSTF-493, Revision 4, Option B. Once approved, the program would allow for controlling the setpoint values outside of the technical specifications.

In 2016, the International Society of Automation (ISA)-S67.04 Committee initiated work to update American National Standards Institute (ANSI)/ISA-67.04.01 as follows:

- Improved definitions based on TSTF-493, Revision 4, RIS-2006-17, and NRC unissued RG 1.105/Draft Regulatory Guide (DG)-1141 proposed revisions.
- Improved guidance on the development of component uncertainty data and analysis techniques for applying tolerance intervals at 95% probability/95% confidence within total channel uncertainty calculations.
- Improved guidance for addressing technical specification requirements reflecting changes based on criteria within TSTF-493 and RIS 2006-17.
- Clarified that limiting safety system settings had to be specified as technical specification defined limits only.
- Clarified that the allowable value relationship to the setpoint methodology and testing requirements in the technical specifications must be documented.

The revised ANSI/ISA-67.04.01-2018 standard was approved on December 8, 2018.

Proposed Revision 4 of RG 1.105 updates the staff endorsement to ANSI/ISA-67.04.01-2018, “Setpoints for Nuclear Safety-Related Instrumentation.” The staff review of updated ANSI/ISA-67.04.01-2018 confirmed that the RG 1.105, Revision 3 positions have been addressed and that the issues addressed by RIS 2006-17 and TSTF-493, Revision 4 have been incorporated. Thus, the staff concludes and endorses ANSI/ISA-67.04.01-2018 as a method acceptable to the NRC staff for use in complying with the agency’s regulations to ensure that a) setpoints for safety-related instrumentation are established to protect nuclear power plant safety and analytical limits, and b) the maintenance of instrument channels implementing these setpoints ensures they are functioning as required, consistent with the plant technical specifications without exceptions or additional clarifying guidance.

We heard a different view about the establishment of the limiting trip setpoint uncertainties. The approach outlined in the different view would decrease the probability of exceeding the analytic limit but would have an insignificant impact on execution of the safety function, because the analytic limits have margin built-in based on engineering design.

The approach to establishment of setpoints described in RG 1.105, Revision 4 is a significant improvement and should be issued.

We are not requesting a formal response from the staff to this letter report.

Sincerely,

Matthew W. Sunseri  
Chairman

## REFERENCES

1. American National Standards Institute (ANSI)/International Society of Automation (ISA), Standard 67.04.01, "Setpoints for Nuclear Safety-Related Instrumentation," ISA, Research Triangle Park, NC, 2018
2. Instrument Society of America (ISA) Standard S67.04, "Setpoints for Nuclear Safety-Related Instrumentation Used in Nuclear Power Plants," 1982
3. U.S. Nuclear Regulatory Commission (NRC), Regulatory Issue Summary (RIS) 2006-017, "NRC Staff Position on the Requirements of 10 CFR 50.36, 'Technical Specifications,' regarding Limiting Safety System Settings during Periodic Testing and Calibration of Instrument Channels," Washington, DC, August 24, 2006 (ML051810077)
4. U.S. Nuclear Regulatory Commission (NRC), Technical Specifications Task Force (TSTF) Traveler TSTF-493, "Clarify Application of Setpoint Methodology for Limiting Safety System Settings," Washington, DC, Revision 4, Errata was issued on May 11, 2010 (ML093410581)
5. Proposed Draft Regulatory Guide (RG) 1.105, "Setpoints for Safety-Related Instrumentation," Revision 4, Draft Issued: January 2021 (ML20330A329)
6. Regulatory Guide 1.105, "Instrument Setpoints," Revision 1, November 1976 (ML13064A112)
7. Regulatory Guide 1.105, "Instrument Setpoints for Safety-Related Systems," Revision 2, February 1986 (ML003740318)
8. Regulatory Guide 1.105, "Setpoints for Safety-Related Instrumentation," Revision 3, December 1999 (ML993560062)

March 1, 2021

SUBJECT: PROPOSED DRAFT REGULATORY GUIDE 1.105., REVISION 4, SETPOINTS FOR SAFETY-RELATED INSTRUMENTATION

Accession No: **ML21054A204** Publicly Available (Y/N):   Y   Sensitive (Y/N): N

If Sensitive, which category?

Viewing Rights:  NRC Users or  ACRS only or  See restricted distribution

<b>OFFICE</b>	ACRS	SUNSI Review	ACRS	ACRS	ACRS
<b>NAME</b>	CAntonescu	CAntonescu	LBurkhart	SMoore (SWM)	MSunseri
<b>DATE</b>	2/23/21	2/23/21	2/23/21	2/24/21	3/1/21

**OFFICIAL RECORD COPY**