



# **Non-Real-Time, High-Integrity Software for the Nuclear Industry—User Requirements**

An American National Standard

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**American National Standard  
Non-Real-Time, High-Integrity Software for the  
Nuclear Industry—User Requirements**

Secretariat  
**American Nuclear Society**

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## Foreword

(This foreword is not a part of American National Standard “Non-Real-Time, High-Integrity Software for the Nuclear Industry—User Requirements,” ANSI/ANS-10.8-2015.)

The purpose of this standard is to provide quality assurance requirements for the users of non-real-time, high-integrity software developed for nuclear industry applications. This standard is intended to complement ANSI/ANS-10.7-2013, “Non-Real-Time, High-Integrity Software for the Nuclear Industry—Developer Requirements,” which provides requirements for the development of such software. The standard does not recommend a specific approach to software deployment and use but does recommend that for a specific project, the project sponsor should determine the level of effort to be applied. Compliance with this standard does not automatically guarantee compliance with any other standard.

The standard complements the following ANS-10 standards related to computer program development. *Any references in this document to the standards listed below refer to the version given here:*

ANSI/ANS-10.2-2000 (R2009), “Portability of Scientific and Engineering Software”;  
ANSI/ANS-10.3-1995 (withdrawn), “Documentation of Computer Software”;  
ANSI/ANS-10.4-2008, “Verification and Validation of Non-Safety-Related Scientific and Engineering Computer Programs for the Nuclear Industry”;  
ANSI/ANS-10.5-2006 (R2011), “Accommodating User Needs in Scientific Engineering Computer Software Development”;  
ANSI/ANS-10.7-2013, “Non-Real-Time, High-Integrity Software for the Nuclear Industry—Developer Requirements.”

This standard builds upon NUREG/CR-6263, “High-Integrity Software for Nuclear Power Plants: Candidate Guidelines, Technical Basis and Research Needs,” which was prepared for the U.S. Nuclear Regulatory Commission to assist with development of a technical basis for regulatory positions related to the use of high-integrity software in nuclear power plants. NUREG/CR 6263 and NUREG/CR-5930, “High Integrity Software Standards and Guidelines,” were developed for application to nuclear power plants, and this standard is primarily applicable to nuclear power plants and other nuclear facilities and operations with similar high consequences and hazards.

NUREG/CR-6263 was the result of a comprehensive review of the state of software engineering processes and design attributes. While the focus of that effort was on real-time, high-integrity software, the standard ANSI/ANS-10.7-2013 and this standard focus on non-real-time, high-integrity software, such as for design and analysis. Therefore, the requirements of NUREG/CR-6263 were carefully adapted, and new requirements were developed and added for model development and validation, which are a key aspect of analytical, non-real-time software.

In addition to calculation correctness, cybersecurity is an important aspect of high-integrity software and is addressed in this standard by the identification of activities that affect cybersecurity. The requirements in this standard for cybersecurity were derived from U.S. Nuclear Regulatory Commission Regulatory Guide 1.152, “Criteria for Use of Computers in Safety Systems of Nuclear Power Plants.” The regulatory guide ensures satisfaction of the requirements outlined in 10 CFR 50, 50.55a (h) and Appendix A [Title 10, “Energy,” Part 50, “Domestic Licensing of Production and Utilization Facilities, Sec. 50.55a, “Codes and Standards,” (h), “Protection and Safety Systems,” Appendix A], and 10 CFR 73.54 [Title 10, “Energy,” Part 73, “Physical Protection of Plants and Materials, Sec. 54, “Protection of Digital Computer and Communication Systems and Networks”].

Additional discussions of cybersecurity requirements may be found in NEI 08-9, “Cyber Security Plan for Nuclear Power Reactors”; NEI 10-04, “Identifying Systems and Assets Subject to the Cyber Security Rule”; and NRC Regulatory Guide 5.71, “Cyber Security Programs for Nuclear Facilities.”

An effort has been made to maintain consistency in terminology and concepts with various software standards being developed under the sponsorship of the Institute of Electrical and Electronics Engineers, Inc., and the American Society of Mechanical Engineers.

This standard might reference documents and other standards that have been superseded or withdrawn at the time the standard is applied. A statement has been included in the references section that provides guidance on the use of references.

This standard does not incorporate the concepts of generating risk-informed insights, performance-based requirements, or a graded approach to quality assurance. The user is advised that one or more of these techniques could enhance the application of this standard. For example, the software requirements of ANSI/ANS-10.7-2013 and this standard, which are applicable for high-consequence applications, could be appropriately tailored or graded for applications of lower consequence.

This standard has been written by Working Group ANS-10.8 of the American Nuclear Society’s Standards Committee. The membership of this group during the preparation of the final drafts consisted of the following:

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## Contents

<b>Section</b>	<b>Page</b>
1 Scope and objective .....	1
1.1 Scope .....	1
1.2 Objective.....	1
1.3 Areas of application.....	1
1.4 Intended usage of this standard.....	2
1.5 Conformance .....	3
1.6 Organization .....	3
2 Acronyms and definitions .....	3
2.1 List of acronyms .....	3
2.2 Shall, should, and may.....	3
2.3 Definitions .....	3
3 Introduction and overview .....	5
4 Requirements .....	6
5 Software quality assurance .....	6
5.1 SQA during software development .....	7
5.2 SQA subsequent to deployment.....	7
6 Software configuration management .....	8
7 Software acquisition .....	9
7.1 Software developed in accordance with ANSI/ANS-10.7-2013 .....	9
7.2 Otherwise acquired software .....	9
8 Software and model validation and acceptance testing.....	10
9 Installation testing.....	11
10 User operation and training.....	12
11 Maintenance.....	13
12 Retirement.....	13
13 Security .....	13
14 Support software .....	14
15 References.....	14
<b>Appendix</b>	
User Checklist for Software Quality Assurance .....	16
User Checklist for Software Configuration Management.....	17
User Checklist for Software Acquisition .....	17
User Checklist for Software and Model Validation and Acceptance Testing.....	18

User Checklist for Installation Testing .....	18
User Checklist for Operation and Training.....	19
User Checklist for Maintenance.....	20
User Checklist for Retirement .....	20
User Checklist for Security .....	20
User Checklist for Support Software .....	20