ASME NQA-1–2019

(Revision of ASME NQA-1–2017)

Quality Assurance Requirements for Nuclear Facility Applications

AN AMERICAN NATIONAL STANDARD

The American Society of Mechanical Engineers

This is a preview. Click here to purchase the full publication.

ASME NQA-1–2019
(Revision of ASME NQA-1–2017)

Quality Assurance Requirements for Nuclear Facility Applications

AN AMERICAN NATIONAL STANDARD

The American Society of Mechanical Engineers
Two Park Avenue • New York, NY • 10016 USA

This is a preview. Click here to purchase the full publication.

Date of Issuance: December 31, 2019

The next edition of this Standard is scheduled for publication in 2021.

ASME issues written replies to inquiries concerning interpretations of technical aspects of this Standard. Interpretations are published on the ASME website under the Committee Pages at http://cstools.asme.org/ as they are issued.

Errata to codes and standards may be posted on the ASME website under the Committee Pages to provide corrections to incorrectly published items, or to correct typographical or grammatical errors in codes and standards. Such errata shall be used on the date posted.

The Committee Pages can be found at http://cstools.asme.org/. There is an option available to automatically receive an e-mail notification when errata are posted to a particular code or standard. This option can be found on the appropriate Committee Page after selecting "Errata" in the "Publication Information" section.

ASME is the registered trademark of The American Society of Mechanical Engineers.

This code or standard was developed under procedures accredited as meeting the criteria for American National Standards. The Standards Committee that approved the code or standard was balanced to assure that individuals from competent and concerned interests have had an opportunity to participate. The proposed code or standard was made available for public review and comment that provides an opportunity for additional public input from industry, academia, regulatory agencies, and the public-at-large.

ASME does not "approve," "rate," or "endorse" any item, construction, proprietary device, or activity.

ASME does not take any position with respect to the validity of any patent rights asserted in connection with any items mentioned in this document, and does not undertake to insure anyone utilizing a standard against liability for infringement of any applicable letters patent, nor assume any such liability. Users of a code or standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, is entirely their own responsibility.

Participation by federal agency representative(s) or person(s) affiliated with industry is not to be interpreted as government or industry endorsement of this code or standard.

ASME accepts responsibility for only those interpretations of this document issued in accordance with the established ASME procedures and policies, which precludes the issuance of interpretations by individuals.

No part of this document may be reproduced in any form,
in an electronic retrieval system or otherwise,
without the prior written permission of the publisher.

The American Society of Mechanical Engineers
Two Park Avenue, New York, NY 10016-5990

Copyright © 2019 by
THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS
All rights reserved
Printed in U.S.A.

This is a preview. Click here to purchase the full publication.

CONTENTS

Foreword . . . xvii

Correspondence With the NQA Committee . . . xix

Committee Roster . . . xxi

Introduction . . . xxiv

Summary of Changes . . . xxv

Part I	**Requirements for Quality Assurance Programs for Nuclear Facilities (From Former NQA-1)**	1
	Introduction	1
100	Purpose	1
200	Applicability	1
300	Responsibility	1
400	Terms and Definitions	1
Requirement 1	**Organization**	5
100	General	5
200	Structure and Responsibility	5
300	Interface Control	5
Requirement 2	**Quality Assurance Program**	6
100	General	6
200	Indoctrination and Training	6
300	Qualification Requirements	6
400	Records of Qualification	8
500	Records	8
Requirement 3	**Design Control**	9
100	General	9
200	Design Input	9
300	Design Process	9
400	Design Analyses	9
500	Design Verification	10
600	Change Control	10
700	Interface Control	11
800	Software Design Control	11
900	Documentation and Records	11
Requirement 4	**Procurement Document Control**	12
100	General	12
200	Content of the Procurement Documents	12
300	Procurement Document Review	12
400	Procurement Document Changes	12

This is a preview. Click here to purchase the full publication.

Requirement 5	**Instructions, Procedures, and Drawings**	13
100	General	13
Requirement 6	**Document Control**	14
100	General	14
200	Document Control	14
300	Document Changes	14
Requirement 7	**Control of Purchased Items and Services**	15
100	General	15
200	Supplier Evaluation and Selection	15
300	Bid Evaluation	15
400	Control of Supplier-Generated Documents	15
500	Acceptance of Item or Service	15
600	Control of Supplier Nonconformances	16
700	Commercial Grade Items and Services	16
800	Records	16
Requirement 8	**Identification and Control of Items**	18
100	General	18
200	Identification Methods	18
300	Specific Requirements	18
Requirement 9	**Control of Special Processes**	19
100	General	19
200	Process Control	19
300	Responsibility	19
400	Records	19
Requirement 10	**Inspection**	20
100	General	20
200	Inspection Requirements	20
300	Inspection Hold Points	20
400	Inspection Planning	20
500	In-Process Inspection	20
600	Final Inspections	20
700	Inspections During Operations	20
800	Records	20
Requirement 11	**Test Control**	22
100	General	22
200	Test Requirements	22
300	Test Procedures (Other Than for Computer Programs)	22
400	Computer Program Test Procedures	22
500	Test Results	22
600	Test Records	22
Requirement 12	**Control of Measuring and Test Equipment**	24
100	General	24
200	Selection	24
300	Calibration and Control	24
400	Records	24

This is a preview. Click here to purchase the full publication.

Requirement 13	**Handling, Storage, and Shipping**	26
100	General	26
200	Special Requirements	26
300	Procedures	26
400	Tools and Equipment	26
500	Operators	26
600	Marking or Labeling	26
Requirement 14	**Inspection, Test, and Operating Status**	27
100	General	27
200	Authority	27
300	Status Indication	27
Requirement 15	**Control of Nonconforming Items**	28
100	General	28
200	Identification	28
300	Segregation	28
400	Disposition	28
Requirement 16	**Corrective Action**	29
100	General	29
Requirement 17	**Quality Assurance Records**	30
100	General	30
200	Generation of Records	30
300	Authentication of Records	30
400	Classification	30
500	Receipt Control of Records	30
600	Storage	30
700	Retention	31
800	Maintenance of Records	31
Requirement 18	**Audits**	32
100	General	32
200	Scheduling	32
300	Preparation	32
400	Performance	33
500	Reporting	33
600	Response	33
700	Follow-Up Action	33
800	Records	33
Part II	**Quality Assurance Requirements for Nuclear Facility Applications**	34
	Introduction	34
100	Purpose	34
200	Applicability	34
300	Responsibility	34
400	Planning and Procedures	34
500	Definitions	35
600	Multiunit Facility Provisions	35

This is a preview. Click here to purchase the full publication.

Subpart 2.1	**Quality Assurance Requirements for Cleaning of Fluid Systems and Associated Components for Nuclear Facilities**	36
100	General	36
200	General Requirements	37
300	Cleanness Criteria	38
400	Manufacturing Phase Cleanness	40
500	Cleanness Prior to Installation	41
600	Cleanness During Installation	42
700	Maintenance of Installation Cleanness	42
800	Preoperational Cleaning	42
900	Layup and Postlayup Cleaning	43
1000	Postoperational Repairs and Modifications	43
1100	Records	44
Subpart 2.2	**Quality Assurance Requirements for Packaging, Shipping, Receiving, Storage, and Handling of Items for Nuclear Facilities**	45
100	General	45
200	General Requirements	45
300	Packaging	46
400	Shipping	52
500	Receiving	53
600	Storage	54
700	Handling	56
800	Records	56
Subpart 2.3	**Quality Assurance Requirements for Housekeeping at Nuclear Facilities**	57
100	General	57
200	General Requirements	57
300	Requirements	57
400	Records	59
Subpart 2.5	**Quality Assurance Requirements for Installation, Inspection, and Testing of Structural Concrete, Structural Steel, Soils, and Foundations for Nuclear Facilities**	60
100	General	60
200	General Requirements	61
300	Requirements	61
400	Preconstruction Verification	61
500	Inspection of Soils and Earthwork	62
600	Inspection of Foundation Pile and Caisson Construction	63
700	Inspection of Concrete Construction	65
800	Inspection of Steel Construction	68
900	Data Analysis and Evaluation	69
1000	Records	70
Subpart 2.7	**Quality Assurance Requirements for Computer Software for Nuclear Facility Applications**	71
100	General	71
200	General Requirements	72

This is a preview. Click here to purchase the full publication.

300	Software Acquisition	74
400	Software Engineering Method	74
500	Standards, Conventions, and Other Work Practices	76
600	Support Software	76
700	References	76
Subpart 2.8	**Quality Assurance Requirements for Installation, Inspection, and Testing of Mechanical Items for Nuclear Facilities**	77
100	General	77
200	General Requirements	77
300	Preinstallation Verification	78
400	Installation Inspections	79
500	Systems Turnover Inspection and Tests	80
600	Data Analysis and Evaluation	82
700	Records	82
Subpart 2.14	**Quality Assurance Requirements for Commercial Grade Items and Services**	83
100	General	83
200	CGI Definition Applications	84
300	Utilization	84
400	Technical Evaluation	84
500	Critical Characteristics	85
600	Methods of Accepting Commercial Grade Items and Services	85
700	Commercial Grade Services	88
800	Documentation	88
900	References	88
Subpart 2.15	**Quality Assurance Requirements for Hoisting, Rigging, and Transporting of Items for Nuclear Power Plants**	90
Subpart 2.17	**Quality Assurance Requirements for Electronic Quality Assurance Records Systems**	91
100	General	91
200	General Requirements	91
300	Record Recovery	91
400	Access Control and Retrieval	92
500	Digital and Physical Security	92
600	Electronic Data Integrity	92
700	Disposal of Records	92
800	Acquisition, Development, and Maintenance of Electronic Records Systems	92
Subpart 2.18	**Quality Assurance Requirements for Maintenance of Nuclear Facilities**	93
100	General	93
200	General Requirements	93
300	Preventive Maintenance	94
400	Corrective Maintenance	95
500	Records	95
Subpart 2.19	**Quality Assurance Requirements for the Use of Supplier Accreditation for Calibration or Testing Services**	96
100	General	96

This is a preview. Click here to purchase the full publication.

200	Requirements	96
Subpart 2.20	**Quality Assurance Requirements for Subsurface Investigations for Nuclear Facilities**	98
100	General	98
200	General Requirements	98
300	Verification	99
400	Field Investigation	100
500	Laboratory Testing	102
600	Engineering Evaluation and Analysis	103
700	Records	103
Subpart 2.22	**Quality Assurance Requirements for Management Assessment and Quality Improvement for Compliance With 10 CFR 830 and Department of Energy (DOE) Order 414.1 for DOE Nuclear Facilities**	104
100	General	104
200	Management Assessment Requirements	105
300	Quality Improvement	106
400	Records	107
500	References	107
Subpart 2.25	**Quality Assurance Requirements for High-Level Waste Custodians**	108
100	General	108
200	Requirements	108
Part III	**Guidance for Implementing Parts I and II Requirements**	113
	Introduction	113
100	Purpose	113
200	Applicability	113
Subpart 3.1	**Guidance for Implementing Part I Requirements**	114
Subpart 3.1-1.1	**Implementing Guidance for Part I, Requirement 1: Organization**	115
100	General	115
200	Organizational Structure	115
300	Basic Principles	115
Subpart 3.1-2.1	**Implementing Guidance for Part I, Requirement 2: Quality Assurance Programs**	116
100	General	116
200	Program Format	116
300	Program Development	116
400	Work Requirements and Performance	117
500	Work Processes	117
600	Training and Qualification	117
700	Assessment of Performance	118
Subpart 3.1-2.2	**Implementing Guidance for Part I, Requirement 2: Quality Assurance Programs, Lead Auditor Qualification**	119
100	General	119
200	Education and Experience	119
300	Records	119

This is a preview. Click here to purchase the full publication.

Subpart 3.1-2.3 **Implementing Guidance for Part I, Requirement 2: Quality Assurance Programs, Inspection and Test Personnel Qualification** 122
100 General 122
200 Functional Qualifications 122
300 Education and Experience Qualifications 122
400 Use of Inspection and Test Personnel 123
Subpart 3.1-2.4 **Implementing Guidance for Part I, Requirement 2: Quality Assurance Programs, Management Assessment of the QA Program Using Surveillance** 124
100 General 124
200 Planning and Scheduling 124
300 Preparation 124
400 Performance 125
500 Reporting and Communication 126
600 Resolution of Issues 126
Subpart 3.1-3.1 **Implementing Guidance for Part I, Requirement 3: Design Control** . 127
100 General 127
200 Design Input 127
300 Design Process 128
400 Design Analysis 129
500 Design Verification 130
600 Change Control 130
700 Use of Reverse-Engineering Techniques 131
800 Interface Control 132
900 Documentation and Records 132
1000 Reference 132
Subpart 3.1-4.1 **Implementing Guidance for Part I, Requirement 4: Procurement Document Control** 133
100 General 133
200 Procurement Document Review 133
300 Typical Scope of Procurement Effort 133
400 Categorization of Procurement Actions 134
500 General Logic Considerations 134
600 Logic Chart 135
700 Methods of Specifying Quality Assurance Program Requirements 135
Subpart 3.1-7.1 **Implementing Guidance for Part I, Requirement 7: Control of Purchased Items and Services** 138
100 General 138
200 Procurement Planning 138
300 Supplier Selection 138
400 Bid Evaluation 139
500 Purchaser/Supplier Communications 139
600 Control of Changes in Items or Services 139
700 Product Acceptance 139
Subpart 3.1-10.1 **Implementing Guidance for Part I, Requirement 10: Inspection** . . . 141
100 General 141

This is a preview. Click here to purchase the full publication.

200	Inspection and Process Monitoring	141
300	In-Service Inspection	141
Subpart 3.1-15.1	**Implementing Guidance for Part I, Requirement 15: Control of Nonconforming Items**	142
100	General	142
200	Identification	142
300	Segregation	142
400	Disposition	142
Subpart 3.1-16.1	**Implementing Guidance for Part I, Requirement 16: Corrective Action**	145
100	General	145
200	Corrective Action	145
300	Basic corrective Action Elements	145
400	Management Involvement	147
500	Process Chart	147
Subpart 3.1-16.2	**Implementing Guidance for Part I, Requirement 16: Trend Analysis**	148
100	General	148
200	Definitions	148
300	Trending Program	148
400	Data Collection	149
500	Trend Analysis Process	149
600	Trend Reporting	150
700	Records	151
800	References and Recommended Reading	151
Subpart 3.1-17.1	**Implementing Guidance for Part I, Requirement 17: Quality Assurance Records**	152
100	General	152
200	List of Typical Lifetime Records	153
Subpart 3.1-17.2	**Implementing Guidance for Part I, Requirement 17: Quality Assurance Records, Electronic Records**	156
100	General	156
200	Authentication of Records	156
300	Generation of Records	157
400	Receipt Control of Records	157
500	Storage	158
600	Access Control and Retrieval	158
700	Disposal of Records	159
800	Maintenance of Records System	159
900	System Integrity and Record Recovery	160
Subpart 3.1-18.1	**Implementing Guidance for Part I, Requirement 18: Audits**	161
100	General	161
200	Audit Administration	161
300	Preparation for Auditing	162
400	Audit Performance	163
500	Reporting	164
600	Response	164
700	Follow-Up Action	164

This is a preview. Click here to purchase the full publication.