ENCLOSURE 5

NUCLEAR MANAGEMENT COMPANY

DUANE ARNOLD ENERGY CENTER DOCKET 50-331 KEWAUNEE NUCLEAR POWER PLANT DOCKET 50-305 MONTICELLO NUCLEAR GENERATING PLANT DOCKET 50-263 PALISADES NUCLEAR PLANT DOCKET 50-255 POINT BEACH NUCLEAR PLANT UNITS 1 AND 2 DOCKETS 50-266 AND 50-301 PRAIRIE ISLAND NUCLEAR GENERATING PLANT UNITS 1 AND 2 DOCKETS 50-282 AND 50-306

October 31, 2003

NQA-1 vs NON-PROGRAMMATIC ANSI STANDARDS COMPARISON TABLES

156 Pages Follow

ANSI N45.2.1-1973	NQA-1 (1994) Subpart 2.1	Comments
	(except where noted)	nearly identical wording)
INTRODUCTION I.1 Scope This standard covers on-site cleaning	1 GENERAL Subpart 2.1 provides amplified requirements for the management of cleaning and cleanness control of	N45.2.1 limited to "during construction." NQA-1 larger scope of "during manufacturing, construction, repairs, and modifications."
of materials and components, cleanness control, and preoperational cleaning and layup of important nuclear power plant fluid systems during construction.	fluid systems and associated components for nuclear power plants during manufacturing, construction, repairs, and modifications. It supplements the requirements of Part I.	
These systems include those whose satisfactory performance is required for safe and reliable operation of the plant.		QATR establishes applicability in Section A.1 "Methodology"
The requirements may also be extended to other parts of nuclear power plants when specified in contract documents.	when and to the extent specified by the organization invoking Subpart 2.1.	In addition, the QATR establishes applicability in Section A.1 "Methodology"
The standard covers requirements necessary to ensure an adequately clean system upon completion of construction activities, and covers the period from which the materials and equipment are removed from storage or receiving for installation at the construction site until the systems are ready for pre-operational testing.		Guidance only. Wording does not establish requirements.
The intent of this standard is to require close attention to cleanness control during erection of a nuclear power plant so that only water flushing or rinsing of an installed system is required to render it ready for service.		Guidance only. Wording does not establish requirements.
When more than a water flush or rinse is needed to produce the specified cleanness, additional cleaning, in accordance with this standard may be necessary.		Guidance only. Wording does not establish requirements.
This standard is intended to be used in conjunction with ANSI N45.2 Quality Assurance Requirements for Nuclear Power Plants.	and shall be used in conjunction with applicable Basic and Supplementary Sections of Part I when and to the extent specified by the organization invoking Subpart 2.1.	Guidance only. Wording does not establish requirements.
1.2 Applicability	Section 1 "Introduction"	These words are not included in NQA- 1 Subpart 2.1, but rather in Section 1
The requirements of this standard apply to the work of any individual or	2 Applicability	
organization that participates in the construction phase cleaning of items to be incorporated into nuclear power	The requirements of this Part (Part II) apply to fabrication, construction, modification, repair maintenance	
plants as discussed in Subsection 1.1.	and testing activities that affect the quality of structures, systems, and components for nuclear facilities. These activities include the performing function of attaining quality objectives and verifying that activities affecting quality have been correctly performed. These activities	
	include planning, subsurface investigation, fabricating, handling, shipping, storing, cleaning	
The extent to which the individual re- quirements of this standard will apply will depend upon the nature and scope	when and to the extent specified by the organization invoking Subpart 2.1.	OK

ANSI N45.2.1-1973	NQA-1 (1994) Subpart 2.1 (except where noted)	Comments (NOTE: OK signifies identical or nearly identical wording)
of work to be performed and the importance of the item or service involved.		
The requirements are intended to ensure that only proper cleaning materials, equipment, processes and procedures are utilized during the construction of power plants and that the quality of items is maintained as a result of use of proper cleaning practices and techniques during construction.	Section 1 "Introduction" 2 Applicability The requirements of this Part (Part II) apply to fabrication, construction, modification, repair, maintenance, and testing activities that affect the quality of structures, systems, and components for nuclear facilities. These activities include the performing function of attaining quality objectives and verifying that activities affecting quality have been correctly performed. These activities include planning, subsurface investigation, fabricating, handling, shipping, storing, cleaning.	These words are not included in NQA- 1 Subpart 2.1, but rather in the Introduction to Part II
1.3 Responsibility The organization or organizations responsible for the activities covered by this standard shall be identified and the scope of their responsibility shall be documented.	Section 1 "Introduction" 3 Responsibility The organization invoking this Part (Part II) shall be responsible for specifying which section, or portions thereof, apply and appropriately relating them to specific items and services. To the extent necessary, this organization shall invoke the applicable provision of Part 1, Basic and Supplementary Requirements, to specify a complete Quality Assurance Program appropriate for the specific items or services. The organization upon which this Part (Part II), or portions thereof, is invoked shall be responsible for complying with the specified requirements.	These words are not included in NQA- 1 Subpart 2.1, but rather in the Introduction to Part II
at the earliest practical point in time so as to facilitate incorporation of cleaning requirements in design drawings and purchase specifications.		establishes responsibilities. Otherwise wording is guidance.
The establishment of practices and procedures and provision of resources, in terms of personnel, equipment, and services necessary to implement the requirements of this standard, may be delegated to other organizations and such delegations shall also be documented.		QATR Section A.2 "Organization" covers delegation.
Each organization participating in site construction activities shall comply with procedures and instructions issued for the project and with those require- ments of this standard applicable to his work.	Section 1 "Introduction" 3 Responsibility The organization invoking this Part (Part II) shall be responsible for specifying which section, or portions thereof, apply and appropriately relating them to specific items and services. To the extent necessary, this organization shall invoke the	These words are not included in NQA- 1 Subpart 2.1, but rather in the Introduction to Part II

ANSI N45.2.1-1973	NQA-1 (1994) Subpart 2.1	Comments
	(except where noted)	(NOTE: OK signifies identical or
	applicable provision of Part 1 Pasic	nearly identical wording)
	and Supplementary Requirements, to	
	specify a complete Quality Assurance	
	Program appropriate for the specific	
	Items or services. The organization	
	portions thereof, is invoked shall be	
	responsible for complying with the	
The organization responsible for	specified requirements.	These words are not included in NOA
performing the cleaning shall identify	Section 1 Introduction	1 Subpart 2.1, but rather in the
and document detailed cleaning	4.2 Procedures	Introduction to Part II. Not as specific
procedures unless they are specified in		in NQA-1.
the procurement documents.	nstallation, inspection, test procedures and work instructions	
	identified during planning shall be	
	prepared.	
Requirements for review and/or	NQA-4S-1 "Supplementary	OK
specified in the procurement	Document Control"	
documents.		
	Section 2.5	
	The procurement documents at all	
	tiers shall identify the documentation	
	information, review, or approval by	
	the Purchaser.	
1.4 Definitions	1.1 Definitions	ОК
The following, definitions are provided	The following definitions are provided	
to assure a uniform understanding of select terms as they are used in this	to assure a uniform understanding of unique terms as they are used in	
standard.	Subpart 2.1.	
Acid Cleaning—The removal of metal	acid cleaning — the removal of metal	ОК
oxide or undercutting the oxide by	oxide or undercutting the oxide by	
dissolution of the base metal with an	dissolution of the base metal with an	
acid solution.	acid solution	01
organic contaminants by converting	organic contaminants by converting	ŬŔ
them to an emulsion with an alkaline	them to an emulsion with an	
solution such as trisodium phosphate.	alkaline solution such as trisodium	
Chelate Cleaning—The removal of	chelate cleaning — the removal of	OK
slightly soluble compounds such as	slightly soluble compounds such as	
iron oxide, by complexing the metallic	iron oxide, by complexing the metallic	
such as ethylene diamine tetra-acetic	compounds such as ethylene	
acid (EDTA).	diamine tetra-acetic acid (EDTA)	
Chemical Conditioning—The addition	chemical conditioning — the addition	OK
of chemicals in low concentration to	of chemicals in low concentration to	
precipitation of dissolved solids, inhibit	precipitation of dissolved solids,	
corrosion, etc.	corrosion, and other detrimental	
Cleaning—The removal of anv	cleaning — the removal of any	Definitions are similar and have same
contaminants that might have a	contaminants that might have a	intent- N45.2.1 includes the words "on
deleterious effect on plant safety and reliable operation	deleterious effect on operation of the	plant safety" and "reliable"
Contractor—Any individual or	Section 1 "Introduction"	This definition not included in NQA-1
organization entering into a contract to		Subpart 2.1, but rather in Section 1
turnish items or services to a	Supplier - any individual or	
includes the terms Vendor, Supplier.	services in accordance with a	
and Subcontractor or sub-tier levels of	procurement document. An all	

ANSI N45.2.1-1973	NQA-1 (1994) Subpart 2.1	Comments
	(except where noted)	(NOTE: OK signifies identical or nearly identical wording)
these where appropriate.	inclusive term used in place of the	
	following: vendor, seller, contractor,	
	and their subtier levels.	
Contamination—Any undesirable	contamination — any unwanted or	ОК
foreign material on the surface of an	undesirable foreign material on the	
item, in the atmosphere, or in process	surface of an item, in the atmo-	
Corrosion Resistant Allovs	corrosion-resistant alloys — materials	ОК
Materials, such as stainless steel,	that inherently resist oxidation or	
nickel-base, or cobalt-base alloys, that	chemical attack in water, air, and the	
inherently resist oxidation or chemical	operating environment, such as	
environment	cobalt-base alloys	
Crevice—Any narrow opening in a	crevice — a narrow opening in a	ОК
surface or any open juncture between	surface or an open juncture between	
mating surfaces in which	mating surfaces in which solutions or	
solutions can be trapped and not	contaminants can be trapped and not	
flushing operations: for example, the	flushing operations (for example, the	
annular spaces in threaded	annular spaces in threaded	
connections and socket assemblies,	connections and socket assemblies,	
tube-to-tube sheet joints, and tube-to-	tube-to-tube sheet joints, and tube-to-	
Dead LegAny area that does not	dead leg — an area that does not	OK
have flow during the cleaning	have flow during the cleaning	
operation or which cannot be drained	operation or that cannot be drained	
without special provisions.	without special provisions	
pictorial information describing,	Section 1 "Introduction"	Subpart 2.1, but rather in Section 1
defining, specifying, reporting, or	document - any written or pictorial	
procedures or results	specifying, reporting, or certifying	
	activities, requirements, procedures,	
	or results"	
	fluid — any gas or liquid	This definition not included in N45.2.1
component or system at adequate	component or system at adequate	ŬK
velocity to suspend and carry	velocity to suspend and carry away	
away anticipated contaminants.	anticipated contaminants	
Inhibitor—A chemical additive which	<i>inhibitor</i> — a chemical additive that	OK
reaction	retards some specific chemical	
Inaccessible Area—An area or	<i>inaccessible area</i> — an area or	ОК
opening in an item which is not directly	opening in an item that is not directly	
accessible for cleaning or inspection.	accessible for cleaning or inspection	This definition not included in NOA 4
including structure, system	Section 1 Introduction	Subpart 2.1, but rather in Section 1
subsystem, subassembly, component,	item - an all inclusive term used in	
part or material.	place of any of the following:	
	appurtenance, assembly, component,	
	equipment, material, module, part, structure subassembly subsystem	
	system, or unit.	
Layup—The protection of an item after	layup — the protection of an item	ОК
it has been cleaned, to prevent	atter it has been cleaned to prevent	
while the item is out of service or	the item is out of service or awaiting	
awaiting subsequent operations.	subsequent operations	
Mechanical Cleaning—A method in	mechanical cleaning — a method in	ОК
which contaminant removal is	which contaminant removal is	
accomplished solely by mechanical	accomplished solely by mechanical	
blasting, brushing, grinding, sanding.	blasting, high pressure water jetting.	
chipping, etc.	brushing, sanding, grinding, and	
	chipping	

ANSI N45.2.1-1973	NQA-1 (1994) Subpart 2.1	Comments
	(except where noted)	(NOTE: OK signifies identical or nearly identical wording)
Pitting— Localized corrosion resulting	<i>pitting</i> — surface defects resulting	ОК
In surface defects. Purchaser—The agency responsible	Section 1 "Introduction"	This definition not included in NQA-1
for issuance administration of a		Subpart 2.1, but rather in Section 1
contract, subcontract, or purchase	Purchaser—The organization	
portions hereof.	procurement requirements and for	
	issuance or administration, or both, of	
Rinsing—(I) Filling and draining an	rinsing	ОК
item with water until contaminants in	(a) filling and draining an item with	
the effluent water are reduced to some predetermined concentration or (2)	water until soluble contaminants in the effluent water are reduced to	
flowing water through the system or	some predetermined concentration;	
component at low velocity until	or (b) flowing water through the system	
reduced to some predetermined	or component until water soluble	
concentration.	contaminants in the effluent water are	
	concentration	
RustCorrosion products, consisting	<i>rust</i> — corrosion products consisting	ОК
vary in color from red to black and may	may vary in color from red to black	
form a loosely adherent heavy	and may form anything from a loosely	
Covering to a tightly adherent light film. Pitting or general surface roughening	adherent heavy covering to a tightly adherent light film. Pitting or general	
may or may not be present.	surface roughening may or may not	
Sensitized Corrosion Resistant Allov	be present.	ANSI N45 2 1 includes ASTM A393
— Any alloy which has been	a corrosion-resistant alloy that has	NQA-1 refers to the latest document
subjected to heating that causes inter-	been subjected to heating that	A262.
carbides in quantities sufficient to be	chromium car-bides in sufficient	
detected by methods of ASTM A262-	quantities to be detected by Practice	
Detecting Susceptibility to Intergranular	Practices for Detecting Susceptibility	
Attack in Stainless Steel or ASTM	to Intergranular Attack in Austenitic	
Conducting Acidified Copper Sulfate	Stalliess Steels	
Test for Inter-granular Attack in		
Solvent Cleaning— Dissolving organic	solvent cleaning — removing	ОК
contaminants with an organic solvent.	contaminants with an organic solvent	These words are not included in NOA
1.5 Referenced Documents	Section 1 Introduction	1 Subpart 2.1, but rather in the
Other documents that are required to	7 Referenced Codes, Standards,	Introduction to Part II.
either identified at the point of	and Specifications	
reference or described in Section 10 of	All codes, standards, and	
this standard. The issue or edition of the referenced document that is	specifications that are referenced as a part of this Part (Part II) are listed in	
required will be specified either at the	the Table entitled "Codes, Standards,	
point of reference or in Section 10 of this standard	and Specifications Referenced in	
	specifications referenced in this Part	
	(Part II) may be identified with the	
	point of reference or in the Table	
	"Codes, Standards, and	
Other terms and definitions are	Specifications Referenced in Text.	N45.2.10 incorporated into NQA-1.
contained in ANSI N45.2.10		
2. GENERAL REQUIREMENTS	Z GENERAL REQUIREMENTS	Delegation is covered in QATR
This section contains requirements		Section A.2 "Organization" and use of
that are to be fulfilled by the contractor		contractors is covered in Sections B.4

ANSI N45.2.1-1973	NQA-1 (1994) Subpart 2.1	Comments
	(except where noted)	(NOTE: OK signifies identical or nearly identical wording)
who is responsible for performing any segment of work described in paragraphs 3 through 9 of this standard.		"Procurement Control" and B.5 "Procurement Verifications".
Cleanness classification for an item shall be specified in accordance with paragraph 3.1 of this standard.	The cleanness classification of each item shall be specified in accordance with para. 3.2 of Subpart 2.1.	ОК
The work and quality assurance requirements for the cleaning of items and systems to be incorporated in the nuclear power plant and control of cleanness thereof shall be established in order to	The work and quality assurance requirements for the cleaning of components and systems and for the control of their cleanness shall be established in order to:	ОК
(1) ensure the removal of any deleterious contaminants,	(a) ensure the removal of deleterious contaminants;	ОК
(2) minimize recontamination of cleaned surfaces, and	(b) minimize recontamination of cleaned surfaces; and	OK
(3) minimize the cleaning required after installation.	(c) minimize the cleaning required after installation, repair, or modification.	ОК
2.1 Planning The cleanness and cleanness control activities shall be planned and outlined to define cleaning and inspection operations to be used.	2.1 Planning Cleaning and cleanness control activities for each phase (manufacturing, construction, modification, repair, etc.) shall be planned in accordance with the re- quirements of the Introduction to this Dat (Part II)	NQA-1 adds the words (manufacturing, construction, modification, repair, etc.)
It shall detail the systematic, sequential progression of cleaning operations for each item or system, the responsibilities of parties concerned for each operation, and measures to be employed to preserve the cleanness of cleaned surfaces	The plan(s) shall define the cleaning and inspection operations to be used, the system, the responsibilities of the parties concerned for each operation, and the measures to be employed to preserve the cleanness of cleaned surfaces	N45.2.1 uses the words "systematic, sequential progression". This is unnecessary detail not included in NQA-1.
Planning for cleaning activities shall include a review of the system and component design specifications and drawings and of the construction work plans and schedules to ensure that provisions for cleaning have been incorporated; that they can be accomplished as specified; and that time and resources are sufficient to accomplish the required actions.	Section 1 Introduction 4.1 Planning Planning shall include a review of the structure, system or component design/procurement specifications, materials, lists, drawings, construction work plans, and schedules to ensure that fabrication, installation, modification, inspection, testing, etc., activities have been incorporated; that the work can be accomplished as specified; and that time and resources, plus training, are sufficient to accomplish the work in accordance with specified requirements	These words are not included in NQA- 1 Subpart 2.1, but rather in the Introduction to Part II
items as appropriate.	the following factors, as appropriate, recognizing that this list may not be complete nor applicable to each phase covered by this Part (Part II):	that this list may not be complete nor applicable to each phase covered by this Part (Part II):"
 Adequacy of vents and drains, inspection access points, bypass or recirculation lines; 	 (a) adequacy of vents, drains, inspection access points, and bypass or recirculation lines; 	ОК
2. Facilities for filters, and flushing and/or drain connections, in locations where dead legs are	 (b) facilities for filters and flushing and drain connections in locations where dead legs are unavoidable; 	ОК

ANSI N45.2.1-1973	NQA-1 (1994) Subpart 2.1 (except where noted)	Comments (NOTE: OK signifies identical or nearly identical wording)
unavoidable;		
 Piping system design-and installation in a manner which minimizes the necessity for installation of temporary piping during the cleaning operations; (Where possible, divide the system into a number of separate cleaning circuits to facilitate cleaning). 	(c) design and installation of piping in a manner that minimizes the necessity for installing temporary piping during the cleaning operations, such as dividing the system into a number of separate cleaning circuits to facilitate cleanability;	ОК
 Sequencing of the installation operations to provide for visual inspection (crawl through) of the inside surfaces of large diameter piping; 	(d) sequencing of installation operations to provide for visual inspection of inside surfaces of large diameter piping;	N45.2.1 uses the words "crawl through". This is unnecessary detail not included in NQA-1.
 Control of the installation operations so that piping and components which have already been installed are not subject to contamination when subsequent installation operations are performed; 	(e) control of installation operations so that piping and components that have already been installed are not subject to contamination when subsequent installation operations are performed;	OK
 Adequate pumping and heating capacities when these are important factors in the cleaning operations. 	 (f) adequacy of pumping and heating capacities when these are important factors in the cleaning op- erations; 	ОК
	(g) disposal of cleaning solutions and waste water;	These words not included in N45.2.1
	(h) safety, fire protection, and other hazards.	These words not included in N45.2.1
2.2 Procedures and Instructions Cleaning procedures as well as procedures or work instructions for cleanness control practices and inspections, examinations or tests to verify cleanness of items shall be prepared.	2.2 Procedures and Instructions Written procedures and instructions for cleaning, cleanness control, inspections, and tests to verify cleanness of items shall be prepared in accordance with the requirements of the Introduction to this Part (Part II).	N45.2.1 includes the word "examinations"
These documents shall include as appropriate:	Section 1 "Introduction 4.2 Procedures The documents shall include the following as applicable:	These words are not included in NQA- 1 Subpart 2.1, but rather in the Introduction to Part II – In addition 2 through 11 are also in this Part.
1. Detailed cleaning—cleanness control procedures	2.2 Procedures and Instructions Written procedures and instructions for cleaning, cleanness control, inspections, and tests to verify cleanness of items shall be prepared in accordance with the requirements of the Introduction to this Part (Part II).	OK
2. Personnel safety considerations	(a) personnel safety and structure of facility protection considerations	OK
3. Structure or facility protection consideration	(a) personnel safety and structure of facility protection considerations	ОК
4. Inspection and test equipment requirements	(h) identification of inspection and test equipment and related calibration requirements including recalibration dates	NQA-1 adds the words "and related calibration requirements including recalibration dates"
5. Sequence of work activities, inspections and tests	(d) sequence of activities to be followed and steps within a given activity	ОК

ANSI N45.2.1-1973	NQA-1 (1994) Subpart 2.1	Comments
	(except where noted)	(NOTE: OK signifies identical or
	(i) sequence and frequency of	nearly identical wording)
	inspection or test	
6. Sequential steps for a given activity	 (d) sequence of activities to be followed and steps within a given activity 	ОК
7. Acceptance criteria including methods for verifying cleanness	(j) acceptance criteria and methods for verifying	ОК
8. Preparatory checks	(e) prerequisites including preparatory checks and inspections	ОК
9. Approvals	(I) approvals and authorizing or verifying signatures	OK
10. Responsibilities	(k) responsibility and required qualifications of personnel	ОК
11. Data report forms	(n) data or test report forms	NQA-1 also adds "or test"
The preparation of the actual working	2.2.2 Preparation of the actual	N45.2.1 uses "should", NQA-1 uses
procedures or instructions to be used	cleaning procedures or instructions	"shall"
1. Work practices, housekeeping,	(a) work practices, housekeeping,	ОК
access control, and prevention of	access control, and prevention of	
contamination and recontamination;	contamination and recontamination;	OK
procedures for removal of the	methods for removal of the	
contaminants,	 containinants, (c) effects of residual quantities of cutting fluids, liquid penetrants, weld fluxes, precleaning solutions, engineering test fluids, and other process compounds that may have been intentionally or advertently ap- plied to the surface of the item during prior steps of manufacture, installation or use; 	These words not included in N45.2.1
3. Corrosiveness of cleaning solutions	(d) corrosiveness of cleaning	NQA-1 adds the words "and
in contact with the material of an item,	solutions in contact with the material	entrapment of cleaning solutions"
metals;	dissimilar metals and entrapment of	
4 Chomical composition	cleaning solutions;	OK
concentration, and temperature limits of cleaning solutions to avoid deleterious effects;	concentration, and temperature limits of cleaning solutions to avoid delete- rious effects;	UK .
5. Proposed solution and metal temperatures, solution concentrations, velocity, and contact times during cleaning:-	<i>(f)</i> solution and metal temperatures, solution concentrations, velocity, and contact times during cleaning;	ОК
6. Methods for monitoring cleaning solution concentration and temperatures during cleaning operations;	(g) methods for monitoring cleaning solution concentration, temperatures, and velocities during cleaning operations;	ОК
7. Identification of the systems and subsystems with which the procedures are to be used;	(<i>h</i>) identification of the items for which the procedures are to be used;	ОК
8. Proposed sequence of operations and methods of filling, system circulation, draining, and flushing:	(i) sequence of operations and methods of filling system circulation, draining, and flushing:	ОК
9. Proposed equipment isolation, location of temporary piping and valves, location of strainers and where possible, the location of temporary equipment;	 (j) (1) equipment isolation (2) location of: (a) temporary piping and valves (b) strainers (c) temporary equipment (d) connections for filling, flushing, rinsing, and draining equipment 	NQA-1 adds: (<i>d</i>) connections for filling, flushing, rinsing, and draining equipment
10. Construction operations prohibited during cleaning operations;	(<i>k</i>) activities to be prohibited or constrained before, during, and after cleaning operations;	OK

ANSI N45.2.1-1973	NQA-1 (1994) Subpart 2.1	Comments
	(except where noted)	(NOTE: OK signifies identical or nearly identical wording)
11. Methods for rinsing and neutralizing including number of rinses;	 (I) methods for rinsing and neutralizing, including estimated number of rinses; 	NQA-1 adds the word "estimated"
12. Methods for verifying cleanness;	(<i>m</i>) methods for verifying cleanness;	ОК
13. Methods of drying and layup of the system;	(n) methods for drying and layup;	ОК
 Methods for protecting installed equipment which are not used in the 	 (o) methods for protecting installed items which are not involved in the 	N45.2.1 states "used", NQA-1 states "involved"
cleaning operations;	cleaning operation;	01
solutions;	solution.	0K
2.3 Results	BR 10 "Inspection"	NQA-1 does not include words "in a
Inspection and test results shall be documented in a suitable test report or data sheet.	Inspection results shall be documented.	suitable test report or data sheet .
Each report shall identify the item to	Test results shall be documented"	Supplement 11S 1 contains similar
which it applies, the procedures or	Requirements for Inspection"	words to 10S-1.
task and the identification of the following:	Paragraph 9	NQA-1 does not include words "the procedures or instruction followed in
	Records shall, as a minimum, identify (a) through (f) below:	performing the task".
(1) Conditions encountered which	(f) reference to information on action	Slightly different words, but same
nonconformance	taken in connection with nonconformances	intent.
(2) Identity of inspector or tester.	(c) inspector	ОК
(3) Completion date.	(b) date of inspection	Slightly different words, but same intent.
Test reports and data sheets shall include an evaluation of the	(e) results or acceptability	Slightly different words, but same intent.
acceptability of inspection and test results and provide for identifying the	and 11S-1 "Supplementary Requirements for Test Control"	
evaluation.	Paragraph 5(g)	
	person evaluating test results	
2.4 Personnel Qualifications	Introduction	These words are not included in NQA- 1 Subpart 2.1, but rather in the
Those personnel who perform	Section 5 "Qualification of	Introduction to Part II. N45.2.1
activities required by this standard	Personnei	with N45.2.6 NOA-1 requires
shall be qualified in accordance with	Inspection, test, and nondestructive	qualification in accordance with NQA-
<i>N45.2.6</i> Qualifications of Inspection,	examination personnel and	1.
for the Construction Phase of Nuclear	trained and gualified/certified in	
Power Plants.	accordance with the applicable	
	portions of Part 1, Basic and	
	Professional personnel shall meet the	
	requirements defined by the	
	implementing organization in its	
2.5 Test Equipment	Supplement 12S-1 "Supplementary	Slightly different words, but same
2.5.1 Selection.	Requirements for Control of Measuring and Test Equipment"	intent.
Inspection and test equipment used to	Paragraph 2	
standard shall be selected to have	Selection of measuring and test	
sufficient accuracy and sensitivity	equipment shall be controlled to	
specified requirements.	assure that such items are of proper type, range, accuracy, and tolerance	

ANSI N45.2.1-1973	NQA-1 (1994) Subpart 2.1	Comments
	(except where noted)	(NOTE: OK signifies identical or
	to accomplish the function of	nearly identical wording)
	determining conformance to specified requirements.	
2.5.2 Calibration and Control.	Supplement 12S-1 "Supplementary Requirements for Control of	Slightly different words, but same intent.
Test equipment shall be adjusted and calibrated at prescribed intervals	Measuring and Test Equipment"	
against certified equipment having known valid relationships to nationally	Paragraph 3.1	
known standards.	"Measuring and test equipment shall	
	maintained at prescribed intervals or,	
	prior to use, against certified	
	relationships to nationally recognized	
If no national standards exist, the basis	Supplement 12S-1 "Supplementary	ОК
of calibration shall be documented.	Requirements for Control of Measuring and Test Equipment"	
	Paragraph 3.1	
	If no national recognized standards	
	exists, the bases for calibration shall be documented.	
Records' shall be maintained and	Supplement 12S-1 "Supplementary	ОК
equipment suitably marked to indicate calibration status.	Requirements for Control of Measuring and Test Equipment"	
	Paragraph 5	
	Records shall be maintained and	
	to indicate calibration status.	
When inspection and testing	Supplement 12S-1 "Supplementary	NQA-1 adds the words "and
calibration, an evaluation shall be	Measuring and Test Equipment"	documented
made of the validity of previous	Paragraph 3.2	
ceptability of items previously	Falagraph 3.2	
inspected or tested.	When measuring and test equipment is found to be out of calibration an	
	evaluation shall be made and	
	documented of the validity of previous inspection or test results	
	and of the acceptability of items	
2.6 Housekeeping	previously inspected or tested.	QATR Section B.7 "Handling. Storage.
		and Shipping" and Subpart 2.3
where the cleanness controls of this		Housekeeping for Nuclear Power
standard are required, the		Plants" establish requirements for
accordance with ANSI N45.2.3,		housekeeping.
Housekeeping During Construction Phase of Nuclear Power Plants		
	2.3 Rectification of Unacceptable Cleanness	These words not included in N45.2.1
	If indications of contamination in	
	excess of specified limits are	
	observed at the end of a cleaning	
	inspections for cleanness, the item	
	snall be recleaned using an approved procedure. If such indications are	

ANSI N45.2.1-1973	NQA-1 (1994) Subpart 2.1	Comments
	(except where noted)	(NOTE: OK signifies identical or nearly identical wording)
	observed at the anticipated end of a	
	cleaning operation, continued	
	reduce the level to the specified limit.	
	If necessary, an evaluation shall be	
	unacceptable cleanness and the	
	actions required to preclude	
3. CRITERIA FOR CLEANING	CLEANNESS CRITERIA	Guidance only Wording does not
		establish requirements.
It is intended that systems that have been cleaned in accordance with this		
standard should require only water		
flushing or rinsing as a final cleaning step in preparing them for service		
However, where more than normal		Guidance only. Wording does not
water flushing or rinsing is required to		establish requirements.
additional cleaning in accordance with		
this standard may be necessary. While this standard is primarily		Guidance only Wording does not
concerned with the cleaning and		establish requirements.
cleanness of internal surfaces, external surface cleanness may be of equal		
importance in some cases and should		
be recognized during the cleaning operations		
Internal and external surfaces may	3.1 Different cleanness classes may	ОК
have different cleaning and cleanness requirements	be assigned to internal and external surfaces or to different parts of the	
	same item based on the cleanness	
3.1 Cleanness Classifications	3.1 Cleanness Classification	N45.2.1 uses word "dearee". NQA-1
The deriver of elements required in a		uses "level" - these are equivilent.
function of the particular item under	any particular application is a function	
consideration.	of the particular item under	
The assignment of a cleanness	The assignment of a cleanness	N45.2.1 does not reference "the
classification shall consider the	classification shall consider the	function of the item to be cleaned."
material, the consequences of	(a) the function of the item to be	NQA-1 adds words "various forms of
malfunction or failure of the item and	cleaned;	corrosion, including intergranular
contributing to or causing such	of construction to various forms of	under fabrication, installation, or
malfunction or failure.	corrosion, including intergranular	operating conditions" and "(introduced
	under fabrication, installation, or	repairs, or service)".
	operating conditions;	
	malfunction or failure of the item;	
	(d) the possibility of contaminants	
	storage, installation, repairs, or ser-	
	vice) contributing to or causing such malfunction or failure.	
This standard does not establish the		Guidance only. Wording does not
cleanness classification of any specific item. However, typical examples are		establish requirements.
presented as a guide.		
I he specification for the required cleanness class shall be the		QATR Section B.7 "Handling, Storing, and Shipping" establishes
responsibility of the purchaser.		requirements in this area.
The class of cleanness required for	The cleanness class or classes	N45.2.1 states "required for any given

(except where noted) (NOTE: OK signifies identical or nearly identical or nearly identical or of nearly identical wording) and the method of verification of verification of verification of verification of verification of the item shall be established and specified in the applicable the term shall be documented. applicable to the item shall be established and specified in the applicable to the item shall be documented.	ANSI N45.2.1-1973	NQA-1 (1994) Subpart 2.1	Comments
any given application shall be specified in design drawings or specifications associated with the cleaning of items, and the method of verification of verification of cleanness shall be documented. applicatio the stabilished and specified in the applicable drawings, specifications, or other appropriate documents. application of the item of specific parts of the item of specific consider the tolowing; application of the item of specific parts of the item of specific drawings, specifications, or other appropriate documents. and (Preparation of the actual cleaning procedures or instructions shall consider the tolowing; These words not included in N45.2.1 NOTE Cludelines for assigning cleanness classifications as signed to the ASME Boiler and Pressure Vessel Code for design and inspection of ro hert pappoes. Guidance only. Wording does not stabilish requirements. NOTE 3.2 Cleanness Class Criteria 3.1.1 Class IA very high level of obvience of contamination of a surface contamination, according to the acceptance of the inspection without magnification, or with the aid of sensitive detection methods. 3.2 Cleanness Class Criteria 3.2.1 Class A very high level of contamination of a surface contamination as specified in the inspection methods specified in the procedures required by part 2.2.1. If closs control of particulate contamination is sensitive detection methods. NOA-1 includes more detail in referencing ASTM A380. Class A cleanness applies to special items such as fuel elements, control addition is evoluted by the specified in the cleaning procedure. Guidance on		(except where noted)	(NOTE: OK signifies identical or nearly identical wording)
and (Preparation of the actual cleaning procedures or instructions shall consider the following): These words not included in N45.2.1 Consider the following): 2.2(m) methods for verifying cleanness (Classes A. B. C. and D) with criteria for each are provided in Subpart 2.1. These words not included in N45.2.1 NOTE Guidelines for assigning cleanness classifications are listed in Part III. Subpart 3.2, Appendix 2.1. Guidance only. Wording does not establish requirements. NOTE 3.2 Cleanness Class Criteria 3.4.1 Cias. A - Nery high level of cleanness in which there is no vertice, a clean oron, in accor- dition under visual examination, with or required a clean corn, in accor- dance with para. 8.5 of ASTM A 330-78, Practice Cleaning and Descaling Particulate contamination is required, a clean corn, in accor- dance with para. 8.5 of ASTM A 330-78, Practice Cleaning and Descaling Stainless Steel Parts, Equipment, and Systems, shall be employed during the manufacturing, assembly, and installation operations when particulate contamination oid redices is evaluated by file solutions in required a clean corn, in accor- dance with para. 8.5 of ASTM A 330-78, Practice Cleanning and Descaling Stainless Steel Parts, Equipment, and Systems, shall be employed during the manufacturing, assembly, and installation operations when particulate contamination could occur. Gross and periodial the specified instruments, and other close shall be specified by file shalls, surfaces is evaluated by file shing, criteria shall be specified by file shing, cr	any given application shall be specified in design drawings or specifications associated with the cleaning of items, and the method of verification of cleanness shall be documented.	applicable to the item or specific parts of the item shall be established and specified in the applicable drawings, specifications, or other appropriate documents.	application" whereas NQA-1 states "applicable to the item or specific parts of the item"
2.2(m) methods for verifying cleanness Heateness Four classes of surface cleanness (Classes A, B, C, and D) with criteria for each are provided in Subpart 2.1. These words not included in N45.2.1 NOTE Guidelines for assigning cleanness classifications are listed in Part III, Subpart 3.2, Appendix 2.1. Guidance only. Wording does not establish requirements. The following cleanness classifications are not directly related to component cleanness in which there is no evidence of contamination of a surface cleanness in which there is no evidence of contamination, with or without magnification, or with the aid of sensitive detection methods. 3.2 Cleanness Class Criteria 3.2.1 Class A. A very high level of cleanness in according to the acceptance criteria of the inspection of animation, according to the acceptance criteria of the inspection methods specified in the procedures required by para. 2.2.1.1 f close control of particulate contamination is required, a clean room, in accor- dance with para. 3.5.5 of ASTM A 380-78, Practice for Cleaning and Descaling Stating the manufacturing, assembly, and installation operations when particulate contamination, according to the acceptance stables to class A are described in pare. 7.2 and 7.3 of ASTM A 380-78, prescine for cleaning and Descaling Stating as specified as necessary. Where the cleanness of internal surfaces is evaluated by flushing, criteria shall be specified as necessary. Where the cleanness of internal surfaces or assemblies. Guidance only. Wording does not establish requirements. Class A cleanness applies to special items sould receive, their required level of cleanness must be maintained at the construction site. Guidance only. Wording does not establish requirem		and (Preparation of the actual cleaning procedures or instructions shall consider the following):	
Four classes of surface cleanness classifications are provided in Subpart 2.1. These words not included in N45.2.1 NOTE Guidelines for assigning cleanness classifications are included in Subpart 2.1. Guidance only. Wording does not establish requirements. NOTE Subpart 3.2, Appendix 2.1. Guidance only. Wording does not establish requirements. Solier and Pressure Vessel Code for design and inspection or for other purposes. 3.2 Cleanness Class Criteria 3.1.1 Class A—A very high level of cleanness in which thre is no evidence of contamination of a surface contamination, according to the methods specified in the procedures required by para. 2.2.1. If close control of particulate contamination is required by para. 2.2.1. If close control of particulate contamination, according to the acceptance criteria of the inspection methods specified in the procedures required by para. 2.2.1. If close control of particulate contamination, according assembly, and installation operations when particulate contamination is required a clean norm, in accor- dance with para. 8.5.5 of ASTM A 330-78, practice to Cleaning and Descaling Stainless Steel Parts, Equipment, and Systems, shall be employed duing the manufacturing, assembly, and installation operations when particulate contamination is required by aprices is valuated by flushing, criteria shall be specified in the cleaning procedure. Guidance only. Wording does not establish requirements. Class A cleanness applies to special items such as fuel elements, control drive machanisms, dictate instruments, and other close tolerances or arefuly controlled surfaces or assembles. Guidance only. Wording does not establish requirements. Such items should receive		2.2(m) methods for verifying cleanness	
Guidelines for assigning cleanness classifications are listed in Part III, Subpart 3.2, Appendix 2.1. Guidance only. Wording does not establish requirements. NOTE The following cleanness classifications are not directly related to component classifications assigned by the ASME Boiler and Pressure Vessel: Code for design and inspection or for other purposes. Guidance only. Wording does not establish requirements. 3.1.1 Class A—A very high level of cleanness in which there is no evidence of contamination of a surface either under visual examination, with or without magnification, or with the aid sensitive detection methods. 3.2 Cleanness Class Criteria 3.2.1 Class A. Very high level of cleanness as evidenced by the freedom from all types of surface contamination, according to the acceptance criteria of the inspection methods specified in the procedures required, by ara. 2.2.1. if close control of particulate contamination is required, by ara. 2.5.1 of ASTM A 380-78, Practice for Cleaning and Descaling Stallness Stel Parts, Equipment, and Systems, shall be employed during the manufacturing, assembly, and installation operations when particulate contamination could occur. Gross and precision inspection methods applicable to Class A are described in paras. 7.2 and 7.3 of ASTM A 380-78; other special tests shall be specified as necessary. Where the cleanness are of internal surfaces or assemblies. Guidance only. Wording does not establish requirements. Class A cleanness applies to special instruments, and other close matrixets or assemblies. Guidance only. Wording does not establish requirements. Class A cleanness at the point of manufacture and cleanness must be maintained at the construction site. Guidance only. Wording does not estab		Four classes of surface cleanness (Classes A, B, C, and D) with criteria for each are provided in Subpart 2.1.	These words not included in N45.2.1
NOTE Guidance only. Wording dees not establish requirements. The following cleanness classifications assigned by the ASME Boiler and Pressure Vessel Code for design and inspection or other purposes. S.2 Cleanness Class Criteria NQA-1 includes more detail in referencing ASTM A380. S.1.1 Class A –A very high level of cleanness in which there is no evidence of contamination of a surface contamination of a surface contamination, with or without magnification, or with the aid or sensitive detection methods. 3.2 Cleanness Class Criteria NQA-1 includes more detail in referencing ASTM A380. Sound transport 3.2 Cleanness class criteria NQA-1 includes more detail in referencing ASTM A380. either under visual examination, with or without magnification, or with the aid or sensitive detection methods. 3.2 Cleanness as evidenced by the freedom from all types of surface control of particulate contamination is required, a clean room, in accorriding of para. 2.5.1 f Close control of particulate contamination is required, a clean room, in accorriding and Descaling Stainless Steel Parts, Equipment, and Systems, shall be employed during the manufacturing, assembly, and installation operations when particulate contamination could occur. Gross and precision inspection methods applicable to Class A are described in paras. 7.2 and 7.3 of ASTM A 380. Guidance only. Wording does not establish requirements. Class A cleanness applies to special term such as fuel elements, control of drive mechanism, delicate instruments, and other close toles and precision inspection or destablish requirements. Guidance only. Wording does not establish		Guidelines for assigning cleanness classifications are listed in Part III, Subpart 3.2, Appendix 2.1.	
are not directly related to component classifications assigned by the ASME Boiler and Pressure Vessel Code for design and inspection or for other purposes. NOA-1 includes more detail in referencing ASTM A380. 3.1.1 Class A.—A very high level of cleanness in which there is no evidence of contamination of a surface either under visual examination, with or without magnification, or with the aid of sensitive detection methods. 3.2 Cleanness Class Criteria 3.2.1 Class A. A very high level of cleanness as evidenced by the freedom from all types of surface contamination, according to the acceptance criteria of the inspection methods specified in the procedures required, a clean room, in accor- dance with para. 8.5.5 of ASTM A 380-78, Practice for Cleaning and Descaling Stainless Stele Parts, Equipment, and Systems, shall be employed during the manufacturing, assembly, and installation operations when particulate contamination could occur. Gross and precision inspection methods applicable to Class A are described in paras. 7.3 of ASTM A 380-78; other special tests shall be specified in the cleanning procedure. Guidance only. Wording does not establish requirements. Class A cleanness applies to special tierns such as fuel elements, control rod drive mechanisms, delicati instruments, and other close tolerances or carefully controlled surfaces or samembles. Guidance only. Wording does not establish requirements.	NOTE The following cleanness classifications		Guidance only. Wording does not establish requirements.
3.1 Class A—A very high level of cleanness in which there is no evidence of contamination of a surface either under visual examination, with or without magnification, or with the aid of sensitive detection methods. 3.2 Cleanness Class Criteria NQA-1 includes more detail in referencing ASTM A380. sensitive detection methods. 3.2 Cleanness class Criteria NQA-1 includes more detail in referencing ASTM A380. sensitive detection methods. 3.2 Cleanness class Criteria NQA-1 includes more detail in referencing ASTM A380. sensitive detection methods. 3.2 Cleanness as evidenced by the freedom from all types of surface contamination, according to the acceptance criteria of the inspection methods specified in the procedures required by para. 2.2.1. If close control of particulate contamination is required, a clean room, in accordance with para. 8.5.5 of ASTM A 380-78. Practice for Cleaning and Descaling Stainless Steel Parts, Equipment, and Systems, shall be employed during the manufacturing, assembly, and installation operations when particulate contamination could occur. Gross and precision inspection methods applicable to Class A are described in paras. 7.2 and 7.3 of ASTM A 380-78. Practice is evaluated by flushing, criteria shall be specified in the cleanness of internal surfaces is evaluated by flushing, criteria shall be specified in the cleannes of internal surfaces is evaluated by flushing, criteria shall be specified in the cleannes or acserulity controlled surfaces or assemblies. Guidance only. Wording does not establish requirements. Class A cleanness applies to special items should receive, their required level of cleanness at the point of manufacture and cleanness must be manufacture and cleanness must be maintianed at the cons	are not directly related to component classifications assigned by the ASME Boiler and Pressure Vessel Code for design and inspection or for other purposes.		
Cleanness in which there is no evidence of contamination of a surface either under visual examination, with or without magnification, or with the aid of sensitive detection methods. 32.1 Class A. A very high level of cleanness as evidenced by the freedom from all types of surface contamination, according to the acceptance criteria of the inspection methods specified in the procedures required by para. 2.2.1. If close control of particulate contamination is required, a clean room, in accor- dance with para. 8.5 5 of ASTM A 380-78, Practice for Cleaning and Descaling Stainless Steel Parts, Equipment, and Systems, shall be employed during the manufacturing, assembly, and installation operations when particulate contamination could occur. Cross and precision inspection methods applicable to Class A are described in paras. 7.2 and 7.3 of ASTM A 380-78; other special tests shall be specified in the cleanness of internal surfaces is evaluated by flushing, criteria shall be specified in the cleanness of internal surfaces or carefully controlled surfaces or assemblies. Guidance only. Wording does not establish requirements. Class A cleanness applies to special items should receive, their required level of cleanness at the point of manufacture and cleanness must be maintained at the construction site. Guidance only. Wording does not establish requirements.	3.1.1 Class A—A very high level of	3.2 Cleanness Class Criteria	NQA-1 includes more detail in
Class A cleanness applies to special items such as fuel elements, control rod drive mechanisms, delicate instruments, and other close tolerances or carefully controlled surfaces or assemblies. Guidance only. Wording does not establish requirements. Such items should receive, their required level of cleanness at the point of manufacture and cleanness must be maintained at the construction site. Guidance only. Wording does not establish requirements. For these reasons, requirements of Guidance only. Wording does not	evidence of contamination of a surface either under visual examination, with or without magnification, or with the aid of sensitive detection methods.	3.2.1 Class A . A very high level of cleanness as evidenced by the freedom from all types of surface contamination, according to the acceptance criteria of the inspection methods specified in the procedures required by para. 2.2.1. If close control of particulate contamination is required, a clean room, in accordance with para. 8.5.5 of ASTM A 380-78, Practice for Cleaning and Descaling Stainless Steel Parts, Equipment, and Systems, shall be employed during the manufacturing, assembly, and installation operations when particulate contamination could occur. Gross and precision inspection methods applicable to Class A are described in paras. 7.2 and 7.3 of ASTM A 380-78; other special tests shall be specified as necessary. Where the cleanness of internal surfaces is evaluated by flushing, criteria shall be specified in the cleaning procedure.	
Such items should receive, their Guidance only. Wording does not required level of cleanness at the point establish requirements. of manufacture and cleanness must be establish requirements. maintained at the construction site. Guidance only. Wording does not For these reasons, requirements of Guidance only. Wording does not	Class A cleanness applies to special items such as fuel elements, control rod drive mechanisms, delicate instruments, and other close tolerances or carefully controlled surfaces or assemblies.		Guidance only. Wording does not establish requirements.
required level of cleanness at the point of manufacture and cleanness must be maintained at the construction site. For these reasons, requirements of Guidance only. Wording does not	Such items should receive, their		Guidance only. Wording does not
maintained at the construction site. For these reasons, requirements of Guidance only, Wording does not	of manufacture and cleanness at the point		establish requirements.
	maintained at the construction site. For these reasons, requirements of		Guidance only. Wording does not

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	(except where noted)	(NOTE: OK signifies identical or nearly identical wording)
this level of cleanness are considered to be outside of the scope of this document.		establish requirements.
3.1.2 Class B—A high level of cleanness applicable to reactor coolant systems, components, and other items, such as the reactor coolant purification system, which have similar cleanness requirements.	3.2.2 Class B – A high level of cleanness as evidenced by the following characteristics	NQA-1 does not include the examples given in N45.2.1.
Piping and components in systems which are designed as requiring Class B cleanness shall meet the following requirements:	3.2.2 Class B . A high level of cleanness as evidenced by the following characteristics.	NQA-1 does not include the words "piping and component in systems"
1. The surface shall appear "metal clean" when examined without magnification under a lighting level (background plus supplementary lighting) of at least 100 foot candles. Scattered areas of rust are permissible provided the aggregate area of rust does not exceed 2 square inches in any one square foot area.	 (a) Corrosion-Resistant Alloys (1) The surface shall appear metal clean and free of organic films and contaminants when examined in accordance with para. 7.2.1 of ASTM A 380-78, Practice for Cleaning and Descaling Stainless Steel Parts, Equipment, and Systems, except light deposits of atmospheric dust are permissible and shall show no evidence of deleterious contamination when subjected to the wipe test of para. 7.2.2 of ASTM A 380-78. Scattered areas of rust are permissible, provided the aggregate area does not exceed 2 sq in. in any 1 sq ft area (14 cm² per 1000 cm²). Temper films and discolorations resulting from welding are acceptable. (b) Carbon and Low Alloy Steels (1) The surface shall appear metal clean when examined in accordance with para. 7.2.1 of ASTM A 380-78, except light deposits of atmospheric dust are permissible, and shall show no deleterious contamination when subjected to the wipe test of para. 7.2.2 of ASTM A 380-78. Wipe tests shall be made prior to the application of any preservative film (some type of protective film may be required in order to maintain a clean carbon or low alloy steel surface at Class 8 level). 	NQA-1 includes more detail in referencing ASTM A380.
NOTE	i squtarea (14 cm per 1000 cm).	Guidance only. Wording does not
Localized rusting may indicate pitting of the surface and should be evaluated metallurgically). Thin temper films resulting from welding or post-weld heat treatment are acceptable.		establish requirements.
2. The surface shall be free or particulate contaminants such as sand, metal chips, weld slag, etc.	 (a) Corrosion-Resistant Alloys (1) The surface shall appear metal clean (b) Carbon and Low Alloy Steels 	Different words but same intent on cleanness.

ANSI N45.2.1-1973	NQA-1 (1994) Subpart 2.1	Comments
	(except where noted)	(NOTE: OK signifies identical or nearly identical wording)
	(1) The surface shall appear metal clean	
3. The surface shall be free of organic films and contaminants such as oils, paint, and preservatives as determined by a visual examination or an organic solvent-dampened white cloth or an equivalent alternate method.	 (a) Corrosion-Resistant Alloys (1) The surface shall appear metal clean and free of organic films and contaminants when examined in accordance with para. 7.2.1 of ASTM A 380-78, Practice for Cleaning and Descaling Stainless Steel Parts, Equipment, and Systems (b) Carbon and Low Alloy Steels (1) The surface shall appear metal clean when examined in accordance with para. 7.2.1 of ASTM A 380-78, 	N45.2.1 provides examples otherwise same.
4. When a visual inspection is not possible and the surfaces are accessible, a dry white-cloth wipe, followed by a solvent-dampened white- cloth wipe, may be used to evaluate the cleanness of the surface.	 3.2.2(a). When visual inspection is impossible but surfaces are accessible for wipe tests, sufficient wipe tests in different areas of the item shall be made to evaluate the general cleanness level of the surface. 3.2.2(b). When visual inspection is impossible, but surfaces are accessible for a wipe test, sufficient wipes of different areas of the item shall be made to evaluate the general cleanness of the surface. 	Wording between N45.2.1 and NQA-1 is somewhat different. Detail method information in N45.2.1 covered by specific NQA-1 reference to ASTM 380-78 Paragraph 7.2.2.
If either cloth exhibits indications of contamination, the system shall either be recleaned or the specific contaminant shall be determined and evaluated as to its potential deleterious effect.	2.3 If indications of contaminations in excess of specified limits are observed at the end of a cleaning operation or at any subsequent inspections for cleanness, the item shall be recleaned using an approved procedure.	N45.2.1 also allows for determination and evaluation.
5. If flushing is the only practical means for determining system cleanliness, the system shall be evaluated by examining a 20-mesh (ASTM E11 1-70, Specifications for Wire Cloth Sieves for Testing Purposes) or finer filter, or the equivalent, installed on the outlet of the cleaning circuit.	(a) Corrosion-Resistant Alloys (2) If flushing is the only practical means for evaluating the cleanness of internal surfaces, a 20-mesh (850 mm, ASTM E 11, Specification for Wire Filter Cloth Sieves for Testing Purposes) or finer filter (or the equivalent) shall be installed and the item flushed with water or other fluid meeting the requirements of para. 3.4.	The words "and the item flushed with water or other fluid meeting the requirements of paragraph 3.4" are not included in N45.2.1. The note is not included in N45.2.1.
	 (b) Carbon and Low Alloy Steels (2) If flushing is the only practical means for evaluating the cleanness of internal surfaces, a 20 mesh (850 mm, ASTM E 11, Specification for Wire Cloth Sieves for Testing Purposes) or finer filter (or the equivalent) shall be installed and the item flushed with water or other fluid meeting the requirements of para. 3.4. NOTE: class B cleanness should be 	
	alloy steel surfaces only in special	

ANSI N45.2.1-1973	NQA-1 (1994) Subpart 2.1	Comments
	(except where noted)	(NOTE: OK signifies identical or nearly identical wording)
	cases because of the difficulty in maintaining such surfaces in that condition after they have been cleaned.	
The system shall be flushed at its normal design velocity (or other velocity if specified by procurement documents) until the screen shows no more than slight particle speckling and no more than slight rust staining.	 3.2.2(a) The item shall be flushed at the design velocity (or other flow velocity if specified in the procedure) until the screen shows no more than slight speckling (as specified in the procedure in qualitative or quantitative terms, such as the number of particles per unit surface area of the screen) and no more than slight rust staining. 3.2.2(b) The item shall be flushed at the design velocity (or other flow velocity if specified in the procedure) until the screen shows no more than slight speckling (as specified in the procedure) until the screen shows no more than slight speckling (as specified in the procedure) until the screen shows no more than slight speckling (as specified in the procedure in qualitative or quantitative terms, such as the number of particles per screen shows no more than slight speckling (as specified in the procedure in qualitative or quantitative terms, such as the number of particles per screen shows no more than slight speckling (as specified in the procedure in qualitative or quantitative terms, such as the number of particles per screen shows no more than slight speckling (as specified in the procedure in qualitative or quantitative terms, such as the number of particles per screen shows no more than slight speckling (as specified in the procedure) and the per screen shows no more than slight speckling (as specified in the procedure) and the per screen shows no more than slight speckling (as specified in the procedure) and the per screen shows no more than slight speckling (as specified in the per screen shows no more than slight speckling (as specified in the per screen shows no more than slight speckling (as specified in the per screen shows no more than slight speckling (as specified in the per screen shows no more than slight speckling (as specified in the per screen shows no more than slight speckling (as specified in the per screen shows no more than slight speckling (as specified in the per screen shows no more than slight speckling (as specified in the	NQA-1 includes some additional details "(as specified in the procedure in qualitative or quantitative terms, such as the number of particles per unit surface area of the screen)".
There shall be no particles larger than 1/32 inch in any dimension, except fine bairline slivers of less than 1/32 inch	3.2.2(a) There shall be no particles larger than 1/32 in. X 1/16 in. long	Slight difference in description of allowable particles. (1/32 inches in any dimension y 1/32 X 1/16)
thickness are permissible up to 1/16 inch long.	3.2.2(b) There shall be no particles larger than 1/32 in. X 1/16 in. long (0.8 mm x 1.6 mm).	
There shall be no evidence of organic contamination in the effluent water or on the filter.	 3.2.2(a) In water flushed systems there shall be no visual evidence of contamination (e.g., oil, discoloration) of the effluent flush water or screen. 3.2.2(b) In water flushed systems there shall be no visual evidence of contamination (e.g., oil, discoloration) of the effluent flush water or screen. 	ОК
3.1.3 Class C—An intermediate level of cleanness generally applicable to closed service-water systems that cool components containing reactor coolant, engineered safety systems, and other high integrity systems. Surfaces shall meet the requirements for Class B cleanness, except:	3.2.3 Class C . An intermediate level of cleanness in which the surfaces meet the requirements for Class B except:	N45.2.1 includes a generally applicable statement. Guidance only. Wording does not establish requirements.
1. Thin uniform rust films are acceptable on carbon steel surfaces.	(b) Carbon and Low Alloy Steels. A uniform light rust bloom which can be removed by brushing or wiping is acceptable.	NQA-1 adds the words "can be removed by brushing or wiring"
2. Scattered areas of rust are permissible provided that the area of rust does not exceed 15 square inches in any 1square foot on corrosion resistant alloys.	(a) Corrosion-Resistant Alloys. Scattered areas of rust are permissible, provided the aggregate area does not exceed 15 sq in. per 1 sq ft area (100 cm ² per 1000 cm ²).	NQA-1 adds the word "aggregate".
3. Flush-test filters may exhibit considerable rust staining.	(c) Corrosion-Resistant Alloys and Carbon and Low Alloy Steels. Screens installed for evaluation of internal surfaces by flushing may exhibit considerable particle speckling (as specified in the procedures in qualitative or	NQA-1 adds the words in the parenthesis.

ANSI N45.2.1-1973	NQA-1 (1994) Subpart 2.1 (except where noted)	Comments (NOTE: OK signifies identical or
	quantitativo tarmo, quah ao tha	nearly identical wording)
	number of particles per unit area of the screen) and considerable rust staining.	
3.1.4 Class D—The level of cleanness applicable to fire-protection, open service water, and similar systems requiring only a nominal degree of cleanness. The following are	3.2.4 Class D. A nominal level of cleanness in which the following are acceptable:	N45.2.1 includes a generally applicable statement. Guidance only. Wording does not
acceptable on items which meet Class D cleanness:		
carbon steel surfaces.	(b) tightly adherent mill scale on nonmachined carbon and low alloy steel surfaces that resist removal by hand scrubbing with a stiff wire brush;	steel surfaces"
2. Paint or preservative coatings on carbon steel surfaces that will not peel or flake when exposed to cold-water flushing.	 (c) paint or preservative coatings on carbon or low alloy steel surfaces that will not peel or flake when subjected to cold water flushing; 	NQA-1 adds the words "or low alloy steel surfaces"
3. Rust films on carbon steel and stainless steel surfaces that resist removal by scrubbing with a bristle brush.	(a) rust films on both corrosion- resistant alloys and carbon and low alloy steel surfaces;	N45.2.1 includes the words "that resist removal by scrubbing with a bristle brush."
4. If flushing is the only practical means of determining system cleanness, the system shall be evaluated by examining a 14-mesh (ASTM E11-70, Specification for Wire Cloth Sieves for Testing Purposes) or fine filter, or the equivalent, installed on the outlet of the cleaning circuit.	<i>(d)</i> particles no larger than 1/16 in. x 1/8 in. long (1.6 mm x 3.2 mm) on a 14-mesh (1.4 mm, ASTM E 11), or finer filter (or the equivalent).	Words are different, but intent is same.
The system shall be flushed at its normal velocity until the screen shows no more than occasional particle speckling.		These words not included in NQA-1
There shall be no particles larger than 1/16 inch in any dimension, except hairlike slivers of less than 1/16 inch thickness are permissible up to 1/8 inch long.	<i>(d)</i> particles no larger than 1/16 in. x 1/8 in. long (1.6 mm x 3.2 mm) on a 14-mesh (1.4 mm, ASTM E 11), or finer filter (or the equivalent).	N45.2.1 states no particles shall be larger than 1/16 inch in any direction – NQA-1 allows for 1/16 inch X 1/8 inch long.
There shall be no evidence of organic contamination on the screen; con- siderable rust-staining is acceptable.		These words not included in NQA-1
	3.2.5 Summary The cleanness classes are summa-	These words not included in N45.2.1
	rized in Table 3.2 of Subpart 2.1. 3.3 Hydraulic, Instrument Control, and Lubrication Lines and Systems	These words not included in N45.2.1
	The preceding cleanness classifications and criteria in para. 3.2 are primarily applicable to relatively large items which are generally amenable to visual inspection of internal surfaces at some time during manufacture and installation operations. Interior surfaces of hydraulic, instrument control, and lubrication systems are generally not accessible for visual inspection dur-	

ANSI N45.2.1-1973	NQA-1 (1994) Subpart 2.1	Comments
	(except where noted)	(NOTE: OK signifies identical or
		nearly identical wording)
	ing manufacture and installation, and may have much more stringent	
	requirements on particulate contami-	
	nation than those specified in the	
	preceding cleanness classes. Where	
	requirements are needed for such	
	systems, they shall be specified.	
	Guidelines for classifying hydraulic,	
	instrument, and lubrication cleanness	
	Appendix 2.1.	
	3.4 Cleaning and Flushing	These words not included in N45.2.1
	Fluid Quality Requirements	
	2.4.2. Casesone Fluide The	
	3.4.2 Gaseous Fluids. The requirements for gaseous fluids used	
	for flushing are dependent upon the	
	particular item being flushed. The	
	requirements for any given item shall	
	contaminants, organic contaminants.	
	water soluble contaminants, and	
	water content as appropriate for the	
	nem.	
	3.4.3 Organic Fluids.	
	Requirements for organic fluids used	
	for flushing are dependent upon the	
	requirements for any given item shall	
	incorporate restrictions on particulate	
	contaminants, water soluble	
	contaminants, and water content as	
	3.4.4 Fluids for Hydraulic,	
	Instrument Control, and	
	the requirements of para. 3.4.1,	
	3.4.2, or 3.4.3, as applicable for the	
	system being flushed, fluids used for	
	components and installed systems	
	covered by this paragraph shall	
3.2 Water Quality Requirements	3.4.1 Water. The water quality for	NQA-1 goes into greater detail.
The selection of the water quality for a	and flushing shall be specified by the	
specific application shall be made by	organization responsible for cleaning	
the organization responsible for the	unless otherwise stipulated in	
cleaning operations unless otherwise	procedures Table 3.4.1 lists water	
	quality requirements commonly used	
	for such purposes in nuclear cleaning	
	operations. When fresh water is used	
	containing austenitic stainless steel.	
	attention shall be given to methods	
	for minimizing the possible effects of	
	contamination limits specified in	
	Table 3.4.4 for the system class	
	specified.	Mordo are different but intent is a
operating systems is lower than that	flushing or rinsing shall be equivalent	words are different, but intent is same.

ANSI N45.2.1-1973	NQA-1 (1994) Subpart 2.1 (except where noted)	Comments (NOTE: OK signifies identical or
		nearly identical wording)
specified below (e.g., open service water systems), the water used for cleaning can be equivalent to the quality of the operating system water.	to the quality of the operational fluid of the item, unless otherwise specified in approved procedures.	
When cleaning water quality is not otherwise specified, it shall comply with the following specifications.	4(d) The quality of fluid used for final flushing or rinsing shall be equivalent to the quality of the operational fluid of the item, unless otherwise specified in approved procedures.	Words are different, but intent is same.
Fresh Water	TABLE 3.4.1 WATER REQUIREMENTS	Chloride allowance is larger in NQA-1 (250 v 100ppm)
Fresh water shall meet the following requirements:	Fresh water shall meet the following requirements:	Turbidity not mentioned in NQA-1
pH at 25 C (77 F) 5.5 to 8	pH at 25 C (77 F) 5.5 to 8	
Chloride Less than 100 ppm	Chloride Less than 250 ppm	
Fluoride Less than 5 ppm	Fluoride Less than 5 ppm	
Sulfide Less than 1 ppm	Sulfide Less than 1 ppm	
Total Dissolved Solids Less than 500 ppm	Total Dissolved Solids	
Turbidity Less than 5 Jackson Turbidity Units	Less than 500 ppm	
Demineralized Water	TABLE 3.4.1 WATER REQUIREMENTS	N45.2.1 references turbidity, NQA-1 references total suspended solids.
Demineralized water shall meet the following requirements:	High quality water shall meet the	This is equivalent.
ph at 25 C (77 F) 5.5 to 8	nh at 25 C (77 E) 5.5 to 8	
Chloride Less than 1 ppm	Chloride	
Fluoride Less than 1 ppm	Eluoride	
Sulfide Less than 1 ppm	Sulfide Less than 1 nnm	
Conductivity Less than 3 micromho/cm	Conductivity Less than 3	
Silica Less than 0.05 ppm	micromho/cm	
Turbidity	Silica Less than 0.05 ppm	
Less than 1 Jackson Turbidity Unit	Total suspended solids Less than 3ppm	
	3.4.6 The use of contaminated tools shall be avoided. Tools which contain, or which may become contaminated with, materials that could contribute to stress-corrosion or intergranular cracking shall not be used on corrosion-resistant alloys.	These words not included in N45.2.1
4. PRE-INSTALLATION CLEANNESS	5 CLEANNESS PRIOR TO INSTALLATION	Words are slightly different, but intent is same.
Items should not be delivered to the point of installation site sooner than necessary unless the installation location is considered a better storage area.	From a cleanness standpoint, consideration shall be given as to whether items should be delivered to the point of installation sooner than necessary, i.e., whether the installation location is a better storage area [see Subpart 2.2 of this Part (Part II)].	

ANSI N45.2.1-1973	NQA-1 (1994) Subpart 2.1	Comments
	(except where noted)	(NOTE: OK signifies identical or nearly identical wording)
Inspections, examinations, and tests	Inspections and tests, as appropriate,	ОК
immediately prior to installation to	installation to determine the	
determine the cleanness of the item.	cleanness of the item.	
If contaminants are detected, they	If potentially harmful contaminants	NQA-1 adds the words "potentially
they will not be removed in subsequent	they will not be removed in	narmu
cleaning operations.	subsequent cleaning operations.	
Items having surfaces to which	Items having surfaces to which	OK
coatings have been applied shall be	coatings have been applied shall be	
identified, the composition of the	identified; the composition of the	
shall be determined and removal of	shall be determined and removal of	
coatings, where required, recorded in	coatings, when required, recorded in	
the inspection report.	the inspection report.	01
specifications, the temporary coatings	specifications, the temporary	OK
shall be removed prior to installation of	coatings shall be removed prior to	
items.	installation of items.	OK
J. INSTALLATION CLEANING	INSTALLATION	
The installation process represents an		
contaminants into a cleaned item and	an opportunity for the introduction of	
care should be taken to minimize	contaminants into a cleaned item,	
contamination. Operations which	and care shall be taken to minimize	
grinding and welding, should be con-	generate particulate matter, such as	
trolled.	grinding and welding, shall be	
Local cleanup of contaminated areas is	controlled.	OK
recommended as installation	areas as installation progresses is	
progresses, rather than one cleanup	recommended (rather than one	
completed.	completed).	
Consideration should be given to	Consideration shall be given to	ОК
operations, when practical, to facilitate	erection operations to facilitate	
cleaning and cleanness control.	cleaning, cleanness control, and	
Where visual inspection of internal	inspection.	NOA_1 adds the words "insofar as
surfaces of a portion of a system can	surfaces of a portion of a system that	practicable" and "obscured by
be blocked, that part of the system	can be blocked or obscured by	subsequent operations"
unit and a visual inspection should be	visually inspected and verified as	
performed just before the access	being clean before the access points	
points are closed.	are closed.	OK
sealed at all times except when they	sealed at all times except when they	
must be unsealed to carry out	must be unsealed to carry out	
Fitted and tack-welded joints (which	necessary operations.	These words not included in NQA-1
will not be immediately sealed by		
welding) shall be wrapped with		
plastic film until the welds can be com-		
pleted.		
contamination of crevices blind holes	contamination of crevices blind	whereas NQA-1 states "inaccessible areas"
dead legs, undrainable cavities, and	holes, dead legs, undrainable cavi-	areas".
inaccessible areas.	ties, and accessible areas.	OK
wire brushing, the item shall be so	wire brushing, the item shall be so	
oriented that chips fall away from the	oriented that chips fall away from the	
openings or covers shall be provided	openings, or covers shall be provided	

ANSI N45.2.1-1973	NQA-1 (1994) Subpart 2.1	Comments
	(except where noted)	(NOTE: OK signifies identical or
for the openings	for the openings	nearly identical wording)
for the openings. Marking materials containing sulfur, lead, zinc, mercury and other low melting alloys as a basic chemical constituent shall not be brought into contact or shall not be used on the surfaces of corrosion resistant alloys.	for the openings. 4 MANUFACTURING PHASE CLEANNESS (b) Cleaning methods and materials used during manufacture shall be compatible with the materials of construction of the item being cleaned (see para. 2.2.2). Cutting fluids, lubricants, liquid penetrants, marking materials, precleaning solutions, engineering test fluids, tools, and other materials and process compounds to be used on surfaces of items made from austenitic stainless steel or corrosion- resistant alloy during manufacture shall be evaluated from the stand- point of potentially harmful contaminants. Such contaminants include chlorides, fluorides, and low melting point materials such as sulfur, lead, zinc, copper, and mercury. Where potentially harmful quantities of such contaminants can be leached or are in a form that they could be released by breakdown of the compound during subsequent	NQA-1 includes more detail. Different words, but same intent.
Low-sulfur, low fluorine, and/or low- chlorine compounds may be used on austenitic stainless steels. Low-sulfur, low lead compounds may be used on	manufacturing, installation, or operation, they shall not be used. The use of mineral acids and organic acids to clean austenitic stainless steel and nickel alloys shall be evaluated and approved prior to use.	Wording is different but overall intent is similar.
nickel-base alloys. Paints, chalk and other temporary marking materials shall be removed by solvent-wiping or mechanical means.	(b) Paint, chalk, scribing inks, and other temporary marking materials shall be removed from the affected surfaces prior to heat treatment or welding	N45.2.1 is more specific in how they shall be removed.
Surfaces should be cleaned after completion of work on them, before proceeding to the next installation or construction step.	Surfaces shall be visually inspected upon completion of work on them, and obvious contamination removed before proceeding to the next installation or construction step.	ОК
The use of mineral acids and organic acids on austenitic stainless steels and nickel alloys should be avoided except when the material is in the solution annealed condition.	The use of cleaning methods and materials, cutting fluids, lubricants, liquid penetrants, marking materials, precleaning solutions, engineering test fluids, tools, and other materials and process compounds used during installation of items made from austenitic stainless steel or other corrosion-resistant alloys shall be subject to the limitations on such methods and materials specified in Section 4.	Wording is different but intent is same.
Pre-cleaning and post-cleaning of weld joint areas and welds shall be performed by wire brushing and scrubbing with a solvent-moistened clean cloth unless specified otherwise	Precleaning and post-cleaning of weld joint areas and welds shall be performed by wire brushing and scrubbing with a solvent-moistened clean cloth unless otherwise specified.	ОК
	Large openings, such as the open reactor vessel, shall be protected	These words not included in N45.2.1

ANSI N45.2.1-1973	NQA-1 (1994) Subpart 2.1	Comments
	(except where noted)	(NOTE: OK signifies identical or
	against falling and windblown con-	nearly identical wording)
	taminants.	
	TABLE 3.4.4	This table not included in N45.2.1
	FLUSHING REQUIREMENTS FOR	
	CONTROL, AND LUBRICATION	
	SYSTEMS	
	4 MANUFACTURING PHASE CLEANNESS	These words not included in N45.2.1
	The cleanness of an item at the point of manufacture is critical to the final	
	cleanness level ultimately attained	
	after installation. Where practicable,	
	the cleanness classification of an item listed in the purchase	
	specification shall be the same as	
	that for final service. The capability of	
	may not be sufficient to upgrade the	
	cleanness level of a complex item	
	since a much wider variety of	
	generally available for use at the	
	manufacturer's shops than are	
	available at the construction sites.	
	Purchase specifications shall specify	
	the required asshipped cleanness	
	procedures shall be in accordance	
	with para. 2.2, and inspection and	
	test results shall be documented, as	
	approved procedures.	
	Listed below are cleaning	
	all manufacturing operations. Addi-	
	tional information is presented in	
	ASTM A 380-78 where applicable, they shall be considered	
	(a) Operations which generate	
	chemical or particulate contaminant	
	such as weiging and grinding shall be controlled during fabrication steps.	
	after which removal of such	
	contaminants becomes difficult be-	
	conditions, protection of openings	
	shall be provided to prevent entry of	
	contaminants, especially particulate	
	manufacturing sequence shall be	
	based on considerations related to	
	cleaning of individual items as the component is assembled junless the	
	component is readily cleanable in its	
	final assembled state.	
	used for grinding, polishing, filing.	
	deburring, and brushing during man-	
	ufacture shall be controlled when	
	from such tools is considered an im-	
	portant factor.	
	(d) The quality of fluid used for	

ANSI N45.2.1-1973	NQA-1 (1994) Subpart 2.1	Comments
	(except where noted)	(NOTE: OK signifies identical or
	final fluching or ringing shall be	nearly identical wording)
	equivalent to the quality of the oper-	
	ational fluid of the item, unless	
	otherwise specified in approved	
	procedures (see para. 3.4.1).	
	flushing of pockets, crevices, or dead	
	legs to assure that cleaning solutions	
	are not trapped in such areas.	
	mixing oil cleaning solutions and for	
	initial rinsing and flushing when per-	
	mitted by approved procedures.	
	(<i>i</i>) The final cleaned item shall be sealed in a dried condition to	
	prevent subsequent recontamination	
	and then packaged in accordance	
	with the requirements established in the procurement documents	
6. MAINTENANCE OF	7 MAINTENANCE OF	ОК
INSTALLATION CLEANNESS	INSTALLATION CLEANNESS	
	After any isolable item has been	
After any isolable system has been	installed in a clean condition,	
Installed in a clean condition and	cleanness control measures and	
been established, access control into	access control shall be established to minimize the introduction of	
the system is essential to minimize the	contaminants between the time of	
the time of system isolation and pre-	system isolation and preoperational	
operational testing.		
Access control shall be established to	Control of tools, loose items, and	Similar words but same intent
exclude personnel and contaminants.	accordance with applicable	
	requirements.	
where environmental contamination	Where environmental contamination	N45.2.1 Includes the words "Which must be bermetically tight and difficult
of quality, seals must be installed	seals shall be installed to prevent	to remove"
which must be hermetically tight and	contamination of interior surfaces.	
Gasketed metal seals with welded		Guidance only Wording does not
metal strap closures, or seal welded		establish requirements.
metal caps are recommended for		
Items in this condition shall be tagged	Removal shall be only with proper	
with identifications and instructions for	authorization.	Similar words, same intent
seal removal.	Seals shall be installed in a manner	
	to prevent accidental removal.	
If access to a sealed system is	If access to such sealed items is	ОК
prevent introduction of contaminants	to prevent introduction of contam-	
	inants.	
Prior to opening the seals, the	Such precautions include masking	ОК
cleaned to remove solid contaminants	plastic film or tabe, cleanup of the	
which might be introduced in the	immediate surroundings to remove	
system.	particulate matter that can be	
Personnel entering the system should	requiring personnel to wear clean	ОК
wear clean outer clothing and shoe	outer clothing and shoe covers, etc.	
covers.		OK
completed, the interior surface shall be	completed, the interior surface shall	UK
locally cleaned to its original condition	be locally cleaned, if necessary, to its	
and the system should be resealed.	original condition and the item	

ANSI N45.2.1-1973	NQA-1 (1994) Subpart 2.1	Comments
	(except where noted)	(NOTE: OK signifies identical or
	(except milere neted)	nearly identical wording)
	resealed.	
	Materials used for sealing items	These words not included in N45.2.1
	made from austenitic stainless steel	
	shall be subject to the limitations	
	specified in Section 4	
7. PRE-OPERATIONAL	8 PREOPERATIONAL CLEANING	NQA-1 states "insofar as practicable"
CLEANING	9 1 Proportions	
7.1 Prenarations	8.1 Preparations	
	Insofar as practicable, cleaning and	
Cleaning and flushing operations shall	flushing operations shall be	
be scheduled so as to minimize	scheduled so as to minimize	
interference from other plant	interference from other plant	
Areas in which cleaning operations are	Areas in which cleaning operations	OK
being performed shall be isolated to	are being performed shall be isolated	
the extent that personnel performing	and marked to the extent that	
other construction phase operations	personnel performing other	
are aware that the cleaning operations	construction phase operations are	
are being conducted.	are being conducted	
Personnel shall be familiarized with the	Personnel shall be familiarized with	ОК
intended procedure and associated	the intended procedure and	
hazards.	associated hazards.	01/
Means for communicating shall be	Means for communicating shall be	ŬK
which the cleaning is performed and	which the cleaning is performed and	
any remote areas (e.g., control rooms)	any remote areas (e.g., control	
that may be related to the cleaning	rooms) that may be related to the	
operations.	cleaning operations.	NOA 4 includes light other lases
Loose tools should be attached to either the workman or the exterior of	roots and other loose items in controlled	NQA-1 Includes "and other loose
the system with a lanyard.	as specified in Section 7.	
The actual circulating flow path shall	The actual circulating flow path shall	ОК
be checked for agreement with	be checked for agreement with	
specified requirements in regard to	specified requirements with regard to	
components.	components.	
Critical valves, controls and switches	Critical valves, controls, and switches	ОК
shall be tagged to prevent inadvertent	shall be tagged to prevent	
actuation during the cleaning	inadvertent actuation during the	
The interior of all accessible	The interior of all accessible com-	ОК
components (e.g., tanks) and large	ponents (i.e., tanks) and large	
diameter piping shall be inspected for	diameter piping shall be inspected for	
cleanness; all debris and	cleanness; all debris and	
Demineralizers filters instruments	Demineralizers filters instruments	OK
valve internals and other items that	valve internals, and other items that	
may be damaged by the cleaning	may be damaged by the cleaning	
process shall be blanked off, bypassed	process shall be blanked off,	
or removed.	bypassed, or removed.	OK
the suction side of all numps and other	on the suction side of all numps and	UN
components that may be subject to	other components that may be sub-	
damage during the cleaning opera-	ject to damage during the cleaning	
tions.	operations.	<u> </u>
Instrumentation (e.g., pressure	Instrumentation (e.g., pressure,	UK
where possible to monitor the cleaning	flow) shall be used as necessary to	
operations.	monitor flushing and recirculatory	
	cleaning operations.	
All other permanently installed	Instrumentation installed in the	ОК
monumentation shall be isolated where	System but not used to monitor the	

ANSI N45.2.1-1973	NQA-1 (1994) Subpart 2.1	Comments
	(except where noted)	(NOTE: OK signifies identical or nearly identical wording)
possible.	cleaning operations shall be isolated where necessary.	
Cleaning should be completed before installation of fuel, reactor vessel internals and control rods.	Cleaning of the reactor vessel and reactor vessel internals shall be completed before installation of fuel and control rods.	NQA-1 adds the words "of the reactor vessel and reactor vessel internals"
Provisions shall be made to collect leakage and to protect insulation from being wetted.	Provisions shall be made to collect liquid leakage and to prevent wetting of insulation.	ОК
Where the use of installed plant components, such as pumps, may be affected by the cleaning operations, recommendations shall be obtained from the component manufacturers regarding the use of their components.	Where the use of installed plant components such as pumps may be affected by the cleaning operations, recommendations shall be obtained from the component manufacturers regarding precautions to be taken for the use of their components.	
Procedures used to protect installed components which are not used in the cleaning operations but which are included in the cleaning circuit should he reviewed.	Procedures shall be established to protect or isolate installed components that could be adversely affected by cleaning or flushing operations.	ОК
7.2 Flushing and Cleaning Methods	8.2 Flushing and Cleaning Methods	N45.2.1 states water flushing, NQA-1 uses the term flushing (applicable throughout this section)
7.2.1 Water Flushing. If the intended level of cleanness has been maintained during erection of the plant, only water flushing will be required.	8.2.1 Flushing. If the intended level of cleanness has been maintained during erection of the plant, only flushing or rinsing will normally be required.	
The system shall be filled with water of the quality specified and flushed in accordance with approved procedures.	The system shall be filled with fluid of the type and quality specified and flushed in accordance with approved procedures.	ОК
Completion of flushing shall be determined by filter, turbidimetric or chemical analyses. If the final flushes for removal of particulate contaminants are directed toward the reactor vessel, soluble contaminants shall be removed from the system by first flushing away from the reactor vessel until a specified water quality is achieved on the ef- fluent from the system.	Completion of flushing shall be deter- mined by filter, turbidimetric or chemical analysis, or any combination of these, as applicable. If flushes are directed toward the large components, provisions shall be made to prevent contaminants from collecting in areas where they cannot be removed in subsequent cleaning operations.	ОК
At this time, high velocity flushes may be made toward the reactor vessel.	If flushes are directed toward the large components, provisions shall be made to prevent contaminants from collecting in areas where they cannot be removed in subsequent cleaning operations.	ОК
This procedure is not recommended unless reactor vessel internal surfaces are accessible for subsequent me- chanical cleaning and inspection, or unless provisions are made to collect particulate contaminants at some accessible location within the reactor vessel by filtration or other technique.		Guidance only. Wording does not establish requirements.
After system flushing is completed, but before system drain, all pockets and dead legs shall be flushed through their drain connections.	After system flushing is completed, but before draining, all pockets and dead legs shall be thoroughly flushed.	ОК
If conditioned water is used, particular attention should be given to assure that large volumes of solution do not	Where conditioned water is used, particular attention should be given to assure that large volumes of solvent	ОК

ANSI N45.2.1-1973	NQA-1 (1994) Subpart 2.1 (except where noted)	Comments (NOTE: OK signifies identical or nearly identical wording)
remain trapped in the system.	do not remain trapped in the system.	· · · · · · · · · · · · · · · · · · ·
Care shall be taken to assure that organics do not remain on the surfaces.	Provisions shall be made to assure that organics do not remain on the surfaces.	ОК
A final flush with demineralized water is desirable, but is not necessarily required at this time.		Guidance only. Wording does not establish requirements.
The system shall be sealed to prevent the subsequent entry of contamination. If no further cleaning is required, system layup may be performed.	After cleaning, the item shall be sealed where appropriate to prevent the subsequent entry of contami- nants. If no further cleaning is required, system layup shall be performed if specified.	OK
 7.2.2 Alkaline Cleaning. Although it shall be the intent of those involved in erecting the nuclear plant to install piping systems in a clean condition, this may not be achieved. 	8.2.2 Alkaline Cleaning. Although it is the intent of those involved in erecting the nuclear plant to install piping systems and components in a clean condition, this may not be fully achieved.	ОК
One relatively common source of organic contamination in piping systems is lubricating oils from air tools.	Common sources of organic contamination in items are lubrication oils from air tools, preservative films, and valve lubricants.	ОК
When local cleanup is not performed following grinding operations on internal surfaces of piping welds, full system cleaning to remove organic contaminants may be necessary.	When immediate local cleanup is not performed, full item cleaning to remove such organic contaminants may be necessary.	ОК
If required the cleaning shall be performed according to the cleaning procedures established for the operation and the procedure shall assure that quantities of organics do not remain on the surfaces.	Such cleaning shall be performed according to the cleaning procedures established for the operation, and the procedure shall assure that quantities of organic contaminants do not remain on the surfaces.	ОК
Alkaline cleaning should consist of the circulation of an appropriately heated solution until a selected area or a coupon contaminated with the ex- pected contamination is cleaned by the cleaning solution.	Alkaline cleaning consists of the circulation of an appropriately heated solution until a selected area represented by the worst contamination or a coupon contaminated with the expected contamination is cleaned by the cleaning solution to the specified cleanness level.	ОК
After system cleaning is completed, a flush with water of a quality consistent with the system requirements shall be performed to remove the cleaning agents.	After item cleaning is completed, the item shall be flushed with water of the specified quality to remove the cleaning agents.	ОК
In particular, all pockets and dead legs should be flushed and attention should be given to assure that large volumes of solution do not remain in the system.	In particular, all pockets and dead legs shall be flushed and attention given to assure that large volumes of solution do not remain.	ОК
The system should be sealed to prevent the subsequent entry of contamination.	Where appropriate, the item shall be sealed to prevent subsequent contamination.	ОК
If no further cleaning is required, system layup may be performed.	It no further cleaning is required, system layup shall be performed, if specified.	OK
Precautions related to the use of alkaline cleaning solutions are listed in paragraph 7.3.	Precautions related to the use of alkaline cleaning solutions are listed in Part III, Subpart 3.2, Appendix 2.1.	UK
7.2.3 Chelate Cleaning.	8.2.3 Chelate Cleaning.	Guidance only. Wording does not establish requirements.

ANSI N45.2.1-1973	NQA-1 (1994) Subpart 2.1 (except where noted)	Comments (NOTE: OK signifies identical or nearly identical wording)
Chelate cleaning of carbon or low-alloy steel surfaces to remove light corrosion product films is not a required cleaning operation.		hearly identical wording
If chelating cleaning is used, flushing with water of a quality consistent with the system requirements should be performed to remove the chelating agents.	Unless it is considered desirable to leave a film of chelating agent on the surfaces as a protective film, the item shall be flushed with water of a quality consistent with the item requirements to remove residual chelating agents.	ОК
All pockets and dead legs in particular should be flushed and attention should be given to assure that large volumes of the chelating solution do not remain in the system.	If chelate cleaning is used, attention shall be given to all pockets and dead legs to ensure that large volumes of solution do not remain in the item.	ОК
The system should be sealed to prevent the subsequent entry of contaminants. If no further cleaning is required, layup may be performed.	Where appropriate, items shall be sealed to prevent subsequent contamination. If no further cleaning is required, layup shall be performed, if specified.	ОК
Precautions related to the use of chelating agents are listed in paragraph 7.3.	Precautions related to the use of chelating agents are listed in Part III, Subpart 3.2, Appendix 2.1.	ОК
7.3 Cleaning Precautions	8.2.2 Alkaline Cleaning	Similar words – same intent
There are a number of precautions that should be observed during cleaning operations. The following should be considered as appropriate.	Precautions related to the use of alkaline cleaning solutions are listed in Part III, Subpart 3.2, Appendix 2.1.	
1. The addition of a suitable chloride stress cracking inhibitor is recommended if fresh water flushing of systems containing austenitic stainless steels is planned.	3.4.1 Water When fresh water is used on components or systems containing austenitic stainless steel, attention shall be given to methods for minimizing the possible effects of chlorides.	Similar words – same intent
2. The use of alkaline cleaning compounds which contain free caustic is not recommended on components or systems in which cleaning solutions may be entrapped. Cleaners based on compounds which produce hydroxylions by hydrolysis, such as tri- sodium phosphate, are recommended. If heavy organic solids are present, the addition of an emulsifier and a wetting agent may be considered.	Part II refers to Appendix 2.1 "Nonmandatory Guidance on Cleaning of Fluid Systems and Associated Components for Nuclear Power Plants" 3(a) The use of alkaline cleaning compounds that contain free caustic is not recommended on components or systems in which cleaning solutions may be entrapped. Cleaners based on compounds that produce alkaline solutions by hydrolysis, such as phosphate compounds, are recommended. If heavy organic contaminants are present, the addition of an emulsifier and a wetting agent should be	Similar words – same intent
3. The use of acid-chelating agents on welded or furnace sensitized stainless steels and nickel base alloys is not recommended.	Part II refers to Appendix 2.1 "Nonmandatory Guidance on Cleaning of Fluid Systems and Associated Components for Nuclear Power Plants" 3(b) The use of acid-chelating agent on welded or furnace sensitized stainless steels and nickel base	Similar words – same intent

ANSI N45.2.1-1973	NQA-1 (1994) Subpart 2.1	Comments
	(except where noted)	(NOTE: OK signifies identical or
	allovs is not recommended	nearly identical wording)
4. The use of halogenated	Part II refers to Appendix 2.1	Similar words – same intent
organic solvents is not recommended, except upon crevice-free, open, freely evaporating surfaces. This recom- mendation is not intended to prohibit the use of such solvents under other conditions, providing adequate removal is assured prior to any	"Nonmandatory Guidance on Cleaning of Fluid Systems and Associated Components for Nuclear Power Plants" 3(c) The use of halogenated organic solvents is not recommended except	
subsequent operations.	upon crevice-free, open, freely evaporating surfaces. This recom- mendation is not intended to prohibit the use of such solvents under other conditions, providing adequate removal is assured prior to any subsequent operations.	
5. Acid cleaning of installed systems is not recommended. however, if used, particular attention shall be given to:	3.4.5 If acid cleaning is used, particular attention shall be given to:	N45.2.1 includes the words "is not recommended"
(a) Avoiding the entrapment of acids in the crevices.	(a) avoidance of entrapment of acids in crevices;	ОК
(b) Avoiding contact with either welded or furnace sensitized corrosion resistant alloys, and non-ferrous materials.	 (b) effects on either welded or sensitized corrosion-resistant alloys and nonferrous materials; 	ОК
(c) Complete removal of any residual acid solution from the system.	(c) complete removal of any residual acid solution from the item;	N45.2.1 uses the term "system", NQA- 1 states "item" – these are equivalent.
(d) Neutralization treatment as a final operation.	(d) neutralization treatment followed by thorough rinsing or flushing.	OK
7.4 Control of Cleaning Solutions Cleaning solutions should be prepared in accordance with the applicable cleaning procedure and shall be checked for proper chemical composition and effectiveness of inhibitors (if used).	2.4 Control of Cleaning Solutions Cleaning solutions shall be prepared in accordance with the applicable cleaning procedure and shall be checked for proper chemical composition and effectiveness of inhibitors, if used.	ОК
Solution temperatures must be maintained and controlled to assure adequate cleaning and to prevent decomposition and possible damage to the system.	Solution temperatures shall be maintained and controlled to ensure adequate cleaning and to prevent cleaning agent decomposition and possible damage to the item.	OK
	REPAIRS AND MODIFICATIONS Subpart 2.1 does not address radioactive decontamination operations that may be required prior to post-operational repairs or system modifications, although some of its requirements may be applicable to such decontamination operations. For the purposes of maintenance of cleanness as defined in Subpart 2.1, post-operational repairs or system modifications shall be considered identical to preoperational installation procedures and treated in accordance with Sections 5, 6, and 7. If system cleaning following repair or modification operations is deemed	

ANSI N45.2.1-1973	NQA-1 (1994) Subpart 2.1	Comments
	(except where noted)	(NOTE: OK signifies identical or
	performed in accordance with	nearly identical wording)
	Section 8, except that flushes	
	directed toward the reactor vessel	
	preceded with flushes directed away	
	from the reactor vessel until expected	
	contamination is removed and the	
	achieved. If lavup is deemed neces-	
	sary, it shall be performed in	
	accordance with Section	
8. LAYUP AND POST-LAYUP CLEANING	9 LAYUP AND POST-LAYUP CLEANING	ОК
8.1 Upon completion of pre-operational	Upon completion of preoperational	
cleaning, unless the system is to be	cleaning, unless the item is to be	
released for the next series of	released for the next series of	
be placed in layup condition, if	placed in layup condition by filling	
required, by filling with dry inert gas,	with dry, contaminant-free inert gas	
the process fluid that will be used in the system during operation, water of	or dry air; the process fluid that will be used in the system during	
purity equivalent to that used to make	operation; fluid of purity equivalent to	
up the system, or chemically-	that used to make up the system;	
conditioned water.	specified method.	
8.2 Prior to the next series of	Prior to the next series of operations	ОК
operations or tests residual cleaning	or tests, residual cleaning solutions	
removed from the system by flushing,	required, from the item by flushing or	
or draining and filling until the effluent	by draining and filling until the	
operational test water quality	preoperational test fluid guality re-	
requirements for the system.	quirements for the system.	
9. RECORDS	11 RECORDS	N45.2.1 includes "personnel qualification records"
Record copies of completed	The following shall be prepared:	
procedures; reports; personnel	 (a) record copies of procedures; (b) reports; 	
calibration records, test deviation or	(c) test equipment calibration	
exception records; inspection and	records;	
examination records shall be prepared.	(a) test deviation or exception records:	
	(e) inspection and examination	
	records;	
	document the cleaning and	
	cleanness history of the items	
	during manufacture, shipment, storage installation preopera-	
	tional cleaning, modifications, and	
Those shall be placed with other	repairs.	OK
project records as required by code,	other project records as required by	
standard, specification, or project	code, standard, specification, or	
Collection. Storage and maintenance	BR17 "Quality Assurance Records"	Similar words, same intent.
records shall be in accordance with		
ANSI <i>N45.2.9.</i>	Records that furnish documentary	
	prepared, and maintained.	
10. REVISION OF ANSI		N/A - These words not included in
STANDARDS REFERRED TO		be.

ANSI N45.2.1-1973	NQA-1 (1994) Subpart 2.1 (except where noted)	Comments (NOTE: OK signifies identical or nearly identical wording)
When the following standards referred to in this document are superseded by a revision approved by the American National Standards Institute, the revi- sion shall apply.		
N45.2 Quality Assurance Program Requirements for Nuclear Power Plants N45.2.3 Housekeeping During the Construction Phase of		
Qualification of Inspection, N45.2.6 Qualification of Inspection, Examination, and Testing Personnel for the Construction Phase of Nuclear Power Plants N45.2.9 Requirements for Collection,		
Storage and Maintenance of Quality Assurance Records *N45.2.10 Terms and Definitions *These Standards are being approved by The American National Standards Institute and they should be available in 1973.		

ANSI N45.2.2-1972	NQA-1 (1994) Subpart 2.2	Comments
	(except where noted)	(NOTE: OK signifies identical or
		nearly identical wording)
	IGENERAL	UK .
1.1 Scope	Subpart 2.2 provides amplified	
This standard defines requirements for	requirements for packaging, snipping, receiving, storage, and handling of	
packaging, shipping, receiving,	nuclear power plant items.	
storage, and handling of nuclear		
These items include the parts of	Part II	QATR Section A.1 "Methodology"
structures, systems, and components	Introduction	establishes applicability.
whose satisfactory performance is	The requirements of this Part (Part II)	
reliably, to prevent accidents that	apply to fabrication, construction,	
could cause undue risk to the health	modification, repair, maintenance, and	
and safety of the public, or to mitigate the consequences of such accidents if	testing activities that affect the quality	
they were to occur.	components for nuclear facilities.	
The requirements stated herein deal	Part II	QATR Section A.1 "Methodology"
necessary to assure that the requisite	Introduction	establishes applicability.
quality of those important parts of the	The requirements of this Part (Part II)	
plant are preserved from the time	apply to fabrication, construction,	
incorporated in the plant.	testing activities that affect the quality	
	of structures, systems, and	
This standard is intended to be used in	components for nuclear facilities.	Slightly different words, but same
conjunction with ANSI N45.2, Quality	Part I and shall be used in conjunction	intent.
Assurance Program Requirements for	with applicable Basic and	
Nuclear Power Plants. The requirements may also be extended to	and to the extent specified by the	
other appropriate parts of nuclear	organization invoking Subpart 2.2.	
power plants when specified in		
1.2 Applicability	Part II	QATR Section A.1 "Methodology"
	Introduction	establishes applicability.
The requirements of this standard	These activities include the performing	
organization that participates in the	function of attaining quality objectives	
packaging, shipping, receiving,	and verifying that activities affecting	
incorporated into nuclear power plants	quality have been correctly performed.	
as discussed in Subsection 1.1 of this		
standard.	Introduction	Slightly different words, but same
quirements of this standard shall apply		intent.
will depend upon the nature and scope	Section 2 "Applicability"	
or the work to be performed and the importance of the item or service in-	To the extent applicable to the	
volved.	activities being performed, the	
	application of this Part (Part II) or	
	Portions thereor, and the provisions of Part 1, Basic and Supplementary	
	Requirements, shall be specified in	
	written contracts, policies, procedures,	
The requirements are intended to	BR 13 "Handling, Storage, and	Slightly different words, but same
assure that the quality of items is not	Shipping"	intent.
degraded as a result of packaging,	Handling storage cleaning	
handling practices and techniques.	packaging, shipping, and preservation	
	of items shall be controlled to prevent	
	damage or loss and to minimize deterioration.	
1.3 Responsibility	BR 1 "Organization"	In addition, QATR Section A.2
		"Organization" and A.3

ANSI N45.2.2-1972	NQA-1 (1994) Subpart 2.2	Comments
	(except where noted)	(NOTE: OK signifies identical or nearly identical wording)
The organization or organizations responsible for establishing the applicable requirements for the activities covered by this standard shall be identified and the scope of their responsibilities shall be documented	The organizational structure, functional responsibilities, level of authority, and lines of communication for activities affecting quality shall be documented.	"Responsibility" establish responsibility.
The work of establishing practices and	BR 1 "Organization"	QATR Section A.2 "Organization"
procedures and providing the resources in terms of personnel,	Section 2.2	also details delegation and the need for documenting said function.
implement the requirements of this standard may be delegated to other organizations and such delegation also shall be documented.	The individual(s) or organization(s) responsible for establishing and executing a quality assurance program under this Standard may delegate any or all of the work to others but shall retain responsibility.	
However, it is the responsibility of	Introduction	Slightly different words, but same
each organization performing work covered by this standard to comply with the procedures and instructions	Section 3 "Responsibility"	intent.
issued for the project and to conform to the requirements of this standard applicable to his work.	The organization upon which this Part (Part II), or portions thereof, is invoked shall be responsible for complying with the specified requirements.	
The following shall be used as a guide in determining those responsibilities which shall be established and documented:		Guidance only. Wording does not establish requirements. (Same for 1- 7 below).
1. Classification of items (protection level)		
2. Packaging design and methods		
3. Shipping requirements and methods		
4. Receiving requirements and methods		
 Storage requirements and procedures 		
6. Handling requirements and procedures		
7. Records		
1.4 Definitions	1.1 Definitions	OK
The following definitions are provided to assure a uniform understanding of select terms as they are used in this standard.	The following definitions are provided to assure a uniform understanding of unique terms as they are used in Subpart 2.2.	
Barrier — A flexible material designed to withstand the penetration of water, water vanor grease or harmful gases	barrier — a flexible material designed to withstand the penetration of water, water vanor grease or barmful gases	ОК
<i>Carrier</i> — The transporting agency.	<i>carrier</i> — the transporting agency	ОК
Classification — The organization of items according to their susceptibility to damage during shipping, receiving and storage only. It does not relate to	classification — the organization of items according to their susceptibility to damage during shipping, receiving, and storage only. It does not relate to	ОК
the function of the item in the com- pleted system.	the function of the item in the completed system.	
Documentation — Any written or	I Introduction	NQA-1 provides additional details on
pictorial information describing, defining, specifying, reporting, or	Section 4 "Terms and Definitions"	when a document is considered a Quality Assurance Record.
certifying activities, requirements, procedures or results.	Document – any written or pictorial information describing, defining, specifying, reporting, or certifying activities, requirements, procedures, or	

ANSI N45.2.2-1972	NQA-1 (1994) Subpart 2.2	Comments
	(except where noted)	(NOTE: OK signifies identical or nearly identical wording)
	results. A document is not considered to be a Quality Assurance Record until it satisfies the definition of a Quality Assurance Record as defined in this Supplement.	
Dynamic Load Test — A test to demonstrate the ability of hoisting equipment to safely handle its rated load by exercising the equipment through vertical and horizontal movement along its lines of travel, using a load of specified weight.	<i>dynamic load test</i> — a test wherein designated loads are hoisted, rotated, or transported through motions and accelerations required to simulate handling of the intended item	Different words are used, but intent is same.
Handling — The act of physically moving items by hand or by mechanical machinery, not including transport modes.		No definition of this exists in NQA-1.
<i>Item</i> — Any level of unit assembly, including system, subsystem, subassembly, component, part, or material.	I Introduction Section 4 "Terms and Definitions" Item – an all-inclusive term used in place of any of the following: appurtenance, assembly, component, equipment, material, module, part, structure, subassembly, system, or unit.	Definitions are slightly different but intent is same.
Nonconformance — A deficiency in characteristic, documentation, or procedure which renders the quality of an item unacceptable or indeterminate. Examples of nonconformance include: physical de- fects, test failures, incorrect or inadequate documentation, and deviation from prescribed processing, inspection or test procedures.	I Introduction Section 4 "Terms and Definitions" Nonconformance – a deficiency in characteristic, documentation, or procedure that renders the quality of an item or activity unacceptable or indeterminate	N45.2.2 provides examples.
Package — The shipping container plus the contents of the container.		No definition of this exists in NQA-1.
Package Unit — Any assembly of mechanical and/or electrical components and parts which can be disassembled without destroying the integrity of the individual parts.		No definition of this exists in NQA-1.
Receiving — To take delivery of material at the construction site or other location designated by the purchaser.	I Introduction Section 4 "Terms and Definitions" Receiving – taking delivery of an item at a designated location	ОК
Storage — The act of holding items at the construction site or in an area other than its permanent location in the plant.	storage — the act of holding items in storage facilities	ОК
Storage Facilities — Warehouse or yard area designated and prepared for holding of items.	storage facilities — warehouse, yard, or other areas designated and prepared for holding of items	ОК
<i>Transit Carrier</i> (Open) — Trucks, Trailers, Railroad cars, Barges, Aircraft, or Ships which <i>do not</i> provide protection of items from the environment.		No definition of this exists in NQA-1.
Transit Carrier (Closed) — Trucks, Trailers, Railroad cars, Barges, Aircraft or Ships which <i>do</i> provide protection of items from the environment by nature of their inherent design.		No definition of this exists in NQA-1.
<i>Transportation Mode</i> — A method identified by the conveyance used for	<i>transportation mode</i> — a method identified by the conveyance used for	ОК

ANSI N45.2.2-1972	NQA-1 (1994) Subpart 2.2	Comments
	(except where noted)	(NOTE: OK signifies identical or nearly identical wording)
transportation of items and includes	transportation of items and includes	
any motor venicles, snips, railroad cars or aircraft Each cargo-carrying	any motor venicies, snips, railroad cars, or aircraft Each cargo carrying	
body (trailer, van, boxcar, etc.) is a	body (trailer, van, boxcar, etc.) is a	
separate vehicle.	separate vehicle.	
Wrap — A flexible material, formed around the item or package to exclude	wrap — a flexible material formed	OK
dirt and to facilitate handling, marking	dirt and to facilitate handling, marking,	
or labeling.	or labeling	
Other terms and their definitions are	NQA-1 Introduction contains many of the definitions that were in N45.2.10	These words are not in NQA-1 nor
1.5 Referenced Documents	Introduction	Slightly different words, but same
		intent.
Other documents that are required to	Section 7 "Referenced Codes, Standarda, and Specifications"	
are either identified at the point of	Standards, and Specifications	
reference or described in Section 9 of	All codes, standards, and	
this Standard.	specifications that are referenced as a	
	the Table entitled "Codes. Standards.	
	and Specifications Referenced in	
The issue on edition of the referenced	Text."	NOA 1 adds the clarification on what
document that is required will be	referenced in this Part (Part II) may be	to do when a specific date or edition
specified either at the point of	identified with the applicable date or	is not identified.
reference or in Section 9 of this	reference at the point of reference or	
standard.	Specifications Referenced in Text."	
	Where no specific date or edition is	
	identified, the latest published version	
	documents stipulate otherwise.	
2. GENERAL REQUIREMENTS	Introduction	Slightly different words but same
This section contains requirements that are to be fulfilled by the	Section 1 "Purpose"	
organization or organizations re-	This Part (Part II) sets forth the quality	
sponsible for performing any segment	assurance requirements for the	
through 8 of this standard.	tasks during the fabrication.	
	construction, modification, repair,	
	maintenance, and testing of systems,	
	facilities.	
Measures shall be established and implemented for the packaging.	2 GENERAL REQUIREMENTS	N45.2.2 includes the word "examinations". Same intent/results.
shipping, receiving, storage and	Measures shall be established and	
handling of specified items to be	implemented for the packaging,	
plant, and for the inspections, ex-	dling of specified items to be	
aminations, testing and documentation	incorporated in the nuclear power	
to verify conformance to specified	plant, and for the inspection, testing,	
l'équitements.	conformance to specified re-	
	quirements.	
2.1 Planning	Introduction	QATR Section A.1, "Methodology"
The specific items to be governed by		which the QATR is applied.
this standard shall be identified.	An appropriate Quality Assurance	
	Program, based on the nature and	
	and the relative importance of the	
	items or services, shall be specified in	
	contractual documents by selective applications of portions of Part I. Basic	

ANSI N45.2.2-1972	NQA-1 (1994) Subpart 2.2	Comments
	(except where noted)	(NOTE: OK signifies identical or
		nearly identical wording)
	and Supplemental Requirements, for	· · · · · · · · · · · · · · · · · · ·
	programmatic activities and of this Part	
Diapping shall take into account the	(Part II) for work oriented activities.	Clightly different words, but some
pred for the preparation and control of	2.1 Planning and Procedures	slightly different words, but same
procedures and work instructions as	Planning and procedure preparation	intent.
necessary to comply with specified	shall be in accordance with the	
requirements.	requirements of the Introduction to this	
Dispring shall include a particular of the	Part (Part II).	
design specifications and drawings for	Introduction	details but the intent is similar
the items covered by this standard to	Section 4.1 "Planning"	
assure that packaging, shipping,	C C	
receiving, storage, and handling	Planning shall include a review of the	
activities have been incorporated and	structure, system or component	
specified	materials lists drawings construction	
	work plans and schedules to ensure	
	that fabrication, installation,	
	modification, inspection, testing, etc.,	
	the work can be accomplished as	
	specified; and that time and resources,	
	plus training, are sufficient to	
	accomplish the work in accordance	
2.2 Procedures and Instructions	with the specified requirements.	N45.2.2 is more specific, however
2.2 Procedures and first uctions	Introduction	intent of developing using and
Procedures and instructions shall be	Section 4.2 "Procedures"	maintaining procedures is similar.
generated, used, and maintained		
current; these shall contain sufficient	Installation, inspection, test	
(see Subsection 2.1 of this Standard)	procedures, and work instructions	
a basis for packaging design, shipping	prepared. Preparation and approval of	
requirements, receiving, storage and	the procedures/instructions shall be in	
handling procedures, implementation	advance of the need to use the	
thereof, and inspection, in accordance with this standard	documents. The documents shall be	
	to assure that the work is performed in	
	accordance with the latest approved	
	information.	
2.3 Results	BR 10 "Inspection"	NQA-1 does not include words "in a
Inspection and test results shall be	Inspection results shall be	suitable test report of data sheet .
documented in a suitable test report or	documented.	
data sheet.		
	BR 11 "Test Control"	
	Test results shall be documented "	
Each report shall identify the item to	Supplement 10S-1 "Supplementary	Supplement 11S-1 contains similar
which it applies, the procedures or	Requirements for Inspection"	words to 10S-1.
instruction followed in performing the	Baus survey b	
following:	Paragraph 9	NQA-1 does not include words "the
	Records shall, as a minimum. identifv	performing the task".
	(a) through (f) below:	
(1) Conditions encountered which	(f) reference to information on action	Slightly different words, but same
were not anticipated, including	taken in connection with	intent.
(2) Identity of inspector or tester	(c) inspector	OK
(3) Completion date.	(b) date of inspection	Slightly different words. but same
	· · · · · · · · · · · · · · · · · · ·	intent.
Test reports and data sheets shall	(e) results or acceptability	Slightly different words, but same
Include an evaluation of the	and 11S-1 Paragraph 5(g) porson	intent.
results and provide for identifying the	evaluating test results.	

ANSI N45.2.2-1972	NQA-1 (1994) Subpart 2.2	Comments
	(except where noted)	(NOTE: OK signifies identical or
individual who performed the		nearly identical wording)
evaluation.	Introduction	Slightly different words, but same
		intent. N45.2.2 uses the words "at the
Those personnel who perform inspection, examination or testing activities at the job site shall be	Section 5 "Qualification of Personnel"	job site".
qualified in accordance with N45.2.6.	Inspection, test, and nondestructive	
	technicians shall be trained and	
	qualified/certified in accordance with the applicable portions of Part 1. Basic	
0 55 - 11 - 11 - 11 - 11 - 11 - 11 - 11 -	and Supplementary Requirements.	
Off-site inspection, examination or testing shall be audited and monitored	Introduction	Slightly different words, but same intent. NQA-1 does not require that
by personnel who are qualified in ac- cordance with N45.2.6.	Section 5 "Qualification of Personnel"	auditors be qualified/certified as inspectors to monitor offsite inspection, examinations or testing
	Inspection, test, and nondestructive	inspection, examinations of testing.
	examination personnel and laboratory technicians shall be trained and	
	qualified/certified in accordance with	
	and Supplementary Requirements.	
	Professional personnel shall meet the requirements defined by the	
	implementing organization in its	
2.5 Measuring and Test Equipment	supplement 12S-1 "Supplementary	Slightly different words, but same
2.5.1 Selection.	Requirements for Control of Measuring and Test Equipment"	intent.
Inspection, examination, and testing equipment utilized to implement the	Paragraph 2	
requirements of this standard shall be selected to have accuracy and	Selection of measuring and test	
tolerance sufficient to determine con-	assure that such items are of proper	
formance to specified requirements.	type, range, accuracy, and tolerance to accomplish the function of	
	determining conformance to specified	
2.5.2 Calibration and Control.	Supplement 12S-1 "Supplementary	Slightly different words, but same
As appropriate, measuring and test	Requirements for Control of Measuring and Test Equipment"	intent.
equipment shall be adjusted and calibrated at prescribed intervals	Paragraph 3.1	
known valid relationships to nationally	Measuring and test equipment shall be	
recognized standards.	calibrated, adjusted and maintained at prescribed intervals or, prior to use,	
	against certified equipment having	
	recognized standards.	
If no national standards exists, the basis for calibration shall be	Supplement 12S-1 "Supplementary Requirements for Control of	NQA-1 includes the word "recognized"
documented.	Measuring and Test Equipment"	1000911200
	Paragraph 3.1	
	If no national recognized standards exists, the bases for calibration shall	
Records shall be maintained and	be documented. Supplement 12S-1 "Supplementary	OK
equipment suitably marked to indicate calibration status.	Requirements for Control of Measuring and Test Equipment"	
ANSI N45.2.2-1972	NQA-1 (1994) Subpart 2.2	Comments
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	(except where noted)	(NOTE: OK signifies identical or
		nearly identical wording)
	Paragraph 5	
	Records shall be maintained and equipment shall be suitably marked to indicate calibration status.	
2.6 Housekeeping	NQA-1 Subpart 2.3 replaced N45.2.3.	QATR Section B.7 "Handling,
In job-site areas, facilities, and environments where packaging, shipping, receiving, storage and handling of items is performed in accordance with the requirements of this standard, the housekeeping requirements shall be in accordance with N45.2.3.		Storage, and Shipping" establishes requirements for housekeeping via commitment to NQA-1-1994, Subpart 2.3.
2.7 Classification of Items	2.2 Classification of Items	ОК
The requirements for activities covered by this standard (packaging, shipping, receiving, storage and handling) are divided into four levels with respect to protective measures to prevent damage, deterioration or contamination of the items, based upon the important physical characteristics and not upon the im- portant functional characteristic of the item with respect to safety, reliability and operation.	Requirements are divided into four levels with respect to protective measures to prevent damage, de- terioration, or contamination of the items based upon the important physical characteristics, and not upon the important functional characteristics of the item with respect to safety, reliability, and operation.	
It should be recognized, however, that	It should be recognized, however, that	ОК
within the scope of each level there may be a range of controls and that the <i>detailed</i> requirements for an item are dependent on the importance of the item to safety or reliability.	within the scope of each level there may be a range of controls, and that the detailed requirements for an item are dependent on the importance of the item to safety reliability.	
For example, even though a reactor vessel and structural steel are classified as level D, the degree of protection and control over the reactor vessel should exceed that of the structural steel.	For example, even though a reactor vessel and structural steel are classified as Level D, the degree of protection and control over the reactor vessel should exceed that of the structural steel.	ОК
Each of the specific items governed by this procedure (See Subsection 2.1 of this standard) shall be classified into one of these four levels by the buyer or the contractor.	Each of the specific items governed by Subpart 2.2 shall be classified into one of these four levels by the buyer or the contractor.	ОК
The manufacturer's documented standard or minimum requirements shall be considered when classifying the items.	The manufacturer's documented standard or minimum requirements shall be considered when classifying the items.	ОК
Items, once classified, shall be restricted to the level or higher for each of the packaging, shipping, receiving, storage and handling opera- tions.	Items, once classified at a level, shall be restricted to that level or a higher level for each of the packaging, shipping, receiving, storage, and han- dling operations.	OK
Items shall not be classified according to the requirements of one level, then packaged, shipped, received, stored or handled according to a level of lower grade.		Implied by statement above.
Any package unit or assembly made up of items of different levels shall be classified to the highest level designated for any of the respective parts.	Any package unit or assembly made up of items of different levels shall be classified to the highest level designated for any of the respective items.	ОК
If the unit is disassembled, a level	If the unit is disassembled, a level	OK

ANSI N45.2.2-1972	NQA-1 (1994) Subpart 2.2	Comments
	(except where noted)	(NOTE: OK signifies identical or nearly identical wording)
shall be indicated for each part.	shall be indicated for each part.	
	categorized under the following levels.	
When the unit cannot be physically		These words not included in NQA-1
contained herein.		
Items covered by this standard shall	Items covered by Subpart 2.2 shall be	ОК
levels:	categorized under the following levels.	
2.7.1 Level A Items classified to level	2.2.1 Level A. Items classified to	N45.2.2 uses the term "gravitational
sensitive to environmental conditions	exceptionally sensitive to	term "accelerating forces".
and require special measures for	environmental conditions and require	Similar, Same Intent.
following effects:	one or more of the following effects:	
temperatures outside required limits	(a) temperatures outside required	
sudden temperature changes,	(b) sudden temperature changes	
humidity and vapors, gravitational (g)	(c) humidity and vapors	
contamination (e.g. rain, snow, dust,	(e) physical damage	
dirt, salt spray, fumes).	(f) airborne contamination (e.g., rain,	
The following shall be used as a guide	Types of items to be categorized	ОК
for classifying items intended for this	under this classification level are:	
(1) Special electronic equipment	(a) special electronic equipment and	ОК
and instrumentation. (2) Special materials such as	instrumentation (b) special materials, such as	OK
chemicals that are sensitive to	chemicals, that are sensitive to	
environment.	environment	N45.2.2 uses the term "AEC fuel
and sources. The requirements of the	sources. The requirements of the NRC	license" while NQA-1 uses the term
AEC fuel license and conditions and	fuel license and conditions and of	"NRC fuel license".
met.	met.	
2.7.2 Level B — Items classified to level B are those that are sensitive to	2.2.2 Level B. Items classified to Level B are those that are sensitive to	N45.2.2 uses the term "gravitational (a) forces" whereas NOA-1 uses the
environmental conditions and require	environmental conditions and require	term "accelerating forces"
measures for protection from the	measures for protection from the	Similar, Same Intent
humidity and vapors, g forces, physical	humidity and vapors, accelerating	
damage and airborne contamination	forces, physical damage, and airborne	
protection required for level A items.	special protection required for Level A	
The following shall be used as a guide	items. Types of items to be categorized	OK
for classifying items intended for this	under this classification level are:	
(1) Instrumentation	(a) instrumentation	NQA-1 adds the parenthesis
(2) Electrical penetrations	(b) electrical penetrations	(Welding electrodes hermetically
(3) Batteries (4) Welding electrode and wire	(c) batteries (d) welding electrode and wire	sealed in metal containers may be stored under conditions described for
(5) Control rod drives	(Welding electrodes hermetically	Level C, unless other storage
(b) Motor control centers, switchgear and control panels	sealed in metal containers may be stored under conditions described for	requirements are specified by the manufacturers.) after (d) and deletes
(7) Motors and generators	Level C, unless other storage	the word "erection" before (j).
(o) Precision machined parts (9) Erection spares, such as	requirements are specified by the manufacturers.)	
gaskets, "0" rings	(e) control rod drives	
(10) Air nandling filters (11) Computers	(<i>i</i>) motor control centers, switchgear, and control panels	
	(g) motors and generators	
	(<i>n</i>) precision machine parts (<i>i</i>) spares, such as daskets. 0-rings	
	(j) air handling filters	

ANSI N45.2.2-1972	NQA-1 (1994) Subpart 2.2 (except where noted)	Comments (NOTE: OK signifies identical or nearly identical wording)
	(k) computers	noany laontioar troraing/
2.7.3 Level C — Items classified to level C are those that require protection from exposure to the environment, airborne contaminants, g forces and physical damage. Protection from water vapor and condensation is not so important as that for Level B items.	2.2.3 Level C. Items classified to Level C are those that require protection from exposure to the environment, airborne contamination, acceleration forces, and physical damage. Protection from water vapor and condensation is not as important as for Level B items.	N45.2.2 uses the term "gravitational (g) forces" whereas NQA-1 uses the term "accelerating forces". Similar, Same Intent.
The following shall be used as a guide for classifying items intended for this level classification.	Types of items to be categorized under this classification level are:	ОК
 Pumps Valves Fluid filters Reactor internals Compressors Auxiliary Turbines Instrument cable Refueling equipment Thermal insulation Fans and blowers Cement 	 (a) pumps (b) valves (c) fluid filters (d) reactor internals (e) compressors (f) auxiliary turbines (g) instrument cable (unjacketed) (h) refueling equipment (i) thermal insulation (j) fans and blowers (k) cement (l) fabricated fuel rods and assemblies 	NQA-1 adds the parenthesis (unjacketed) after instrument cable in (g) and adds (l) fabricated fuel rods and assemblies which is not included in N45.2.2. Similar, Same Intent.
2.7.4 Level D — Items classified to level D are those that are less sensitive to the environment than level C. These items require protection against the elements airborn contamination, and physical damage.	2.2.4 Level D. Items classified to Level D are those that are less sensitive to the environment than those for Level C. These items require protection against the weather, acceleration forces, airborne contamination, and physical damage.	NQA-1 adds the words "acceleration forces" as what an item requires protection from. Similar, Same Intent.
The following shall be used as a guide for classifying items intended for this level classification.	Types of items to be categorized under this classification level are:	ОК
 Tanks Heat exchangers and parts Accumulators Demineralizers Reactor vessel Evaporators Steam generators Pressurizer Piping Ectrical cable Structural items Reinforcing steel Aggregates 	 (a) tanks (b) heat exchangers and parts (c) accumulators (d) demineralizers (e) reactor vessel (f) evaporators (g) steam generators (h) pressurizers (i) piping (j) electrical cable (jacketed) (k) structural items (l) reinforcing steel (m) aggregates 	NQA-1 adds the parenthesis (jacketed) after electrical cable in (j). Similar, Same Intent.
3. PACKAGING	3 PACKAGING	ОК
3.1 General This section contains the requirements for packaging of items for protection against corrosion, contamination, physical damage or any effect which would lower the sublive encode the	3.1 General This Section contains the requirements for packaging of items for protection against corrosion, contamination, physical damage, or	
item to deteriorate during the time it is shipped, handled and stored.	or cause the items to deteriorate dur- ing the time they are shipped, handled, and stored.	
The degree of protection specified will vary according to storage conditions and duration, shipping environment, and handling conditions.	The degree of protection specified will vary according to conditions and duration of storage, shipping envi- ronment, and handling conditions.	ОК
Implementation of this packaging	Implementation of this Section is	ОК

(except where noted) (NOTE: OK signifies identical nearly identical wording)	al or
nearly identical wording)	
enation is encountialed by identifying a second laborate with the time the time to a	
section is accomplished by identifying accomplished by identifying the item	
the item and the appropriate and the appropriate packaging	
appropriate criteria contained herein	
concerning cleaning, preservatives, concerning cleaning, preservatives,	
desiccants, inert gas blankets, desiccants, inert gas blankets,	
cushioning, caps and plugs, barrier cushioning, caps and plugs, barrier	
blocking and bracing containers	
marking, other quality assurance marking, other quality assurance	
provisions and documentation. provisions, and documentation.	
Appendix A-3 contains additional Part II introduction OK	
other documents.	
various subparts are provided in Part	
These requirements are a mandatory These words not included in NQ	A-1
part of this standard as the requirements are included	in
appendix	
3.2 Levels of Packaging 3.2 Levels of Packaging OK	
I he packaging requirements are I he packaging requirements shall be hased on the protection that is	
should receive during shipping.	
handling, and storage. and storage of the item to satisfy	
Levels A, B, C, and D protection	
The requirements of this standard are The requirements herein are intended OK	
intended to be in addition to industry to be in addition to industry	
classifications or tariff rules for rail, classifications or tariff rules for rail,	
truck, air and water shipments and truck, air, and water shipments and	
established in the transportation established in the transportation	
industry and in no way are they industry; and in no way are they	
intended to reduce the minimum intended to reduce the minimum	
standards established by these standards established by these regulatory agency rules	
The following packaging criteria are The following packaging criteria are OK	
divided into four levels corresponding divided into four levels corresponding	
to the categories of Subsection 2.7 of to the classification categories of para.	
3.2.1 Level A Items. (See paragraph 3.2.1 Level A Items. (See para OK	
2.7.1). Level A items require the 2.2.1.) Level A items require the	
highest degree of protection and shall highest degree of protection and shall	
(1) Package design requirements (a) Package design requirements shall OK	
are for extraordinary environmental be for extraordinary environmental	
protection to avoid the deleterious protection to avoid the deleterious	
effects of shock and vibration, to effects of shock and vibration, to	
specified limits, or for any other special specified limits, or for any other special	
requirements. requirements.	
(2) Items shall have been inspected (b) Items shall have been inspected for OK	
nackaging Dirt oil residue metal nackaging Dirt oil residue metal	
chips or other form of contamination chips, or other forms of contamination	
shall have been removed by approved shall have been removed by approved	
cleaning methods. Any entrapped cleaning methods. Any entrapped water shall have been removed	
(3) Items which are not immediately (c) Items which are not immediately OK	
packaged shall be protected from packaged shall be protected from contamination	

ANSI N45.2.2-1972	NQA-1 (1994) Subpart 2.2	Comments
	(except where noted)	(NOTE: OK signifies identical or nearly identical wording)
(4) All Items shall be packaged	(d) Items requiring protection from	ОК
this Standard) so that water vapor. salt	other forms of contamination pen-	
air, dust, dirt and other forms of	etrating the package shall be	
contamination do not penetrate the	packaged with a barrier (see para.	
(5) Items shall be packaged in	(e) Items which require protection from	NOA-1 adds the words "which require
containers or crates (see Subsection	damage during shipping and handling	protection from damage during
3.7 of this standard).	shall be packaged in containers or	shipping and handling".
(6) Items which can be damaged by	crates (see para. 3.7).	OK
condensation trapped within the	condensation trapped within the	
package shall be packaged with	package shall be packaged with	
approved desiccant (see paragraph	approved desiccant (see para. 3.6.3)	
proof barrier or by an equivalent	proof barrier or by an equivalent	
method (for example, see paragraph	method (for example, see para. 3.6.2).	
3.6.2).		014
(7) All openings into items shall be capped, plugged or sealed (see	(g) All openings into items shall be capped, plugged, or sealed (see para.	ŬŔ
Subsection 3.5 of this standard). Weld	3.5). Weld end preparations shall be	
end preparations shall be protected	protected against corrosion and	
against corrosion and physical damage	pnysical damage.	
(8) Items packed in containers shall	(h) Items packed in containers shall	N45.2.2 uses the words "and/or"
be blocked, anchored, braced and/or	be blocked, anchored, braced, or	whereas NQA-1 uses the words "or".
standard) to prevent physical damage	physical damage to the item or barrier	Similar, Same Intent.
to the item or barrier.)		
(9) Items and their containers shall be	(<i>i</i>) Items and their container shall be	ОК
3.9 of this standard).	Identified by marking (see para. 3.9).	
3 2.2 Level B Items. (See paragraph	3.2.2 Level B Items. (See para.	ОК
2.7.2) Level B items require a high	2.2.2.) Level B items require a high	
shall be designed to avoid the	shall be designed to avoid the	
deleterious effects of shock, vibration,	deleterious effects of shock, vibration,	
physical damage, water vapor, salt	physical damage, water vapor, salt	
during shipping handling and storage	during shipping handling and storage	
This packaging shall be equivalent to	This packaging shall be equivalent to	Slightly different wording between
that for Level A except that the ex-	that for Level A, except that the	N45.2.2 and NQA-1 but equivalent.
apply.	not be equivalent to satisfy the level of	
~~~~	extraordinary environmental protection	
	indicated in para. 3.2.1(a) where such	
Level B items such as control papels	Shipment of Level B items in fully en-	N45.2.2 includes the words "such as
or similar special items may be	closed vehicles or equivalent	control panels or other similar special
shipped with a minimum of protection	protective enclosure or packaging is	items" and is more specific in
furniture type van with special	high degree of protection for Level B	as "furniture type van with special
suspension, provided the shipment	items is maintained throughout	suspension".
goes through to destination in the	shipment, and the shipment goes	
original vehicle and Level B storage	through to destination in the original	
	are available on site.	
	If transfer becomes necessary to	These words not included in N45.2.2.
	transit, transter procedures shall be subject to purchaser acceptance	
3.2.3 Level C Items. (See paragraph	<b>3.2.3 Level C Items.</b> (See para.	N45.2.2 adds the words "airborne
2.7.3) Level C items require protection	2.2.3.) Level C items require protection	and windblown" when referring to
trom exposure to salt spray, rain, dust,	trom exposure to salt spray, rain, dust,	contaminants.
contaminants. Protection from water	Protection from water vapor and	
vapor and condensation is less	condensation is less important than for	

ANSI N45.2.2-1972	NQA-1 (1994) Subpart 2.2	Comments
	(except where noted)	(NOTE: OK signifies identical or nearly identical wording)
important than for Level B items. The following criteria shall apply:	Level B items. The following criteria shall apply.	
(1) Criteria (2) (3) (5) (7) (8) and (9) for Level A items (see paragraph 3.2.1) shall apply to Level C items.	(a) Criteria (b), (c), (e), (g), (h), and (i) for Level A items (see para. 3.2.1) shall apply to Level C items.	ОК
(2) Items shall be packaged with a waterproof enclosure so that water, salt spray, dust, dirt, and other forms of contamination do not penetrate to the item.	(b) Items shall be packaged with a waterproof enclosure so that water, salt spray, dust, dirt, and other forms of contamination do not penetrate to the item.	ОК
(3) Items subject to detrimental corrosion, either internal or external, shall be suitably protected.	(c) Items subject to detrimental corrosion, either internal or external, shall be suitably protected.	ОК
<b>3.2.4 Level D Items.</b> (See paragraph 2.7.4) Level D items require protection from physical and mechanical damage. The following criteria shall apply:	<b>3.2.4</b> Level D Items. (See para. 2.2.4.) Level D items require protection from physical and mechanical damage. The following criteria shall apply.	ОК
(1) Items, just before packaging, shall have been inspected for cleanness according to the requirements specified in the purchasing document. Dirt, oil residue, metal chips or other forms of contamination shall have been removed by approved cleaning meth- ods. Any entrapped water shall have been removed.	(a) Items, just before packaging, shall have been inspected for cleanness according to the requirements specified in the purchasing document. Dirt, oil residue, metal chips, or other forms of contamination shall have been removed by approved cleaning methods. Any entrapped water shall have been removed.	ОК
(2) All openings into items shall be capped, plugged and sealed (see Subsection 3.5 of this standard). Weld end preparations shall be protected from corrosion and physical damage.	(b) All openings into items shall be capped, plugged, and sealed (see para. 3.5). Weld end preparations shall be protected from corrosion and physical damage.	ОК
(3) Items subject to detrimental corrosion, either internal or external, shall be suitably protected.	(c) Items subject to detrimental contamination or corrosion, either internal or external, shall be suitably protected.	ОК
(4) Items packed in containers shall be blocked, braced and/or cushioned to prevent physical damage (see Subsection 3.8 of this Standard).	<i>(d)</i> Items packed in containers shall be blocked, braced, or cushioned to prevent damage (see para. 3.8).	ОК
(5) Items such as aggregate and reinforcing steel shall be suitably protected against detrimental contamination or corrosion.	(c) Items subject to detrimental contamination or corrosion, either internal or external, shall be suitably protected.	These specific words related to aggregates and reinforcing steel are not included as a separate item since item (c) of this section includes this provision as a general requirement.
(6) The identity of the item shall be maintained by marking (see Subsection 3.9 of this standard) or other appropriate means.	(e) The identity of the item shall be maintained by marking (see para. 3.9) or other appropriate means.	ОК
3.3 Cleaning	3.3 Cleaning	N45.2.2 uses the word "purchase
Cleaning includes the preparation of items for preservation or packaging, or both, to minimize the requirements for site cleaning. Items shall be inspected for cleanness immediately before packaging according to the cleaning requirements specified in the purchase document. Any dirt, oil residue, metal chips or other forms of contamination shall be removed by documented cleaning methods. Any entrapped water shall be removed.	Cleaning includes the preparation of items for preservation or packaging, or both, to minimize the requirements for site cleaning. Items shall be inspected for cleanness immediately before packaging according to the cleaning requirements specified in the pro- curement documents. Any dirt, oil residue, metal chips, or other forms of contamination shall be removed by documented cleaning methods. Any entrapped water shall be removed.	word "procurement document"

ANSI N45.2.2-1972	NQA-1 (1994) Subpart 2.2	Comments
	(except where noted)	(NOTE: OK signifies identical or
	(,	nearly identical wording)
Any item which is not immediately	(d) After cleaning, the item shall be	ОК
further contamination.	preservation or packaging is complete.	
	·	
(See Appendix section A3.3 for		
additional requirements.)	3.4 Mothods of Prospriation	OK
3.4 Methods of Fleservation	3.4 Methods of Freselvation	SK .
Items subject to deleterious corrosion	Items subject to deleterious corrosion	
shall be protected by using either	shall be protected by using either	
blankets or vaporproof barriers with	blankets or vapor-proof barriers with	
desiccants. (See Subsection 3.6 of this	desiccants. (See para. 3.6 for vapor-	
standard for vaporproof barriers and	proof barriers and desiccants.)	
desiccants.)		01
Contact preservatives are compounds	Contact preservatives are compounds	ŬK .
applied to bare metal surfaces to	applied to bare metal surfaces to pre-	
prevent surface corrosion during	vent surface corrosion during shipping	
shipping and storage and generally	and storage and generally require	
(See Appendix section A3.4.1 for		
additional requirements.)		
<b>3.4.2 Inert Gas Blankets</b> . Purging	3.4.2 Inert Gas Blankets. Purging	ОК
or its container or both with a dry inert	or its container, or both, with a dry	
gas provides a means of preventing	inert gas provides a means of	
moisture or corrosive atmospheres	preventing moisture or corrosive	
from acting on sensitive bare metal	atmospheres from acting on sensitive,	
or its container shall be either	The item or its container shall be either	
evacuated prior to filling with the inert	evacuated prior to filling with the inert	
gas or adequately purged with the	gas or adequately purged with the	
blanket. (See Appendix section A3.4.2	blanket.	
for additional requirements.)		
3.5 Caps, Plugs, Tapes, and	3.5 Caps, Plugs, Tapes, and	ОК
Adhesives	Adnesives	
These items shall be of materials	These items shall be of materials that	
which enable them to perform their	enable them to perform their intended	
Intended function adequately without causing deleterious effects on items or	function adequately, without causing deleterious effects on the items or	
systems operation.	system operation.	
3.5.1 Caps and Plugs. Caps and	3.5.1 Caps and Plugs. Caps and	OK
plugs shall be used to seal openings in	plugs shall be used to seal openings in	
surfaces, and to protect threads and	faces and to protect threads and weld	
weld end preparations. (See Appendix	end preparations.	
section A3.5.1 for additional		
3.5.2 Tapes and Adhesives	3.5.2 Tanes and Adhesives	OK
Pressure sensitive, removable, tape	Pressure-sensitive, removable tape	
should be used in lieu of adhesives in	shall be used in lieu of adhesives in	
contact with bare metal surfaces.	contact with bare metal surfaces.	OK
damaging effects on the item or	appes or adnesives that could have	
system shall not be used. Tapes near	tem shall not be used. Tapes near a	
a weld shall be removed completely	weld shall be removed completely,	
immediately prior to performing a weld	immediately prior to performing a weld.	
Tapes used for identification rather	Tapes used for identification rather	ОК
than sealing which are not near a	than sealing that are not near a	
welding operation may remain until	welding operation may remain until	
ayatem teating. (See Appendix section	ayatem teating is complete, but sildli	

ANSI N45.2.2-1972	NQA-1 (1994) Subpart 2.2	Comments
	(except where noted)	(NOTE: OK signifies identical or
A3 5 2 for additional requirements )	be removed before plant operations	nearly identical wording)
	unless qualified for operating conditions.	
3.6 Barrier and Wrap Materials and	1.1 Definitions	ОК
Desiccants	barrier — a flexible material designed	
A barrier generally is a flexible material designed to withstand the penetration of water, water vapor, grease, or	to withstand the penetration of water, water vapor, grease, or harmful gases	
harmful gases. A wrap is a flexible	wrap — a flexible material formed	
package to exclude dirt and to	dirt and to facilitate handling, marking,	
facilitate handling, marking or labeling.	or labeling	
Material thickness shall be selected on the basis of type size and weight of	3.6 Barrier and Wrap Materials and Desiccants	OK
equipment or item to be protected,		
such that the barrier or wrap will not	Material thickness shall be selected on	
abrasion, weathering, cracking,	equipment or item to be protected,	
temperature extremes, wind	such that the barrier or wrap will not	
conditions, and the like.	abrasion, weathering, cracking,	
	temperature extremes, wind	
Barrier and wran materials shall be	conditions, and the like. Barrier and wran materials shall be	OK
nonhalogenated when used in direct	noncorrosive and shall not be	
contact with austenitic stainless steels,	otherwise harmful to the item pack-	
support combustion and shall not be	materials are used in direct contact	
otherwise harmful to the item	with austenitic stainless steels, the	
раскадео.	total and water leachable content of halogen shall not be harmful to the	
	item packaged. Also, barrier and wrap	
	materials shall not readily support	
Vaporproof barrier materials used with	Vapor-proof barrier materials used	ОК
desiccants constitutes another	with desiccants constitute another	
3.4 of this standard); it protects against	against potential damage by water	
potential damage by water vapor	vapor condensate.	
3.6.1 Water-proof Barrier Material.	3.6.1 Waterproof Barrier Material.	ОК
Waterproof barrier material shall be	Waterproof barrier material shall be	
it shall protect items from airborne and	protect items from airborne and	
windblown soils.	windblown soils.	
3.6.2 Vapor Barrier Material. Vaporproof barrier materials shall be	3.6.2 Vapor-proof Barrier Material.	UK
sealable and the edge of the barrier	sealable, and the edge of the barrier	
which normally will be opened at destination shall be of sufficient area	that normally will be opened at destination shall be of sufficient area	
to permit at least two subsequent	to permit at least two subsequent	
sealing operations. (See Appendix A3 6 2 for additional requirements)	sealing operations.	
<b>3.6.3 Desiccants</b> . Desiccants may be	3.6.3 Desiccants. Desiccants shall	ОК
used within a vaporproof barrier when	be used within a vapor-proof barrier	
condensation or high humidity could damage an item by corrosion mold or	when condensation or high humidity could damage an item by corrosion	
mildew. (See Appendix A3.6.3 for	mold, or mildew.	
additional requirements).		
3.7 Containers, Crating and Skids	3.7 Containers, Crating, and Skids	UK
3.7.1 Containers. Containers are	3.7.1 Containers. Containers shall	ОК
used when maximum protection for the item or its barrier is required. Domestic	be used when maximum protection for the item or its barrier is required	

ANSI N45.2.2-1972	NQA-1 (1994) Subpart 2.2	Comments
	(except where noted)	(NOTE: OK signifies identical or
		nearly identical wording)
types used shall be limited to:	to the following:	
(1) Cleated, sheathed boxes (500	(a) cleated, sheathed boxes [500 lb	NQA-1 also references metric weight
lb maximum net weight).	(227 kg) maximum net weight]	equivalents.
(2) Nalled wood boxes. (3) Wood-cleated solid fiberboard	(b) nalled wood boxes	OK
boxes.	boxes	
(5) Metal or fiber drums.	(d) metal or fiber drums	ОК
(6) Crates (see paragraph 3.7.2).	(e) crates (see para. 3.7.2)	OK
(7) Wire bound boxes (200 lb maximum net weight).	maximum net weight]	equivalents.
(8) Other specially designed	(g) other specially designed containers	О́К
(4) Fiberboard boxes (120 lb	(h) fiberboard boxes [120 lb (54.5 kg)	NQA-1 also references metric weight
maximum net weight. See Appendix	máximum net weight].	equivalents.
Cleated boxes in excess of 50 lb shall	Cleated boxes in excess of 50 lb (22.7	NQA-1 also references metric weight
be bound with steel strapping or	kg) shall be bound with steel	equivalents.
less than two places. (See Appendix	container at not less than two places.	
A3.7.1 for additional requirements.)	•	
<b>3.7.2 Crates and Skids.</b> Crates and	<b>3.7.2 Crates and Skids.</b> Crates and	NQA-1 also references metric weight
excess of 500 lb. Skids and runners	excess of 500 lb (227 kg). Skids and	equivalents.
shall be used on boxes with a gross	runners shall be used on boxes with a	
weight of 100 lb or more, allowing a	gross weight of 100 lb (45.5 kg) or	
tipes as provided by 4 inch lumber	more, allowing a minimum floor	
tines as provided by 4 inciritatiber.	by 4 in. (10 cm) lumber.	
3.8 Cushioning, Blocking, Bracing	3.8 Cushioning, Blocking,	ОК
3.8.1 Cushioning Cushioning shall	3.8.1 Cushioning. Cushioning shall	ОК
be used where protection from shock	be used where protection from shock	
and vibration is required; the	and vibration is required. The	
cushioning materials shall have	cushioning materials shall have	
function. (See Appendix A3.8.I for	function.	
additional requirements.)		
3.8.2 Blocking and Bracing.	3.8.2 Blocking and Bracing.	ОК
Blocking and bracing used for	Blocking and bracing used for	
shall be compatible with the size,	shall be compatible with the size,	
shape, and strength of bearing areas	shape, and strength of bearing areas	
of the shipment.	of the shipment.	OK
prevent item movement shall	prevent item movement shall	OK
withstand thrust and impact applied in	withstand thrust and impact applied in	
any direction.	any direction.	
Blocking and bracing used in direct	Blocking and bracing used in direct	ŬK
shall not have a corrosive effect on the	shall not have a corrosive effect on the	
item.	item.	
<b>3.8.3 Anchoring.</b> Anchoring of the	<b>3.8.3 Anchoring.</b> Anchoring of the	OK
adequately fasten the item during	adequately fasten the item during	
shipment and protect the item from	shipment and protect the item from	
potential damage due to rough	potential damage due to rough	
handling.	nandling.	Guidance only. Doos not ostablish
damage when removing container		requirements.
contents, bolting is preferred. (See Ap-		
pendix A3.8.3 for additional		
Temporary cushioning, blocking	Temporary cushioning, blocking	OK
bracing or anchoring placed within an	bracing, or anchoring placed on an	

ANSI N45.2.2-1972	NQA-1 (1994) Subpart 2.2	Comments
	(except where noted)	(NOTE: OK signifies identical or
the set for a historia second a stirm the stars of		nearly identical wording)
be removed prior to operation of the	to be removed prior to operation of the	
item shall be identified by warnings	item shall be identified by warnings	
placed in a conspicuous manner to	placed in a conspicuous manner to	
effect proper removal of the packing	effect proper removal of the packing	
3.9 Marking	3.9 Marking	ОК
To maintain proper identification and	To maintain proper identification and	
receiving and storage and to provide	receiving and storage and to provide	
for identification after the outside of the	for identification after the outside of the	
container has been removed, the item	container has been removed, the item	
and the outside of containers shall be marked (See Appendix 3.9 for	and the outside of the containers shall be marked	
additional requirements.)	be marked.	
	If equipment does not lend itself to	Words not included in N45.2.2
	marking, records shall be maintained	
	item.	
4. SHIPPING	4.1 General	N45.2.2 goes into details as to what
4.1 General		is covered under this section.
4.1 General	This Section covers the requirements	
This section covers the requirements	for loading and shipment of items as	
for loading and shipment of items as		
standard Described are		
environmental protection during		
transit, procedures to minimize		
damage in transit, precaution required when handling items during loading		
and transit, and identification and in-		
spection on overseas shipments.	-	
The mode of transportation used shall be consistent with the protection	I he mode of transportation used shall be consistent with the protection	OK
classification of the item (see	classification of the item (see para.	
Subsection 2.7 of this standard) and	2.1) and with the packaging methods	
with the packaging methods employed	employed (see para. 3.2).	
4.2 Transportation Requirements	4.2 Transportation	ОК
	Requirements	
4.2.1 Open Carriers. For	<b>4.2.1 Open Carriers.</b> For shipment	ОК
may be exposed to adverse	exposed to adverse environmental	
environmental conditions, the following	conditions, the following shall apply.	
shall apply:		
(1) Level A, B, and C items shall be covered for protection from	(a) Levels A, B, and C items shall be covered for protection from	ŬŔ
environmental conditions. Tarpaulins,	environmental conditions. Tarpaulins,	
when used, shall be fire retardant; and	when used, shall be fire retardant, and	
they shall be installed in a manner to	they shall be installed in a manner to	
circulation to prevent condensation.	circulation to prevent condensation.	
	-	
(2) Barrier and wrapping materials	(b) Barrier and wrapped materials (see	ОК
subject to transportation damage shall	damage shall be covered with	
be covered with waterproof shrouds	waterproof shrouds, such as	
such as tarpaulins, so that they are not	tarpaulins, so that they are not	
exposed directly to the environment.		
4.2.2 Closed Carriers. For shipment	4.2.2 Closed Carriers. For shipment	ОК
on closed carriers the following shall	on closed carriers the following shall	
αρμιγ.	appiy.	

ANSI N45.2.2-1972	NQA-1 (1994) Subpart 2.2	Comments
	(except where noted)	(NOTE: OK signifies identical or
	(,	nearly identical wording)
	When Lovels A. D. and C. items connect	
(1) when level A, B, and C items cannot be adequately protected from	be adequately protected from weather	ŬŔ
weather or environment on open	or environment on open carriers,	
carriers, closed carriers shall be used.	closed carriers or fully enclosed vehi-	
(2) Use of fully enclosed furniture	cles shall be used.	Recommendation only. Does not
vans is recommended when shipping		establish requirements.
large delicate items such as control		
panels.	123 Special Shinments Items that	OK
exceed established weight or size	exceed established weight or size	
limitations for railroads or highways, or	limitations for railroads or high	
require special handling should be	ways or require special handling shall	
following areas:	the following areas.	
(1) The type of bracing and tie down	(a) The type of bracing and tie down	ОК
methods to be used with the mode of	methods to be used with the mode of	
shipments shall be specified.	shipments shall be specified.	
(2) "NO HUMPING" shall be specified	(b) NO HUMPING shall be specified	ОК
on rail shipments of these items, and	on rail shipments of these items, and	
prominently displayed.	prominently displayed.	
(3) Use of impact recording meters	(c) Use of impact recording meters	ОК
should be specified on shipments of	shall be specified on shipments of	
incorporating delicate factory installed	incorporating delicate factory-installed	
instrumentation. Meters, when	instrumentation. Meters, when	
specified, shall be installed prior to	specified, shall be installed prior to	
during loading). Procedures shall be	during loading). Procedures shall be	
established to interpret recorded data,	established to interpret recorded data	
and to thoroughly check the integrity of	and to thoroughly check the integrity of	
rough handling. A notice that impact	rough handling. A notice that impact	
recording meters are being used shall	recording meters are being used shall	
be prominently displayed. Special	be prominently displayed. Special	
limits greater than the expected transit	limits greater than the expected transit	
time shall be specified or, if the	time shall be specified or, if the ex-	
expected transit time exceeds the	pected transit time exceeds the	
operating time limit of the recorders	operating time limit of the recorders	
to service the meters during transit.	to service the meters during transit.	
(4) The use of "Escorts" may be		These words are not contained in
specified to accompany shipments, when additional surveillance is		NQA-1. "May" establishes a requirement
required during transit of certain items.		recommendation, not a requirement.
(5) For special shipments, the	(d) For special shipments, the	ОК
conveyance used for transport shall be	conveyance used for transport shall be	
take the loads imposed during loading,	take the loads imposed during loading,	
while en route, and during unloading.	while en route, and during unloading.	
Prior to shipment the route shall have	Prior to shipment the route shall have	
transit.	transit.	
4.3 Precautions During Loading	4.3 Precautions During Loading	ОК
<b>431 Loading</b> The weight lifting	<b>4.3.1</b> Loading The weight lifting	NOA-1 includes the words "by the
points, or center of gravity indicated on	points, or center of gravity indicated by	shipper" when referring to indicating
the crate, skid, or package by the	the shipper on the crate, skid, or	the weight, etc.
snipper (see Subsection 3.9 of this standard) shall be utilized to insure	package by the shipper (see para. 3.9)	
proper handling during loading.	handling during loading, transfer	
transfer between carriers, and un-	between carriers, and unloading (see	

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	(except where noted)	(NOTE: OK signifies identical or
		nearly identical wording)
loading (see Section 7 of this standard)	Section 7).	
<b>4.3.2 Rigging.</b> Carbon steel rigging	4.3.2 Rigging. Carbon steel rigging	ОК
equipment shall not come in direct	equipment shall not come in direct	
contact with stainless steel except	contact with stainless steel, except	
nade in order to avoid surface	nads in order to avoid surface	
damage.	damage.	
4.3.3 Handling Precautions. All	4.3.3 Handling Precautions. All	OK
austenitic stainless steel and nickel	austenitic stainless steel and nickel-	
base alloy materials shall be handled	base alloy materials shall be handled	
In such a manner that they are not in contact with lead zinc conner	In such a manner that they are not in contact with lead zinc conner	
mercury, or other low melting	mercury, or other low melting point	
elements, alloys, or halogenated	elements, alloys, or halogenated	
material.	material.	
4.3.4 Package/Preservative	4.3.4 Package and Preservative	N45.2.2 uses and/or when referring
preservative coatings shall be visually	coatings. Fackage of preservative	coatings" NOA-1 uses the word "or"
inspected after loading, and damaged	after loading and damaged areas	
areas repaired prior to shipment.	repaired prior to shipment.	
Items shipped with desiccants shall be	Items shipped with desiccants shall be	OK
inspected after loading to assure that	inspected after loading to assure that	
435 Sealed Openings Sealed	435 Sealed Openings Sealed	OK
Openings shall be visually inspected	openings shall be visually inspected	
after loading to assure closures are	after loading to assure closures are	
intact. Materials used for resealing	intact. Materials used for resealing	
shall be in accordance with Section 3	shall be in accordance with Section 3.	
<b>4.3.6</b> Stacking, Written instructions	4.3.6 Stacking, Where special care	NQA-1 includes the words "Where
covering the location and stacking	is deemed necessary to avert damage,	special care is deemed necessary to
limits of the crates or boxes on the	written instructions concerning the	avert damage", whereas N45.2
transport vehicle shall be specified;	location or stacking limits for crates or	includes the words "on the transport
container	containers	crates or boxes
4.3.7 Theft and Vandalism.	4.3.7 Theft and Vandalism.	OK
Precautions shall be taken to minimize	Precautions shall be taken to minimize	
the possibility of theft and vandalism	the possibility of theft and vandalism	
during shipment of items.	during shipment of items.	N45.2.2 includes the words "in
4.4 Identification and Marking	4.4 Identification and Markings	accordance with Subsection 3.9 of
Identification and markings on the	Identification and markings on the	this standard."
outside of all packages, skids or	outside of all packages, skids, or	
protective covering shall be	protective covering shall be main-	
Subsection 3.9 of this standard	tained.	
4.5 Shipments From Countries	4.5 Shipments From Countries	ОК
Outside United States	Outside the United States	
4.5.1 Overseas Shipment. When	4.5.1 Overseas Shipment. When	OK
of deck cargo facilities shall be	of deck cargo facilities shall be	
avoided unless necessary due to	avoided unless necessary due to	
physical dimensions. Shipments	physical dimensions. Shipments	
utilizing approved watertight	utilizing approved watertight con-	
containers may be carried on deck.	tainers may be carried on deck.	N45.2.2 uses the terminology "Ear
<b>Shipment.</b> For special shipments	<b>Shipment</b> , Items shall be inspected to	special shipments" NOA-1 is more
items shall be inspected to insure	ensure integrity of packaging or pro-	conservative.
integrity of packaging or protective	tective enclosures after being loaded	ОК
enclosures after being loaded aboard	aboard ship.	
snip. 453 Inspection at Port of Entry	453 Inspection at Port of Entry	N45.2.2 uses the terminology "Ear
For special shipments, items shall be	Items shall be inspected to ensure	special shipments". " NQA-1 is more
inspected to insure integrity of	integrity of packaging or protective	conservative.
packaging or protective enclosures	enclosures when items are off-loaded	ОК

ANSI N45.2.2-1972	NQA-1 (1994) Subpart 2.2	Comments
	(except where noted)	(NOTE: OK signifies identical or
	(	nearly identical wording)
when items are off loaded at the port of entry.	at the port of entry.	
4.5.4 Identification and Markings.	4.5.4 Identification and markings	ОК
the procedure outlined in Subsection	shall follow the procedure outlined in	
3.9 of this Standard.	para. 3.9.	
The English language and evoirduncia		These words are not included in
weight shall be used for all		NQA-1.
identification and marking. Duplicate		
markings and identification in other		
used.		
4.5.5 Transportation	4.5.5 Transportation	ОК
<b>Requirements</b> . Requirements outlined in Subsection 4.2 (Transportation) and	Requirements. Requirements outlined	
in Section 7 of this Standard shall be	followed where applicable.	
followed where applicable.		
4.6 Nuclear Material Shipments	4.6 Nuclear Material Shipments	N45.2.2 uses the term "AEC fuel
Special nuclear material and sources	Special puckers material and sources	license" while NQA-1 uses the term
shall be shipped as specified in the	shall be shipped as specified in the	NICO Idel license .
AEC fuel license and by other	NRC fuel license and by other	Similar, Same Intent.
5. RECEIVING	5 RECEIVING	OK
5.1 General	5.1 General	
This section contains requirements	The requirements that shall be fulfilled	
that are to be fulfilled by the	by the organization(s) responsible for	
sponsible for the receiving of items.	the receiving of items.	
Receiving starts when the items arrive	Receiving starts when the items arrive	ОК
at a storage facility or construction site	at a storage facility or construction site	
Included are procedures, inspections.	before unloading of unpacking.	Guidance only. Does not establish
marking, identification and		requirements.
documentation prior to placing the item		
location. Shipping damage claims.		
transfer of ownership, financial		
responsibility and contractual		
which are not included in the scope of		
this Standard.		
5.2 Receiving Inspection Requirements	5.2 Receiving Inspection Requirements	OK
5.2.1 Shipping Damage	5.2.1 Shipping Damage Inspection.	ОК
Inspection. Preliminary visual	Preliminary visual inspection shall be	
performed prior to unloading to	unloading to determine if any damage	
determine if any damage occurred	occurred during shipping.	
during shipping. Observations for	Observations for unusual conditions	
(1) Fire — Charred paper wood	(a) fire — charred paper wood or	OK
or paint, indicating exposure to fire or	paint, indicating exposure to fire or	
high temperature.	high temperature;	OK
Weather-beaten, fraved, rusted, or	beaten, frayed. rusted. or stained	
stained containers indicating	containers, indicating prolonged ex-	
prolonged exposure during transit.	posure during transit;	OK
Water or oil marks. damp conditions	oil marks, damp conditions. dirty	
dirty areas, or salt film (indicating	areas, or salt film, indicating exposure	
exposure to sea water or winter road	to sea water or winter road salt	

ANSI N45.2.2-1972	NQA-1 (1994) Subpart 2.2	Comments
	(except where noted)	(NOTE: OK signifies identical or
		nearly identical wording)
salt chemicals).	chemicals;	01/
(4) The Down Failure Shifted, broken loose or twisted shipping ties	(a) the down failure — shifted, broken,	0K
and worn material under ties,	worn material under ties indicating	
indicating improper blocking and tie	improper blocking and tie down during	
down during shipment.	shipment;	
(5) Rough Handling —	(e) rough handling — splintered, torn,	OK
Splintered, torn, or crushed containers	or crushed containers, indicating	
Review of impact recording instrument	(f) review of impact recording	NQA-1 adds the words "against
readings.	instrument readings against	established criteria."
	established criteria. See para. 4.2.3(c).	
5.2.2 Item Inspection. Unless the	5.2.2 Item Inspection. Unless the	OK
package marking prohibits unpacking,	package marking prohibits unpacking,	
visually inspected to verify that the	the contents of all shipments shall be	
specified packaging and shipping	specified packaging and shipping	
requirements have been maintained.	requirements have been maintained.	
When items are contained in trans-	When items are contained in	ОК
parent separate moisture-proof bags	transparent, separate moisture-proof	
or envelopes, visual inspection without	bags or envelopes, visual inspection	
	be acceptable	
Statistical sampling methods may be	Where specific inspection	NQA-1 adds the words "Where
used for groups of similar items.	requirements can be achieved,	specific inspection requirements can
	statistical sampling methods may be	be achieved"
	used for groups of similar items.	014
Care shall be taken to avoid	Care shall be taken to avoid	ÜK
inspection. The inspections shall be	inspection. The inspections shall be	
performed in an area equivalent to the	performed in an area equivalent to the	
level of storage requirement for the	level of storage requirement for the	
item (see Section 6 of this standard).	item (see Section 6).	014
I hese inspections and examinations	I hese inspections and examinations	OK
appropriate:	appropriate:	
(1) Identification and Marking.	(a) identification and marking —	ОК
Verification that identification and	verification that identification and	
markings are in accordance with	markings are in accordance with	
applicable codes, specifications,	applicable codes, specifications,	
standard	with requirements in this Part (Part II)	
(2) Manufacturing Documentation —	(b) manufacturing documentations —	N45.2.2 uses the term "and/or
Assurance that the item received was	assurance that the item received was	drawings", NQA-1 states "or
fabricated, tested and inspected prior	fabricated, tested, and inspected prior	drawings".
to shipment in accordance with	to shipment in accordance with appli-	Similar, Same Intent.
applicable code, specification,	cable code, specification, purchase	
(3) Protection Covers and Seals	(c) protoctive covers and scale	OK
Visual inspection to assure that covers	visual inspection to assure that covers	OR .
and seals meet their intended function.	and seals meet their intended function;	
(4) Coatings and Preservatives —	(d) coatings and preservatives	ОК
Verification that coatings and	verification that coatings and	
preservatives are applied in	preservatives are applied in	
purchase orders or manufacturer's	purchase orders or manufacturer's	
instructions.	instructions;	
(5) Inert Gas Blanket — Verification	(e) inert gas blanket — verification that	ОК
that the inert gas blanket pressure is	the inert gas blanket pressure is within	
within the acceptable limits.	the acceptable limits;	
(o) Desiccant — Verification that the	(1) desiccant — verification that the	UK
through the use of humidity indicators	indicated, through the use of humidity	
Desiccants shall be regenerated or	indicators. Desiccants shall be	
replaced as necessary in accordance	regenerated or replaced as necessary	

ANSI N45.2.2-1972	NQA-1 (1994) Subpart 2.2	Comments
	(except where noted)	(NOTE: OK signifies identical or
with an acial instructions	in appardance with appaid in	nearly identical wording)
with special instructions.	structions.	
(7) Physical Damage - Visual	(g) physical damage — visual	ОК
inspection to assure that parts of items	inspection to assure that parts of items	
deformed or misaligned and rotating	deformed or misaligned and that	
parts turn without binding. Accessible	rotating parts turn without binding.	
internal and external areas shall be	Accessible internal and external areas	
free of detrimental gouges, dents,	shall be free of detrimental gouges,	
(8) Cleanness — Visual inspection to	(h) cleanness — visual inspection to	OK
assure that accessible internal and	assure that accessible internal and	
external areas are within the	external areas are within the	
specification requirements for dirt, soil,	specification requirements for dirt, soil,	
stains. If inspection for cleanness was	stains. If inspection for cleanness was	
performed prior to sealing and ship-	performed prior to sealing and ship-	
ping and inspection upon receipt	ping, and inspection upon receipt	
indicates that there has been no	indicates that there has been no	
then inspection for internal cleanness	then inspection for internal cleanness	
is optional.	is optional.	
Unless the completed item was	Unless the completed item was	N45.2 adds the words "or examined"
inspected or examined at the source, it	inspected at the source, it shall be	OK
point of receiving to verify that the	verify that the following characteristics	
following characteristics conform to the	conform to the specified requirements.	
specified requirements.		
These inspections or examinations	These inspections shall include such	OK
(1) Physical Properties —	(a) physical properties — assurance	ОК
Assurance that physical properties	that physical properties conform to the	
conform to the specified requirements	specified requirements and that	
and that chemical and physical test-	chemical and physical test reports, if	
ments.		
(2) <i>Dimensions</i> — Random	(b) dimensions — random visual	ОК
visual inspection to assure that	inspection to as sure that important	
drawings and specifications. Examples	specifications, i.e., baseplate mounting	
are: base plate mounting holes, overall	holes, overall external size, and	
external size, configuration and	configuration and orientation of parts;	
(3) Weld Preparations	(c) wold propagations random	OK
Random verification that weld	verification that weld preparations are	SK .
preparations are in accordance with	in accordance with applicable	
applicable drawings and	drawings and specifications;	
(4) Workmanshin — Visual	(d) workmanship — visual inspection	OK
inspection of accessible areas to	of accessible areas to assure that the	SIX .
assure that the workmanship is	workmanship is satisfactory to meet	
satisfactory to meet the intent of the	the intent of the requirements;	
(5) Lubricants and Oils —	(e) lubricants and oils — verification of	ОК
Verification of presence of proper	presence of proper lubricants and oils,	
lubricants and oils, if required by either	if required, by either specification,	
specification, purchase order, or	purchase order, or manufacturer's in-	
(6) Electrical Insulation —	(f) electrical insulation — performance	ОК
Performance of insulation resistance	of insulation resistance tests for	
tests for motors, generators, control	motors, generators, and control and	
and power cable, to ensure	power cable to ensure conformance	
5.2.3 Special Inspection —	5.2.3 Special Inspection. Where	ОК
Where receiving inspection in addition	receiving inspection in addition to that	
to that described above is required,	described above is required, the	

Image: Complete with documentation instructions, shall be attached to the item or container (see Section 3 of this standard); this is in addition to the copy sent through normal channels. The special inspection shall be performed and the results of the inspection shall be documented.special inspection shall be tem or container sand ichannels. The special inspection of Received ItemsOK5.3 Disposition of Received Items5.3 Disposition of Received ItemsOK5.3.1 Acceptable — Containers and items inspected or examined and found in conformance with specified requirements shall be identified as ac- ceptable in accordance with the status indicating system employed (see Subsection 5.4 of this standard) and placed in a storage area for acceptable items or moved to the final location for installation or use.S.3.2 Nonconforming – ItemsS.3.2 Nonconforming. Items whichN45.2.2 adds the words
the "Special Inspection" procedure, complete with documentation instructions, shall be attached to the item or container (see Section 3 of this standard); this is in addition to the copy sent through normal channels. The special inspection shall be performed and the results of the inspection shall be documented.special inspection shall be channels. The special inspection shall be performed and the results of the inspection shall be documented.OK5.3 Disposition of Received Items5.3 Disposition of Received ItemsOK5.3.1 Acceptable — Containers and items inspected or examined and found in conformance with specified requirements shall be identified as ac- coeptable in accordance with the status indicating system employed (see Subsection 5.4 of this standard) and placed in a storage area for acceptable items or moved to the final location for installation or use.S.3.2 Nonconforming – ItemsS.3.2 Nonconforming. Items whichN45.2.2 adds the words
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Instructions, shall be attached to the item or container (see Section 3 of this standard); this is in addition to the copy sent through normal channels. The special inspection shall be performed and the results of the inspection shall be documented.Instructions, shall be attached to the item or container. This is in addition to the copy sent through normal channels. The special inspection shall be performed, and the results of the inspection shall be documented.OK5.3 Disposition of Received Items5.3 Disposition of Received ItemsOK5.3.1 Acceptable — Containers and items inspected or examined and found in conformance with specified requirements shall be identified as ac- ceptable in accordance with the status indicating system employed (see Subsection 5.4 of this standard) and placed in a storage area for acceptable letms or moved to the final location for installation or use.S.3.2 Nonconforming — ItemsS.3.2 Nonconforming. Items whichN45.2.2 adds the words
Incluine (See Occurrent of or unality (See Occurrent of the status indicating system employed (See Subsection 5.4 of this standard) and placed in a storage area for acceptable items or moved to the final location for installation or use.Similar (See Occurrent of or unality (See Occurrent of the ocpy sent through normal channels). The special inspection shall be documented.5.3.2Nonconforming — Items5.3.2Nonconforming. Items whichN45.2.2 adds the words
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performed and the results of the inspection shall be documented.inspection shall be documented.5.3 Disposition of Received Items5.3 Disposition of Received ItemsOK5.3.1 Acceptable — Containers and items inspected or examined and found in conformance with specified requirements shall be identified as ac- ceptable in accordance with the status indicating system employed (see Subsection 5.4 of this standard) and placed in a storage area for acceptable items or moved to the final location for installation or use.OK5.3.2 Nonconforming — Items5.3.1 Acceptable containers and items inspected and found in conformance with specified requirements shall be identified as acc- the status indicating system employed (see Subsection 5.4 of this standard) and placed in a storage area for acceptable items or moved to the final location for installation or use.N45.2.2 adds the words5.3.2 Nonconforming — Items5.3.2 Nonconforming. Items whichN45.2.2 adds the words
Inspection stail be documented.5.3 Disposition of Received ItemsOK5.3 Disposition of Received Items5.3 Disposition of Received ItemsOK5.3.1 Acceptable — Containers and items inspected or examined and found in conformance with specified requirements shall be identified as ac- ceptable in accordance with the status indicating system employed (see Subsection 5.4 of this standard) and placed in a storage area for acceptable items or moved to the final location for installation or use.5.3.2 Nonconforming — ItemsN45.2.2 adds the words "or examined" and "in accordance with the status indicating system employed (see5.3.2 Nonconforming — Items5.3.2 Nonconforming. Items whichN45.2.2 adds the words
5.3.1AcceptableContainers and items inspected or examined and found in conformance with specified requirements shall be identified as ac- ceptable in accordance with the status indicating system employed (see Subsection 5.4 of this standard) and placed in a storage area for acceptable items or moved to the final location for installation or use.5.3.1Acceptable in control terms of the status area for acceptable items or moved to the final location for installation or use.N45.2.2 adds the words "or examined" and "in accordance with the status indicating system employed".5.3.2Nonconforming — Items5.3.2Nonconforming. Items whichN45.2.2 adds the words
items inspected or examined and found in conformance with specified requirements shall be identified as ac- ceptable in accordance with the status indicating system employed (see Subsection 5.4 of this standard) and placed in a storage area for acceptable items or moved to the final location for installation or use.items inspected and found in conformance with specified require- ments shall be identified as acceptable (see para. 5.4) and placed in a storage area for acceptable items, or moved to the final location for installation or use.examined" and "in accordance with the status indicating system employed".5.3.2Nonconforming — Items5.3.2Nonconforming. Items whichN45.2.2 adds the words
found in conformance with specified requirements shall be identified as ac- ceptable in accordance with the status indicating system employed (see Subsection 5.4 of this standard) and placed in a storage area for acceptable items or moved to the final location for installation or use.conformance with specified require- ments shall be identified as acceptable (see para. 5.4) and placed in a storage area for acceptable items, or moved to the final location for installation or use.the status indicating system employed".5.3.2Nonconforming — Items5.3.2Nonconforming. Items whichN45.2.2 adds the words
requirements shall be identified as acceptable in accordance with the status indicating system employed (see Subsection 5.4 of this standard) and placed in a storage area for acceptable items, or moved to the final location for installation or use.       employed (see Subsection 5.4 of this standard) and placed in a storage area for acceptable items, or moved to the final location for installation or use.       Similar, Same Intent.         5.3.2       Nonconforming — Items       5.3.2       Nonconforming. Items which       N45.2.2 adds the words
indicating system employed (see       area for acceptable items, or moved to         Subsection 5.4 of this standard) and       placed in a storage area for         acceptable items or moved to the final       location for installation or use.         5.3.2       Nonconforming — Items
Subsection 5.4 of this standard) and placed in a storage area for acceptable items or moved to the final location for installation or use.       the final location for installation or use.         5.3.2       Nonconforming — Items       5.3.2       Nonconforming. Items which       N45.2.2 adds the words
placed in a storage area for       acceptable items or moved to the final location for installation or use.         5.3.2       Nonconforming — Items         5.3.2       Nonconforming — Items
acceptable items or moved to the final location for installation or use.       5.3.2 Nonconforming — Items       5.3.2 Nonconforming. Items which       N45.2.2 adds the words
5.3.2       Nonconforming — Items       5.3.2       Nonconforming. Items which       N45.2.2 adds the words
which do not conform to the specified do not conform to the specified "identifiedin accordance with the
requirements shall be identified as requirements shall be controlled in system employed" whereas NQA-1
nonconforming in accordance with the accordance with Part I. uses the word "controlled in
system employed (see Subsection 5.4 accordance with Part 1."
the item shall be placed in a 3 Segregation:
segregated storage area or removed (a) Nonconforming items shall be
from the project site to prevent segregated, when practical, by
inadvertent installation or use. placing tem in a clearly identified
and designated hold area until
(b) When segregation is impractical
or impossible due to physical
conditions such as size, weight,
or access limitations, other
precautions shall be employed to
nonconforming item.
5.3.3 Conditional Release — If the 5.3.3 Conditional Release. If the OK
item to be classified "unaccentable"
can be corrected after installation, the corrected after installation, the item
item may be released for installation may be released for installation on a
on a conditional release basis. A conditional release basis. A statement
statement documenting the authority documenting the authority and
ditional release of the item for
installation shall be prepared, and installation shall be prepared and
made part of the documentation. made part of the documentation.
5.4 Status Indicating System 5.4 Status Indicating System N45.2.2 states that the system "shall be employed" NOA 1 does not use
A system or method for identifying the A status indicating system is a system these words
status of items (e.g. an inventory or method for identifying the status of
system, tagging, labeling, color code) items (e.g., an inventory system,
shall be employed that clearly tagging, labeling, color code) that
Indicates whether items are clearly indicates whether items are acceptable or unacceptable for
stallation.
A controlled physical separation is an A controlled physical separation is an OK
acceptable equivalent method. acceptable equivalent method.
I he system shall indicate the date the The system shall provide for indication N45.2.2 states that "The use of the
unaccentable installation status. The acceptable or unaccentable installation. Quality Control program " NOA-1
use of the system shall be regulated status and the conditional release of does not state this.

ANSI N45.2.2-1972	NQA-1 (1994) Subpart 2.2	Comments
	(except where noted)	(NOTE: OK signifies identical or
		nearly identical wording)
by the Quality Control program. The system shall provide for the conditional	the items for installation pending the	
release of items for installation	formance.	
pending subsequent correction of the		
nonconformance.		01
made from material which will not	made from material that will not	UK .
deteriorate during storage;	deteriorate during storage.	
tags shall be securely affixed to the	Tags shall be securely affixed to the	ОК
Items and displayed in an area that is	Items and displayed in an area that is	
The stock used shall not be	The stock used shall not be	ОК
deleterious to the item.	deleterious to the item.	
5.5 Correction of	Supplement 15S-1 "Supplementary	NQA-1 does not include words "If this
Noncomormances	Nonconforming Items"	scrapped or otherwise discarded".
Items designated nonconforming or	<b>3</b>	
unacceptable for installation or use	Paragraph 4.4	
procedures to meet specified require-	Technical justification for the	
ments, or accepted "As is". If this is not	acceptability of a nonconforming item,	
possible, the item shall be scrapped or	dispositioned repair, or use-as-is shall	
otherwise discarded.	be documented. Supplement 15S-1 "Supplementary	N45.2.2 provides greater detail as to
have been corrected shall be	Requirements for the Control of	actions to take when it is determined
reinspected. The area of inspection	Nonconforming Items"	that the corrected item is satisfactory.
may be confined to the area of the	Paragraph 4 5	
determined that the corrected item is		
satisfactory, the status of the item as	Repaired or reworked items shall be	
denoted by the system shall be	reexamined in accordance with	
entry shall be made in the	original acceptance criteria unless the	
documentation after acceptance is	nonconforming item disposition has	
determined.	established alternate acceptance	
5.6 Marking	BR 8 "Identification and Control of	Slightly different words, but same
5	Items"	intent.
Required marking shall be verified to	Identification shall be maintained on	
receiving, storage, and installation.	items or in documents traceable to the	
Items not properly identified at	items, or in a manner which assures	
receiving may be marked using the	that identification is established and	
A 3.9 of this standard)	maintained.	
Changing, correcting or any other	5.5 Marking	N45.2.2 uses the words "whose serial
marking on Code Stamp name plate is		number is applied" when referring to
manufacturer whose serial number is	marking on Code stamp nameplate	NQA-1 states "manufacturer of the
applied.	shall be prohibited, unless authorized	item."
	by the manufacturer of the item.	
5.7 Documentation	5.6 Documentation	OK
A written record of the receiving	A written record of the receiving	
inspection, package identification,	inspection, package identification,	
tagging, corrective actions, and	tagging, corrective actions, and jus-	
shall be prepared.	shall be prepared.	
These records shall be made a part of	Basic Requirement 17 "Quality	ОК
the permanent records provided for in	Assurance Records" and QATR B.15	
	records that need to be maintained.	
6. STORAGE	6 STORAGE	ОК
	6.4 Conorri	
6.1 General	o.i General	

ANSI N45.2.2-1972	NQA-1 (1994) Subpart 2.2	Comments
	(except where noted)	(NOTE: OK signifies identical or nearly identical wording)
<b>6.1.1 Scope.</b> This section contains requirements that are to be fulfilled by the organization responsible for performing the storage of items.	<b>6.1.1 Scope.</b> This Section contains requirements that shall be fulfilled by the organization responsible for performing the storage of items.	
Levels and methods of storage, necessary are defined to minimize the possibility of damage or lowering of quality due to corrosion, contamination, deterioration or physical damage from the time an item is stored upon receipt until the time the item is removed from storage and placed in its final location.	Levels and methods of storage are defined to minimize the possibility of damage or lowering of quality due to corrosion, contamination, deterioration, or physical damage from the time an item is stored upon receipt until the time the item is removed from storage and placed in its final location.	NQA-1 adds some details on what lowering of quality could be due to. N45.2.2 specifies the time frame as "upon receipt" whereas NQA-1 uses the term "from the time an item is stored."
<b>6.1.2 Levels of Storage.</b> Environmental conditions for items classified as Levels A, B, C, and D described in Subsection 2.7 of this Standard shall meet requirements as described in the following paragraphs:	<b>6.1.2 Levels of Storage.</b> Environmental conditions for items classified as Levels A, B, C, and D described in para. 2.2 shall meet the requirements as described in the following paragraphs.	ОК
(1) Level A items shall be stored under special conditions similar to those described for Level B items but with additional requirements such as temperature and humidity control within specified limits, a ventilation system with filters to provide an atmosphere free of dust and harmful vapors, and any other appropriate requirements.	(a) Level A items shall be stored under special conditions similar to those described for Level B items but with additional requirements such as temperature and humidity control within specified limits, a ventilation system with filters to provide an atmosphere free of dust and harmful vapors, and any other appropriate requirements.	ОК
(2) Level B items shall be stored within a fire resistant, tear resistant, weathertight, and well ventilated building or equivalent enclosure. Precautions shall be taken against vandalism.	(b) Level B items shall be stored within a fire-resistant, tear-resistant, weather- tight, and well-ventilatedbuilding or equivalent enclosure. Precautions shall be taken against vandalism.	OK
This area shall be situated and constructed so that it will not be subject to flooding; the floor shall be paved or equal, and well drained. Items shall be placed on pallets or shoring to permit air circulation.	This area shall be situated and constructed so that it will not be subject to flooding; the floor shall be paved or equal, and well drained. Items shall be placed on pallets or shoring to permit air circulation.	ОК
The area shall be provided with uniform heating and temperature control or its equivalent to prevent condensation and corrosion.	The area shall be provided with uniform heating and temperature control or its equivalent to prevent condensation and corrosion.	ОК
Minimum temperature shall be 40 F and maximum temperature shall be 140 F or less if so stipulated by a manufacturer.	The minimum temperature shall be $40^{\circ}$ F ( $5^{\circ}$ C), and the maximum temperature shall be $140^{\circ}$ F ( $60^{\circ}$ C) or less if so stipulated by the manufacturer.	NQA-1 adds the Celsius equivalents.
(3) Level C items shall be stored indoors or equivalent with all provisions and requirements as set forth in Level B items except that heat and temperature control is not required	(c) Level C items shall be stored indoors or in an equivalent environment with all provisions and re- quirements as set forth for Level B items, except that heat and temperature control is not required	ОК
(4) Level D items may be stored outdoors in an area marked and designated for storage, which is well drained, preferably gravel covered or paved and reasonably removed from the actual construction area and traffic so that possibility of damage from	(d) Level D items may be stored outdoors in an area marked and designated for storage that is well drained, preferably gravel covered or paved, and reasonably removed from the actual construction area and traffic so that the possibility of damage from	ОК

ANSI N45.2.2-1972	NQA-1 (1994) Subpart 2.2	Comments
	(except where noted)	(NOTE: OK signifies identical or nearly identical wording)
construction equipment is minimized.	construction equipment is minimized.	
Items shall be stored on cribbing or equivalent to allow for air circulation	Items shall be stored on cribbing or equivalent to allow for air circulation	
and to avoid trapping water.	and to avoid trapping water.	
6.2 Storage Areas	6.2 Storage Areas	N45.2.2 uses words "these
Periodic inspections shall be	Periodic inspections shall be	"applicable requirements"
performed to assure that storage	performed to assure that storage	
areas are being maintained in ac-	areas are being maintained in	
cordance with these requirements.	requirements.	
The housekeeping requirements shall be in accordance with N45.2.3.	NQA-1 Subpart 2.3 replaced N45.2.3.	QATR Section B.7 commits to Subpart 2.3.
6.2.1 Access to Storage Areas.	6.2.1 Access to Storage Areas.	N45.2.2 states that access to storage
controlled and limited only to	B. and C items shall be controlled and	NQA-1 allows that "Access to storage
personnel designated by the	limited only to personnel designated by	areas involving Level D items shall
responsible organization.	the responsible organization. Access	be controlled as designated by the
	items shall be controlled as designated	responsible organization.
	by the responsible organization.	
6.2.2 Cleanliness and Housekeeping Practices	6.2.2 Cleanness and Housekeeping Practices	ОК
Cleanliness and good housekeeping	Cleanliness and good housekeeping	
practices shall be enforced at all times	practices shall be enforced at all times	
In the storage areas. The storage areas shall be cleaned as required to	in the storage areas. The storage areas shall be cleaned as required to	
avoid the accumulation of trash,	avoid the accumulation of trash,	
discarded packaging materials and	discarded packaging materials, and	
6.2.3 Fire Protection. Fire protection	6.2.3 Fire Protection. Fire	ОК
commensurate with the type of storage	protection commensurate with the type	
area and the material involved shall be provided and maintained	of storage area and the material in-	
P	maintained.	
6.2.4 Storage of Food and	6.2.4 Storage of Food and	ОК
of food, drinks, and salt tablet	of food, drinks, and salt tablet dispens-	
dispensers in any storage area shall	ers in controlled storage areas shall	
not be permitted.	not be permitted.	OK
Entrance of Animals. Measures shall	Entrance of Animals.	
be taken to prevent the entrance of	Measures shall be taken to prevent the	
storage areas or equipment to	entrance of rodents and other animals into indoor storage areas or	
minimize possible contamination and	equipment to minimize possible	
mechanical damage to stored material.	contamination and mechanical	
6.3 Storage Methods	6.3 Storage Methods	ок
Storage methods and procedures shall	Storage methods and procedures shall	
described in the following paragraphs.	described in the following paragraphs.	
		01/
6.3.1 Ready Access to Stored Items All items shall be stored in such	6.3.1 Ready Access to Stored	OK
a manner as to permit ready access	a manner as to permit ready access	
for inspection or maintenance without	for inspection or maintenance without	
damage.	damage.	
6.3.2 Arrangement of Items. Items	6.3.2 Arrangement of Items. Items	ОК
stacked for storage shall be arranged	stacked for storage shall be arranged	
bearing the full weight without	bearing the full weight without	
distortion of the item.	distortion of the item.	

ANSI N43.2.2-1972	NQA-1 (1994) Subpart 2.2	Comments
	(except where noted)	(NOTE: OK signifies identical or nearly identical wording)
6.3.3Storage of Hazardous Material.	6.3.3 Storage of Hazardous Material Hazardous chemicals	ОК
solvents, and other materials of a like	paints, solvents, and other materials of	
nature shall be stored in well ventilated	a like nature shall be stored in well-	
to important nuclear plant items.	proximity to important nuclear plant	
<b>6.2.4</b> Identification All items and	items.	OK
their containers shall be plainly	containers shall be plainly marked so	OK
marked so that they are easily	that they are easily identified without	
or unnecessary opening of crates and	opening of crates and boxes.	
boxes.		
<b>6.3.5 Coverings</b> . Weatherproof covering, when used for outdoor	6.3.5 Coverings. Weatherproof coverings, when used for outdoor	ОК
storage, shall be flame-resistant type	storage, shall be the flame-resistant	
of sheeting or tarpaulins. They shall be placed so as to provide drainage and	type of sheeting or tarpaulins. They shall be placed so as to provide	
to insure air circulation to minimize	drainage and to ensure air circulation	
condensation. They shall be tied down to prevent moisture from entering laps	to minimize condensation. They shall be tied down to prevent moisture from	
and to protect the coverings from wind	entering laps and to protect the	
damage.	coverings from wind damage.	These words are not in N45.2.2
	stored outdoors shall be positioned or	
	covered to avoid trapping moisture in	
	valves shall be positioned such that	
	water does not collect under the	
	packing area.	
6.4 Control of Items in Storage	6.4 Control of Items in Storage	ОК
Control of items in storage is described in the following paragraphs.	Control of items in storage is described in the following paragraphs.	
6.4.1 Inspections and Examinations Inspections and	<b>6.4.1</b> Inspections. Inspections shall be performed and documented on a	N45.2.2 contained the words "and examinations" Similar same intent
	periodic basis to assure that the	
examinations shall be performed and	periodic basis to assure that the	
examinations shall be performed and documented on a periodic basis to assure that the integrity of the item	integrity of the item and its container, as provided for under Section 3 is	
examinations shall be performed and documented on a periodic basis to assure that the integrity of the item and its container as provided for under	integrity of the item and its container, as provided for under Section 3, is being maintained.	
examinations shall be performed and documented on a periodic basis to assure that the integrity of the item and its container as provided for under Section 3 of this standard is being maintained	integrity of the item and its container, as provided for under Section 3, is being maintained.	
examinations shall be performed and documented on a periodic basis to assure that the integrity of the item and its container as provided for under Section 3 of this standard is being maintained. Deficiencies noted shall be corrected and documented	integrity of the item and its container, as provided for under Section 3, is being maintained.	ОК
examinations shall be performed and documented on a periodic basis to assure that the integrity of the item and its container as provided for under Section 3 of this standard is being maintained. Deficiencies noted shall be corrected and documented. The characteristics verified during this	Deficiencies noted shall be corrected and documented.	ОК
examinations shall be performed and documented on a periodic basis to assure that the integrity of the item and its container as provided for under Section 3 of this standard is being maintained. Deficiencies noted shall be corrected and documented. The characteristics verified during this inspection or examination shall include such items as:	Deficiencies noted shall be corrected and documented. The characteristics verified during this inspection shall include such items as:	ОК
examinations shall be performed and documented on a periodic basis to assure that the integrity of the item and its container as provided for under Section 3 of this standard is being maintained. Deficiencies noted shall be corrected and documented. The characteristics verified during this inspection or examination shall include such items as: (1) Identification and marking (see	Deficiencies noted shall be corrected and documented. The characteristics verified during this inspection shall include such items as: (a) identification and marking (see	ок ок ок
examinations shall be performed and documented on a periodic basis to assure that the integrity of the item and its container as provided for under Section 3 of this standard is being maintained. Deficiencies noted shall be corrected and documented. The characteristics verified during this inspection or examination shall include such items as: (1) Identification and marking (see Subsection 3.9 of this Standard). (2) Protective covers and .seals	Deficiencies noted shall be corrected and documented. The characteristics verified during this inspection shall include such items as: (a) identification and marking (see para. 3.9) (a) protective covers and seals (see	ок ок ок
<ul> <li>examinations shall be performed and documented on a periodic basis to assure that the integrity of the item and its container as provided for under Section 3 of this standard is being maintained.</li> <li>Deficiencies noted shall be corrected and documented.</li> <li>The characteristics verified during this inspection or examination shall include such items as: <ol> <li>Identification and marking (see Subsection 3.9 of this Standard).</li> <li>Protective covers and .seals (see Subsection 3.9 of this standard).</li> </ol> </li> </ul>	Deficiencies noted shall be corrected and documented. The characteristics verified during this inspection shall include such items as: (a) identification and marking (see para. 3.9) (a) protective covers and seals (see para. 3.6)	ок ок ок
<ul> <li>examinations shall be performed and documented on a periodic basis to assure that the integrity of the item and its container as provided for under Section 3 of this standard is being maintained.</li> <li>Deficiencies noted shall be corrected and documented.</li> <li>The characteristics verified during this inspection or examination shall include such items as: <ul> <li>(1) Identification and marking (see Subsection 3.9 of this Standard).</li> <li>(2) Protective covers and .seals (see Subsection 3.9 of this standard).</li> <li>(3) Coatings and preservatives (see paragraph 3.4.1).</li> </ul> </li> </ul>	Deficiencies noted shall be corrected and documented. The characteristics verified during this inspection shall include such items as: (a) identification and marking (see para. 3.9) (a) protective covers and seals (see para. 3.6) (b) coatings and preservatives (see para. 3.4.1)	ок ок ок
<ul> <li>examinations shall be performed and documented on a periodic basis to assure that the integrity of the item and its container as provided for under Section 3 of this standard is being maintained.</li> <li>Deficiencies noted shall be corrected and documented.</li> <li>The characteristics verified during this inspection or examination shall include such items as:</li> <li>(1) Identification and marking (see Subsection 3.9 of this Standard).</li> <li>(2) Protective covers and .seals (see Subsection 3.9 of this standard).</li> <li>(3) Coatings and preservatives (see paragraph 3.4.1).</li> <li>(4) Desiccants and inert gas</li> </ul>	Deficiencies noted shall be corrected and documented. The characteristics verified during this inspection shall include such items as: (a) identification and marking (see para. 3.9) (b) coatings and preservatives (see para. 3.4.1) (c) desiccants and inert gas blankets	ок ок ОК
<ul> <li>examinations shall be performed and documented on a periodic basis to assure that the integrity of the item and its container as provided for under Section 3 of this standard is being maintained.</li> <li>Deficiencies noted shall be corrected and documented.</li> <li>The characteristics verified during this inspection or examination shall include such items as: <ol> <li>Identification and marking (see Subsection 3.9 of this Standard).</li> <li>Protective covers and .seals (see Subsection 3.9 of this Standard).</li> <li>Coatings and preservatives (see paragraph 3.4.1).</li> <li>Desiccants and inert gas blankets (see paragraph 3.6.3 and 3.4.2).</li> </ol> </li> </ul>	<ul> <li>integrity of the item and its container, as provided for under Section 3, is being maintained.</li> <li>Deficiencies noted shall be corrected and documented.</li> <li>The characteristics verified during this inspection shall include such items as: <ul> <li>(a) identification and marking (see para. 3.9)</li> <li>(a) protective covers and seals (see para. 3.6)</li> <li>(b) coatings and preservatives (see para. 3.4.1)</li> <li>(c) desiccants and inert gas blankets (see paras. and 3.4.2)</li> <li>(d) physical damage</li> </ul> </li> </ul>	ок ок ок
<ul> <li>examinations shall be performed and documented on a periodic basis to assure that the integrity of the item and its container as provided for under Section 3 of this standard is being maintained.</li> <li>Deficiencies noted shall be corrected and documented.</li> <li>The characteristics verified during this inspection or examination shall include such items as: <ul> <li>(1) Identification and marking (see Subsection 3.9 of this Standard).</li> <li>(2) Protective covers and .seals (see Subsection 3.9 of this Standard).</li> <li>(3) Coatings and preservatives (see paragraph 3.4.1).</li> <li>(4) Desiccants and inert gas blankets (see paragraph 3.6.3 and 3.4.2).</li> <li>(5) Physical damage.</li> </ul> </li> </ul>	<ul> <li>Deficiencies noted shall be corrected and documented.</li> <li>Deficiencies noted shall be corrected and documented.</li> <li>The characteristics verified during this inspection shall include such items as:</li> <li>(a) identification and marking (see para. 3.9)</li> <li>(a) protective covers and seals (see para. 3.6)</li> <li>(b) coatings and preservatives (see para. 3.4.1)</li> <li>(c) desiccants and inert gas blankets (see paras. and 3.4.2)</li> <li>(d) physical damage</li> <li>(e) cleanness</li> </ul>	ОК ОК ОК
<ul> <li>examinations shall be performed and documented on a periodic basis to assure that the integrity of the item and its container as provided for under Section 3 of this standard is being maintained.</li> <li>Deficiencies noted shall be corrected and documented.</li> <li>The characteristics verified during this inspection or examination shall include such items as: <ol> <li>Identification and marking (see Subsection 3.9 of this Standard).</li> <li>Protective covers and .seals (see Subsection 3.9 of this standard).</li> <li>Coatings and preservatives (see paragraph 3.4.1).</li> <li>Desiccants and inert gas blankets (see paragraph 3.6.3 and 3.4.2).</li> <li>Physical damage.</li> <li>Cleanness.</li> </ol> </li> </ul>	<ul> <li>Deficiencies noted shall be corrected and documented.</li> <li>Deficiencies noted shall be corrected and documented.</li> <li>The characteristics verified during this inspection shall include such items as:</li> <li>(a) identification and marking (see para. 3.9)</li> <li>(b) coatings and preservatives (see para. 3.4.1)</li> <li>(c) desiccants and inert gas blankets (see para. 3.4.2)</li> <li>(d) physical damage</li> <li>(e) cleanness</li> </ul>	OK OK OK
<ul> <li>examinations shall be performed and documented on a periodic basis to assure that the integrity of the item and its container as provided for under Section 3 of this standard is being maintained.</li> <li>Deficiencies noted shall be corrected and documented.</li> <li>The characteristics verified during this inspection or examination shall include such items as: <ol> <li>Identification and marking (see Subsection 3.9 of this Standard).</li> <li>Protective covers and .seals (see Subsection 3.9 of this Standard).</li> <li>Coatings and preservatives (see paragraph 3.4.1).</li> <li>Desiccants and inert gas blankets (see paragraph 3.6.3 and 3.4.2).</li> <li>Cleanness.</li> </ol> </li> <li>6.4.2 Care of Items. Care of items in storage shall be exercised in</li> </ul>	<ul> <li>Deficiencies noted shall be corrected and documented.</li> <li>Deficiencies noted shall be corrected and documented.</li> <li>The characteristics verified during this inspection shall include such items as:</li> <li>(a) identification and marking (see para. 3.9)</li> <li>(a) protective covers and seals (see para. 3.6)</li> <li>(b) coatings and preservatives (see para. 3.4.1)</li> <li>(c) desiccants and inert gas blankets (see paras. and 3.4.2)</li> <li>(d) physical damage</li> <li>(e) cleanness</li> </ul>	OK OK OK NQA-1 adds the parenthesis "(includes storage in place)".
<ul> <li>examinations shall be performed and documented on a periodic basis to assure that the integrity of the item and its container as provided for under Section 3 of this standard is being maintained.</li> <li>Deficiencies noted shall be corrected and documented.</li> <li>The characteristics verified during this inspection or examination shall include such items as: <ol> <li>Identification and marking (see Subsection 3.9 of this Standard).</li> <li>Protective covers and .seals (see Subsection 3.9 of this Standard).</li> <li>Coatings and preservatives (see paragraph 3.4.1).</li> <li>Desiccants and inert gas blankets (see paragraph 3.6.3 and 3.4.2).</li> <li>Physical damage.</li> <li>Cleanness.</li> </ol> </li> <li>6.4.2 Care of Items. Care of items in storage shall be exercised in accordance with the following. Requirements for proper maintenance</li> </ul>	<ul> <li>Integrity of the item and its container, as provided for under Section 3, is being maintained.</li> <li>Deficiencies noted shall be corrected and documented.</li> <li>The characteristics verified during this inspection shall include such items as:</li> <li>(a) identification and marking (see para. 3.9)</li> <li>(a) protective covers and seals (see para. 3.6)</li> <li>(b) coatings and preservatives (see para. 3.4.1)</li> <li>(c) desiccants and inert gas blankets (see paras. and 3.4.2)</li> <li>(d) physical damage</li> <li>(e) cleanness</li> </ul> 6.4.2 Care of Items. Requirements for proper maintenance during storage shall be documented. Care of items in storage (includes storage in place)	OK OK OK NQA-1 adds the parenthesis "(includes storage in place)".
<ul> <li>examinations shall be performed and documented on a periodic basis to assure that the integrity of the item and its container as provided for under Section 3 of this standard is being maintained.</li> <li>Deficiencies noted shall be corrected and documented.</li> <li>The characteristics verified during this inspection or examination shall include such items as: <ol> <li>Identification and marking (see Subsection 3.9 of this Standard).</li> <li>Protective covers and .seals (see Subsection 3.9 of this Standard).</li> <li>Protective covers and .seals (see Subsection 3.9 of this standard).</li> <li>Coatings and preservatives (see paragraph 3.4.1).</li> <li>Desiccants and inert gas blankets (see paragraph 3.6.3 and 3.4.2).</li> <li>Physical damage.</li> <li>Cleanness.</li> </ol> </li> <li>6.4.2 Care of Items. Care of items in storage shall be exercised in accordance with the following. Requirements for proper maintenance during storage shall be documented</li> </ul>	<ul> <li>integrity of the item and its container, as provided for under Section 3, is being maintained.</li> <li>Deficiencies noted shall be corrected and documented.</li> <li>The characteristics verified during this inspection shall include such items as:</li> <li>(a) identification and marking (see para. 3.9)</li> <li>(a) protective covers and seals (see para. 3.6)</li> <li>(b) coatings and preservatives (see para. 3.4.1)</li> <li>(c) desiccants and inert gas blankets (see paras. and 3.4.2)</li> <li>(d) physical damage</li> <li>(e) cleanness</li> </ul> 6.4.2 Care of Items. Requirements for proper maintenance during storage shall be documented. Care of items in storage (includes storage in place) shall be exercised in accordance with	OK OK OK NQA-1 adds the parenthesis "(includes storage in place)".

ANSI N45.2.2-1972	NQA-1 (1994) Subpart 2.2	Comments
	(except where noted)	(NOTE: OK signifies identical or
		nearly identical wording)
(1) Items in storage shall have all	(a) Items in storage shall have all	ОК
intact. Methods used to seal openings	intact. Methods used to seal openings	
shall be in accordance with Section 3	shall be in accordance with Section 3.	
of this standard. Covers removed for	Covers removed for internal access	
reason shall be immediately replaced	resealed after completion of the	
and resealed after completion of the	purpose for removal.	
purpose for removal.		
(2) Temporary preservatives shall	(b) Lemporary preservatives shall be	OK
reapplication of preservatives be	reapplication of preservatives be	
required at the site, only those	required at the site, only those	
previously approved shall be used.	previously approved shall be used.	01/
(3) Items pressurized with inert gas	(c) Items pressurized with inert gas shall be monitored at such a frequency	ŬK
as to insure that the gas pressure is	as to ensure that the gas	
maintained within specified limits	pressure is maintained within specified	
during storage. Desiccant humidity	limits during storage. Desiccant	
desiccants shall be changed or re-	monitored and desiccants shall be	
processed when specified.	changed or reprocessed when	
	specified.	
(4) Instrumentation racks shall be	(d) Instrumentation racks shall be	OK
manufacturer.	manufacturer.	
(5) Space heaters enclosed in	(e) Space heaters enclosed in	ОК
electrical items shall be energized.	electrical items shall be energized.	
(6) Rotating electrical equipment	(f) Rotating electrical equipment shall	ОК
tests on a scheduled basis.	a scheduled basis.	
(7) The shafts of rotating	(g) The shafts of rotating equipment	ОК
equipment shall be rotated on a	shall be rotated on a periodic basis.	
periodic basis. The degree of turn shall be established so that the parts	I he degree of turn shall be established so that the parts receive a	
receive a coating of lubrication where	coating of lubrication, where	
applicable, and so that the shaft does	applicable, and so that the shaft does	
not come to rest in a previous position.	not come to rest in a previous position	
examples.)	examples).	
(8) Other maintenance	(h) Other maintenance requirements	ОК
requirements specified by the	specified by the manufacturer's	
manufacturer's instruction for the item	Instructions for the item shall be	
6.4.3 Post Fire Evaluation. In the	6.4.3 Post-Fire Evaluation. In the	NQA-1 deletes the word "or" in the
event a fire should occur in the storage	event a fire should occur in the storage	following from N45.2.2 "In the event a
area or at any time, each item known	area at any time, each item known to	fire should occur in the storage area
to have been heated to an ambient temperature of over 150 F or	have been heated to an ambient temperature of over 150°F (65°C) or	or at any time" Additionally, NQA-1 adds the metric equivalent to the
subjected to smoke contamination	subjected to smoke contamination	temperature.
shall be withheld from installation or	shall be withheld from installation or	
use until it has been thoroughly	use until it has been thoroughly	
verified to be in conformance with	verified to be in conformance with	
specified requirements.	specified requirements.	
6.5 Removal of Items from Storage	6.5 Removal of Items From	ОК
	Storage	
Only items which have been inspected	Only items which have been inspected	
and are considered acceptable for	and are considered acceptable for	
Installation or use in accordance with the receiving inspection procedure	Installation of use in accordance with the receiving inspection procedure	
shall be removed from storage for	shall be removed from storage for	
installation or use. (See Section 5 of	installation or use (see Section 5).	
this standard.)	Itoms released from storage and	OK
I ILENIS I EIEASEU II UIII SIUI AYE ANU	nemo releaseu num siuraye anu	VIN

ANSI N45.2.2-1972	NQA-1 (1994) Subpart 2.2	Comments
	(except where noted)	(NOTE: OK signifies identical or
placed in their final locations within the	placed in their final locations and items	nearly identical wording)
power plant, shall be inspected and	stored in place within the power plant	
cared for in accordance with the	shall be inspected and cared for in	
requirements of Section 6 of this	accordance with the requirements of	
standard, and other applicable	standards as applicable	
6.6 Storage Records	6.6 Storage Records	ОК
<b>3</b>	<b>3</b>	
Written records shall be prepared that	Written records shall be prepared that	
include such pertinent information as	storage location inspection results	
storage location, inspection results,	protection, and personnel access.	
7. HANDLING	7 HANDLING	N45.2.2 contains details for handling
_		items, NQA-1 refers to another
7.1 General	7.1 General	Subpart. QATR Section B.7
This section contains requirements	The requirements that shall be fulfilled	requirements NMC does not commit
that are to be fulfilled by the	by the organizations responsible for	to subpart 2.15, except for 6.1.4
organizations responsible for handling	handling items are contained in	concerning "special lifts"
items. This section covers the	Subpart 2.15.	
in Subsection 2.7 of this standard		
utilizing appropriate equipment in		
accordance with methods and		
procedures specified to minimize		
the item and container		
7.2 Methods and Procedures		N45.2.2 contains details for handling
		items, NQA-1 refers to another
Detailed handling instructions and		Subpart. QATR Section B.7
items that require special handling		requirements NMC does not commit
instructions because of weight, size,		to subpart 2.15, except for 6.1.4
susceptibility to shock damage, high		concerning "special lifts".
nil ductility transition temperatures, or		
special instructions.		
Such instructions or procedures shall		N45.2.2 contains details for handling
be made available prior to the time the		items, NQA-1 refers to another
Item is to be handled and shall give		Subpart. QATR Section B./
points, methods of attachment,		requirements. NMC does not commit
maximum hoist line speeds and other		to subpart 2.15, except for 6.1.4
pertinent features to be considered as		concerning "special lifts".
Items not specifically covered above		N45 2 2 contains details for handling
shall be handled in accordance with		items, NQA-1 refers to another
sound material handling practices.		Subpart. QATR Section B.7
		establishes general handling
		to subpart 2 15, except for 6 1 4
		concerning "special lifts".
7.3 Hoisting Equipment		N45.2.2 contains details for handling
All equipment for handling items shall		Items, NQA-1 refers to another
be used and maintained in accordance		establishes general handling
with the following:		requirements. NMC does not commit
		to subpart 2.15, except for 6.1.4
7.3.1 Hoisting equipment used for		N45.2.2 contains details for handling
handling shall be certified by the		items, NQA-1 refers to another
manufacturer. The certification shall		Subpart. QATR Section B.7
indicate the various parameters for the		establishes general handling
		to subpart 2.15, except for 6.1.4
		concerning "special lifts".

ANSI N45.2.2-1972	NQA-1 (1994) Subpart 2.2	Comments
	(except where noted)	(NOTE: OK signifies identical or
		nearly identical wording)
7.3.2 Hoisting equipment shall not be loaded beyond its rated load as		N45.2.2 contains details for handling
certified by the manufacturer, except		Subpart. QATR Section B.7
for test purposes.		establishes general handling
		requirements. NMC does not commit
		to subpart 2.15, except for 6.1.4 concerning "special lifts"
7.3.3 The requirements of ANSI		N45.2.2 contains details for handling
B30.2.0, Safety Standard for		items, NQA-1 refers to another
Overhead and Gantry Cranes, ANSI		Subpart. QATR Section B.7
Locomotive and Truck Cranes ANSI		requirements NMC does not commit
B30.6, Safety Standard for Derricks,		to subpart 2.15, except for 6.1.4
and ANSI A10.5, Safety Requirements		concerning "special lifts".
for Material Hoists shall be followed.		Por A 7 3 of the OATR "NIMC
equipment may be re-rated, or		substitutes NQA-1 1994. Subpart 2.2
modified and re-rated, upon approval		for N45.2.2 in its commitment to
by the manufacturer or if the		Regulatory Guide 1.38
available the limitations assigned to		Regulatory Position C.1.b modifies a provision of N45.2.2 such that the
the equipment shall be based on the		minimum load for dynamic testing to
determinations of a qualified engineer		re-rate hoisting equipment for special
competent in this field and such		lifts becomes 110% of the rated load.
and recorded appropriately. Re-rated		Subpart 2.2 defers to the provisions
equipment shall be given a dynamic		of Subpart 2.15. For purposes of
load test over the full range of the lift		compliance to Regulatory Guide
using a test weight at least equal to		1.38, Position C.1.b, NMC commits to follow the guidance as stated
raising, lowering and traversing the		Tonow the guidance as stated
load in contrast to a static test where		
the test weight may be increased		
7.4 Inspection of Equipment and		N45 2 2 contains details for handling
Rigging		items, NQA-1 refers to another
		Subpart. QATR Section B.7
An inspection program shall be established for equipment and rigging		establishes general handling
A system shall be established that will		to subpart 2.15, except for 6.1.4
indicate acceptability of all equipment		concerning "special lifts".
and rigging after each inspection. This		
system shall specify control of		
Periodic inspections shall be		
supplemented with special visual and		
non-destructive examinations and		
items described in Subsection 7.2 of		
this standard.		
7.4.1 Rigging that is frayed, worn or		N45.2.2 contains details for handling
otherwise deteriorated shall not be		Items, NQA-1 refers to another
		establishes general handling
		requirements. NMC does not commit
		to subpart 2.15, except for 6.1.4
7.4.2 Hoisting equipment that does		N45.2.2 contains details for handling
not meet manufacturer's specifications		items, NQA-1 refers to another
shall not be used.		Subpart. QATR Section B.7
		establishes general handling
		to subpart 2.15 except for 6.1.4
		concerning "special lifts".
7.4.3 Equipment and rigging shall be		N45.2.2 contains details for handling
kept clean and free of contaminants		items, NQA-1 refers to another

ANSI N45.2.2-1972	NQA-1 (1994) Subpart 2.2	Comments
	(except where noted)	(NOTE: OK signifies identical or
	, , , , , , , , , , , , , , , , , , , ,	nearly identical wording)
that are detrimental to the material		Subpart. QATR Section B.7
being handled.		requirements. NMC does not commit
		to subpart 2.15, except for 6.1.4
		concerning "special lifts".
shackles and turnbuckles that appear		items NOA-1 refers to another
to have yielded or are distorted shall		Subpart. QATR Section B.7
not be used.		establishes general handling
		to subpart 2.15, except for 6.1.4
		concerning "special lifts".
7.5 Personnel	Supplement 13S-1 "Supplementary	Slightly different words, but same
The reasonable organization shall	Requirements for Handling, Storage,	intent.
determine that the personnel engaged		
in operating material handling	Section 3.4	
equipment are competent and have		
demonstrated satisfactory ability in	Uperators of special handling and	
operating similar inting equipment.	or trained in use of the equipment.	
8. RECORDS	8 RECORDS	N45.2.2 uses "completed
Record copies of completed	Record copies of procedures, reports	procedures", NQA-1 states
procedures; reports; personnel	personnel gualification records, test	"inspection and examination records"
qualification records; test equipment	equipment calibration records, test	whereas NQA-1 states "inspection
calibration records; test deviation or	deviation or exception records, and	records".
examination records shall be prepared	as required by this Subpart.	Similar, Same intent.
as required by this standard.		
These records shall be placed with	These records shall be retained with	N45.2.2 uses the word "placed",
other project records as required by code standard specification or project	other project records as required by	NQA-1 uses the word "retained".
procedures.	project procedures.	
9. AMERICAN NATIONAL		N/A- These words are not contained
THIS DOCUMENT		to be
When the following standards referred		
to in this document are superseded by a revision approved by the American		
National Standards Institute, the re-		
vision shall apply:		
N45.2 Quality Assurance Program		
Requirements for Nuclear Power		
Plants		
*N4523 Housekeening During the		
Construction Phase of Nuclear Power		
Plants		
^N45.2.6 Qualifications of Quality		
Construction Phase of Nuclear Power		
Plants		
*N45.2.10 Quality Assurance Terms		
MH 6.1 Pictorial Markings for		
Handling of Goods		
B30.2.0 Safety Code for Overhead		
and Gantry Cranes		

ANSI N45.2.2-1972	NQA-1 (1994) Subpart 2.2	Comments
	(except where noted)	(NOTE: OK signifies identical or nearly identical wording)
		nearly lacifical working)
B30.S Safety Code for Crawler, Loco- motive, and Truck Cranes		
B30.6 Safety Code for Derricks		
A10.5 Safety Requirements for Material Hoists		
*The standards are being approved by the American National Standards Institute and they should be available		
early in 1973.		
		<b>T</b> I (C. I
As PACKAGING The following are additional minimum requirements to be used with the rules of Section 3 of N45.2.2: "Packaging, Shipping, Receiving, Storage and Handling of Items for Nuclear Power Plants".		Ine specified requirements are now included in the body of NQA-1, Subpart 2.2.
A3.3 Cleaning	3.3 Cleaning The following general	ОК
Specific cleaning procedures are considered to be part of the manufacturing specifications. The fol- lowing general criteria shall apply:	criteria shall apply as part of the manufacturing specifications specific cleaning procedures.	
(1) The cleaning process including	(a) The cleaning process, including	ОК
cleaning compounds chosen shall in no way damage the item during cleaning or subsequent service when considering the composition, surface finish, complexity or other inherent features or other interface equipment after installation.	cleaning compounds chosen, shall in no way damage the item during cleaning or subsequent service when considering the composition, surface finish, complexity, or other inherent features, or other interface equipment after installation.	
(2) The cleaning process or processes chosen shall remove loose mill and heat scale, oil, rust, grease, paint, welding fluxes, chalk, abrasives, carbon deposits, coatings used for nondestructive testing processes and other contaminants which would render ineffective the method of preservation and packaging, or other specified requirements.	(b) The cleaning process or processes chosen shall remove loose mill and heat scale, oil, rust, grease, paint, welding fluxes, chalk, abrasives, carbon deposits, coatings used for nondestructive testing processes, and other contaminants that would render ineffective the method or preservation and packaging or other specified requirements.	ОК
(3) Item surfaces after cleaning shall be free of cleaning media, such as aluminum oxide, silica, grit, lint, chemical cleaning residue, petroleum solvent residue, etc.	(c) Item surfaces after cleaning shall be free of cleaning media, such as aluminum oxide, silica, grit, lint, chemical cleaning residue, and petroleum solvent residue. etc.	ОК
(4) After cleaning, the item shall be protected from contamination until preservation or packaging is complete.	(d) After cleaning, the item shall be protected from contamination until preservation or packaging is complete.	ОК
A3.4.1 Contact Preservatives. The following criteria shall be used when considering the type of contact preservative to be used.	3.4.1 Contact Preservatives. The following criteria shall be used when considering the type of contact preservative to be used.	ОК
(1)The contact preservative shall be compatible with the material on which it is applied.	(a) The contact preservative shall be compatible with the material on which it is applied.	ОК
(2) Contact preservatives which are nondrying shall require a neutral- grease-proof protective wrap when packaged.	(b) Contact preservatives which are nondrying shall require a neutral grease-proof protective wrap when packaged.	ОК

ANSI N45.2.2-1972	NQA-1 (1994) Subpart 2.2	Comments
	(except where noted)	(NOTE: OK signifies identical or nearly identical wording)
(3) The procedure for applying	(c) The procedure for applying contact	ОК
contact preservatives shall not require	preservatives shall not require	
necessary to disassemble the item at	necessary to disassemble the item at	
the site for complete removal. An	the site for complete removal. An	
exception would be for long term	exception would be for long-term	
storage protection to be agreed upon	storage protection to be agreed upon	
by the owner, buyer and manufacturer.	manufacturer.	
(4) The method of contact	(d) The method of contact preservative	N45.2.2 states "shall be indicated
preservative removal shall be	removal shall be accomplished with	to facilitate touch-up" whereas NQA-1
accomplished with approved solvents	approved solvents and wiping cloths or by flushing internal cavities with sol-	states "shall be the water flushable
internal cavities with solvents which	vents which are not deleterious to the	type
are not deleterious to the item or other	item or other interconnecting material.	
interconnecting material. However,	However, preservatives for	
surfaces of numps, valves and nine for	valves and nining for systems	
systems containing reactor coolant	containing reactor coolant water shall	
water shall be indicated to facilitate	be the water flushable type.	
touch-up.	(a) The name of the preservative used	In regards to the name of the
(5) The name of the preservative used shall be the water	shall be provided to facilitate touch-up	preservative used N45.2.2 states
flushable type.		"shall be the water flushable type"
		whereas NQA-1 states "shall be
(6) When meters, pumps	(1) M/bon motoro, numpo, turbinoo	provided to facilitate touch-up"
turbines, etc., are shipped with oil	etc., are shipped with oil reservoirs	<b>O</b> K
reservoirs and bearings cavities filled	and bearing cavities filled with	
with preservative oil, the item shall be	preservative oil, the item shall be so	
so tagged and instructions for draining, flushing, refilling and periodic rotation	tagged and instructions for draining, flushing, refilling, and periodic rotation	
shall be included with the item.	shall be included with the item.	
(7) When it is anticipated that	(g) When it is anticipated that the item	ОК
the item might require an extended	might require an extended storage	
longer a preservative needed for the	preservative needed for the long-term	
long term protection of the item shall	protection of the item shall be applied	
be applied or arrangements shall be	or arrangements shall be made to	
made to periodically reapply the	periodically reapply the preservatives.	
A3.4.2 Inert Gas Blankets. When	3.4.2 Inert Gas Blankets.	ОК
inert gas blankets are used, the	When inert gas blankets are used, the	
following criteria shall apply:	following criteria shall apply.	
(1) Inert gas blankets shall be used only when the exterior shell of	(a) there gas blankets shall be used	harrier" whereas NOA-1 states "or an
the item or its container can be tightly	or its container can be tightly sealed or	inert gas blanket can otherwise be
sealed to form a leak-proof barrier.	an inert gas blanket can otherwise be	maintained."
(2) Only a commercial grade of	maintained.	NOA 1 deleted the words
dry, oil-free, inert gas shall be used.	used.	"commercial grade"
(3) Provisions shall be made for	(c) Provisions shall be made for	NQA-1 adds words "when used to
measuring and maintaining the blanket	measuring and maintaining the blanket	maintain a static pressure"
within each pressurized purged item or	within each pressurized purged item or	
container. Closures and seals shall be	container. Closures and seals, when	
tightly secured so that the absolute (by	used to maintain a static pressure,	
mass) pressure after final seal is	snall be tightly secured so that the	
gas, prior to shipping the item from the	seal is maintained for 24 hr, without	
manufacturer's plant.	adding gas, prior to shipping the item	
(4) The item of containing the life	from the manufacturer's plant.	OK
(4) The item or container shall be marked in bold letters cautioning that	(a) The item or container shall be marked in bold letters cautioning that	UN
an inert gas blanket has been used.	an inert gas blanket has been used.	
The required pressure range also shall	The required pressure range also shall	

ANSI N45.2.2-1972	NQA-1 (1994) Subpart 2.2	Comments
	(except where noted)	(NOTE: OK signifies identical or nearly identical wording)
be marked on the item or container.	be marked on the item or container.	
A3.5.1 Caps and Plugs. Caps and	3.5.1 Caps and Plugs.	ОК
plugs shall conform to the following	Caps and plugs shall conform to the	
(1) Nonmetallic plugs and caps	(a) Nonmetallic plugs and caps shall	NOA-1 adds the words "or
shall be brightly colored. Clear plastic	be brightly or contrastingly colored.	contrastingly" when detailing color
closures are not to be used except	Clear plastic closures are not to be	<u>, , , , , , , , , , , , , , , , , , , </u>
when specified for a special purpose;	used except when specified for a	
for example, as a window for humidity	special purpose: for example, as a	
indicator cards. Special attention shall	window for humidity indicator cards.	
closures.	control of these closures.	
(2) Metallic plugs and caps	(b) Metallic plugs and caps contacting	ОК
contacting metal surfaces shall not	metal surfaces shall not cause	
cause galvanic corrosion at the	galvanic corrosion at the contact	
contact areas. Gasketing or other	areas. Gasketing or other nonmetallic	
conjunction with metallic caps or plugs	metallic caps or plugs shall exhibit no	
shall exhibit no corrosive effect on the	corrosive effect on the material.	
material.		
(3) Simplicity of installation,	(c) Simplicity of installation, inspection,	ОК
Inspection, and removal without	and removal without damage to the	
considered.	item shair be considered.	
(4) Provisions shall be made to	(d) Provisions shall be made to	ОК
preclude the plug or cap from falling	preclude the plug or cap from falling	
into or being pushed into the opening	into or being pushed into the opening	
(5) Plugs or caps shall be	(e) Plugs or caps shall be secured with	OK
secured with tape (see paragraph	tape (see para. 3.5.2) or other means	SIX .
A3.5.2 of this Appendix) or other	as necessary to prevent accidental	
means as necessary to prevent ac-	removal.	
(6) All plugs and caps shall be	(f) All plugs and caps shall be clean	OK
clean and free of visible contamination	and free of visible contamination such	SIX .
such as, but not limited to dust, dirt,	as, but not limited to, dust, dirt, stains,	
stains, rust, discoloration or scale.	rust, discoloration, or scale.	
(7) Plugs and caps used in	(g) Plugs and caps used in contact with austenitic stainless steel shall be	ŬK
shall be made from nonhalogenated	made from nonhalogenated materials	
materials or stainless steel.	or stainless steel.	
A3.5.2 Tapes and Adhesives. Tapes	3.5.2 Tapes and Adhesives. Tapes	ОК
and adhesives shall conform to the	and adhesives shall conform to the	
(1) When contacting austenitic	(a) When contacting austenitic	OK
stainless steel and nickel alloy	stainless steel and nickel alloy	
surfaces:	surfaces:	
(a) The halogen and sulfur contents	(1) tapes shall not be compounded	N45.2.2 states that contents "should
of tapes should not be in excess of	from or treated with chemical	not be in excess of 0.10% by weight
(masking) tape shall not be used.	such quantities that harmful	detail but does not specify a %.
(	concentrations are leachable, or that	
	they could be released by breakdown	
	under expected environmental	
	conditions and could contribute to	
	corrosion cracking, such as those	
	containing fluorides, chlorides, sulfur,	
	lead, zinc, copper, and mercury	
	[paperbacked (masking) tape shall not	
(b) Upon removal of tape all residual	(2) upon removal of tane all residual	ОК
adhesive shall be removed by a non-	adhesive shall be removed by wiping	
halogenated solvent (acetone, alcohol	with a nonhalogenated solvent	
or equal) wiping.	(acetone, alcohol, or equal);	

ANSI N45.2.2-1972	NQA-1 (1994) Subpart 2.2	Comments
	(except where noted)	(NOTE: OK signifies identical or
		nearly identical wording)
(c) Starch, silicone and epoxy type	(3) starch, silicone, and epoxy tape	OK
adhesives.	adhesive.	
(2) When contacting other	(b) When contacting other surfaces	ОК
surfaces and containers:	and containers:	01/
(a) Tapes and adnesives used to seal nonaustenitic materials or	(1) tapes and adhesives used to seal	ŬŔ
containers are not subject to the above	are not subject to the above	
restrictions.	restrictions;	
(b) Tape shall be impervious to	(2) tape shall be impervious to water	ОК
drving out if exposed to sunlight heat	out if exposed to sunlight heat or	
or cold.	cold.	
(3) Tapes should be brightly	(c) When used on surfaces of items,	N45.2.2 and NQA-1 use different
colored to preclude their loss into a	tapes shall be visibly distinguishable	words but the intent is same.
System.	used.	
A3.6.2 Vapor Barrier Material. When	3.6.2 Vapor Barrier Material. When	OK
maximum vapor protection is required,	maximum vapor protection is required,	
barrier material shall meet the	barrier material shall meet the	
rate of 0.05 grams per 100 square	rate of 0.05 g/100 sq in. per 24 hr	
inches per 24 hours per ASTM E96	required by ASTM E 96, Test Methods	
Tests for Water Vapor Transmission	for Water Vapor Transmission of	
F and shall be packaged with an	packaged with an approved desiccant	
approved desiccant.		
The barrier material should be brightly	Vapor-proof barrier material should be	N45.2.2 and NQA-1 use different
colored to preclude loss within a	colored to contrast with the material on	words but the intent is same.
A3.6.3 Desiccants. Desiccants shall	<b>3.6.3 Desiccants.</b> Desiccants shall	ОК
consist of nondeliquescent,	consist of nondeliquescent, non-	
nondusting, chemically inert, de- hydrating agents.	dusting, chemically inert, dehydrating agents.	
The following criteria apply when they	The following criteria shall apply.	ОК
(1) When used with austenitic	(b) When used with austenitic	N45.2.2 is limited to austenitic
stainless steels, the desiccant and the	stainless steel and nickel alloy	stainless steels and specifies that the
bag material shall not have a halogen	materials, tapes, desiccants, and the	halogen content shall not be over
content over 0.25%.	materials for the desiccant bag shall	0.25% whereas NQA-1 adds "and
	with chemical compounds containing	does not provide a specific content
	elements in such quantities that	level.
	harmful concentrations are leachable,	
	or they could be released by	
	environmental conditions and could	
	contribute to intergranular cracking or	
	stress corrosion cracking, such as	
	sulfur, lead, zinc, copper, and mercury.	
The desiccant bag shall be made of	(a) The desiccant bag shall be made	ОК
puncture, tear and burst resistant material.	of puncture-, tear-, and burst-resistant material.	
(2) The reactivation	(c) The reactivation temperature and	ОК
temperature and time shall be marked	time shall be marked on the desiccant container	
(3) Canisters used to contain	(d) Canisters used to contain	ОК
desiccants shall be placed so as to	desiccants shall be placed so as to	
cause no deleterious effects such as	cause no deleterious effects such as	
gaivanic corrosion, even when the	gaivanic corrosion, even when the	
capacity for water vapor.	capacity for water vapor.	
(4) Desiccant bags and	(e) Desiccant bags and canisters,	ОК
canisters, when used, shall be secured	when used, shall be secured to	

ANSI N45.2.2-1972	NQA-1 (1994) Subpart 2.2	Comments
	(except where noted)	(NOTE: OK signifies identical or nearly identical wording)
to prevent movement, rupture of the bags, or damage to the item being protected.	prevent movement, rupture of the bags, or damage to the item being protected.	
(5) Water-vaporproof flexible barriers shall be used to seal items containing desiccants. The included air volume within the flexible barrier shall be kept to a minimum.	(f) Water — and vapor-proof flexible barriers shall be used to seal items containing desiccants. The included air volume within the flexible barrier shall be kept to a minimum.	ОК
<ul> <li>(6) Items which contain desiccant shall have all openings securely sealed. When flange con- nections are a part of the barriers, 0- rings or gaskets shall be used with all bolts in place and tightened sufficiently to insure a water-vaporproof seal.</li> <li>Weld end preparations, after capping, shall be covered with a water-vapor proof seal.</li> </ul>	(g) Items that contain desiccants shall have all openings securely sealed. When flange connections are a part of the barriers, 0-rings or gaskets shall be used with all bolts in place and tightened sufficiently to ensure a water- and vapor-proof seal. Weld end preparations, after capping, shall be covered with a water- and vapor-proof seal.	ок
<ul> <li>Packages and items</li> <li>containing desiccant shall be marked.</li> <li>The total number of separate bags</li> <li>and/or containers in the package shall</li> <li>be indicated.</li> </ul>	( <i>h</i> ) Packages and items containing desiccants shall be marked. The total number of separate bags or containers of desiccants in the package shall be indicated.	N45.2.2 uses words "and/or" when detailing bags and containers whereas NQA-1 uses the word "or"
(8) The minimum quantity of desiccant for use in each package shall be determined in accordance with Formula I or Formula II, as applicable.	( <i>i</i> ) The minimum quantity of desiccant for use in each package shall be determined in accordance with Formula I or Formula II, as applicable.	ОК
Formula I: To determine minimum of desiccant for use with other than sealed rigid metal barrier: U= I .6A plus XD.	Formula I To determine minimum units of desiccant for use with other than sealed rigid metal barrier:	ОК
	U = 7.6A + XD	
Formula II: To determine minimum units of desiccant for use within sealed rigid metal barrier:	Formula II To determine minimum units of desiccant for use with sealed rigid metal barrier:	ОК
	U= KV + XD	
In the above formulas: A= Areas of barrier in square feet U= Number of units* of desiccant to be used	where A = area of barrier, sq ft (m ² x 0.0929) U = number of units of desiccant to be used (see Note)	NQA-1 added metric equivalents
<ul> <li>D=Pounds of dunnage (other than metal) within barrier</li> <li>K= 0.0007 when volume is given in cubic inches</li> <li>K= 1.2 when volume is given in cubic feet</li> <li>V=Volume within barrier in cubic inches or cubic feet</li> <li>X= 8 for hair felt, cellulosic material (including wood) and other material not categorized below</li> <li>X= 6 for bound fibers (animal hair, synthetic fiber or vegetable fiber bound with rubber)</li> <li>X= 2 for glass fiber</li> <li>X= 0.5 for synthetic foams and rubber</li> </ul>	<ul> <li>D = dunnage (other than metal) within barrier, lb (kg x 2.2)</li> <li>K = 0.0007 when volume is given in cu in.</li> <li>= 1.2 when volume is given in cu ft</li> <li>= 0.000042 5 when volume is given in cm³ (42.5 in m³)</li> <li>V = volume within barrier in cu in. or cu ft (cm³ or m³)</li> <li>X = 8 for hair felt, cellulosic material (including wood), and other material not categorized below</li> <li>= 6 for bound fibers (animal hair, synthetic fiber, or vegetable fiber bound with rubber)</li> </ul>	

ANSI N45.2.2-1972	NQA-1 (1994) Subpart 2.2	Comments
	(except where noted)	(NOTE: OK signifies identical or
		nearly identical wording)
	= 0.5 for synthetic foams and rubber	
*A desiccant unit is that quantity of	NOTE: A desiccant unit is that	NQA-1 added English unit equivalent
desiccant, as received, which will absorb at equilibrium with air at 25 C	quantity of desiccant, as received, that will absorb at equilibrium with air at	for temperature.
at least the following quantities of	$78^{\circ}$ F (25°C) at least the following	
water vapor: 3.00 grams at 20%	quantities of water vapor: 3.00 g at 20	
relative humidity and 6.00 grams at	% relative humidity and 6.00 g at 40%	
(9) A humidity indicator shall be	(i) A humidity indicator shall be	OK
included in every water-vaporproof	included in every water- and vapor-	SIX .
envelope containing desiccant. As	proof envelope containing desiccant.	
applicable, the indicator shall be	As applicable, the indicator shall be	
immediately within the closing edge	immediately within the closing edge	
face, or cover of the barrier, and as far	face, or cover of the barrier and, as far	
as practical from the nearest unit of	as practical, from the nearest unit of	
desiccant.	desiccant.	01/
A3.7.1 Fiberboard Boxes. The following criteria apply for fiberboard	3.7.1 Containers The following criteria shall apply for fiberboard boxes used	ŬK
boxes used as exterior containers:	as exterior containers.	
(1) Boxes shall be weather-	(1) Boxes shall be weather-resistant	ОК
resistant fiberboard preferably from the	fiberboard preferably from the grade	
symbol): V2 s V3 s or V3 c (Federal	V3 s or V3 c (Federal Specification	
Specification PPP-B-636.)	PPP-B-636).	
(2) Box style shall be RSC	(2) Box style shall be RSC regular	ОК
Regular slotted box, (Outer flaps meet,	slotted box (outer flaps meet, inner	
length).	length).	
(3) Fiberboard boxes shall be	(3) Fiberboard boxes shall be securely	NQA-1 added metric equivalents
securely closed with a water resistant	closed with a water-resistant adhesive	
adhesive applied to the entire area of	applied to the entire area of contact	
and joints shall be further sealed with	joints shall be further sealed with not	
not less than two inch wide, water	less than 2 in. (5 cm) wide, water-	
resistant tape.	resistant tape.	01
(4) Boxes shall be strapped with pressure-sensitive reinforced tape	(4) Boxes shall be strapped with pressure-sensitive reinforced tape	0K
length-wise (top, bottom and ends),	lengthwise (top, bottom, and ends),	
girthwide (top, bottom and sides) and	girthwise (top, bottom, and sides), and	
horizontal sides and ends.	horizontal sides and ends.	01
boxes shall be fabricated from sound	(5) Wood cleating on liberboard boxes shall be fabricated from sound well-	ŬK.
well-seasoned lumber.	seasoned lumber.	
A3.8.1 Cushioning. Selection of	3.8.1 Cushioning. Selection of	ОК
cushioning materials shall be based on the following:	cushioning material shall be based on the following	
(1) It shall exhibit no corrosive	(a) It shall exhibit no corrosive effect	ОК
effect when in contact with the item	when in contact with the item being	
being cushioned.	cushioned.	or/
(2) It shall have low moisture	(b) It shall have low moisture content and exhibit low moisture absorption	OK
absorption properties; or if the	properties, or if the cushioning material	
cushioning material has some	has some moisture absorbing	
moisture absorbing capacity, the item	capacity, the item shall be protected	
proof barrier.	with a water-vaporproor barrier.	
(3) It shall have negligible	(c) It shall have negligible dusting	ОК
dusting characteristics.	characteristics.	01
(4) It shall not readily support	( <i>a</i> ) It shall not readily support	UK
A3.8.3 Anchoring. When bolts are	<b>3.8.3 Anchoring.</b> When bolts are	ОК
used for anchoring the following	used for anchoring, the following	
criteria shall apply.	criteria shall apply.	

ANSI N45.2.2-1972	NQA-1 (1994) Subpart 2.2	Comments
	(except where noted)	(NOTE: OK signifies identical or nearly identical wording)
(1) If precision bolt holes in the item	(a) If precision bolt holes in the item	OK
are used for anchoring, precaution	are used for anchoring, precaution	
fitting bolts of the correct dimension	fitting bolts of the correct dimension	
and characteristics are used to prevent	and characteristics are used to prevent	
marring or elongation of the holes.	marring or elongation of the holes.	
(2) Holes bored through	(b) Holes bored through containers or	OK
containers or mounting bases shall	mounting bases shall provide a snug	
(3) When mounting items to container	(c) When mounting items to container	N45.2.2 states that counter-sinking
bases equipped with skids, bolts shall	bases equipped with skids, bolts shall	"is necessary" whereas NQA-1 states
be extended through the skids	be extended through the skids	"shall be done"
whenever practical. In such instances	whenever practical. In such instances,	
counter-sinking of the bolt in the	countersinking of the bolts in the	
necessary.	done.	
(4) Washers shall be used	(d) Washers shall be used under the	ОК
under the nuts to decrease the	nuts to decrease the possibility of the	
possibility of the bolt pulling through	bolt pulling through the wood.	
(5) Nuts shall be properly	(e) Nuts shall be properly tightened	OK
torgued. To prevent their joosening	To prevent their loosening during	
during shipment, lock nuts, lock	shipment, lock nuts, lock washers,	
washers, cotter pins, or staking shall	cotter pins, or staking shall be	
be employed.	employed.	OK
A3.5 Marking	preserve identity in accordance with	OK
Items shall be marked to preserve	the following criteria.	
identity in accordance with the		
following criteria:		
(1) The specified identification shall be stamped etched stenciled or	(a) The specified identification shall be stamped etched stenciled or	NQA-1 added metric equivalents
otherwise marked on the item or on	otherwise marked on the item or on	
tags to be affixed securely to the item	tags to be affixed securely to the item	
in plain, unobstructed view. When	in plain, unobstructed view. When	
metal stamps are employed, low	metal stamps are employed, low	
shall be used when the item proper is	shall be used when the item proper is	
marked. When vibrating marking tools	marked. When vibrating marking tools	
are used they shall be fitted with a	are used, they shall be fitted with a	
carbide marking tip or equivalent and	carbide marking tip or its equivalent,	
impression not to exceed 0.0.10	rounded impression not to exceed	
inches in depth. Etching shall not be	0.010 in. (0.25 mm) in depth. Etching	
used on nickel alloys or on weld areas	shall not be used on nickel alloys, weld	
or sensitized areas of stainless steel.	areas, or sensitized areas of stainless	
be used	not be used	
(2) The marking shall not be	(b) The marking shall not be	ОК
deleterious to the material nor violate	deleterious to the material nor violate	
any other section of this standard.	any other Section of Subpart 2.2.	
(3) When tags are employed, they shall be of a material which will	(c) when tags are employed, they shall be of a material which will retain	OK
retain the marking, withstand	the marking, withstand weathering	
weathering deterioration, and other	deterioration, and other normal	
normal shipping and handling effects	shipping and handling effects, and	
and shall not be detrimental to the	snail not be detrimental to the item.	
(4) The English language shall	(d) The English language shall be	ОК
be used. Duplicate marking may be	used. Duplicate marking may be made	
made in other languages.	in other languages.	
(5) References to weights shall	(e) References to weights shall be in	UK
markings in other systems may also	avoiroupois units. Duplicate markings in other systems may also be	
be indicated.	indicated.	
Markings on the outside container	Markings on the outside container	OK

ANSI N45.2.2-1972	NQA-1 (1994) Subpart 2.2	Comments
	(except where noted)	(NOTE: OK signifies identical or nearly identical wording)
shall be in accordance with the following criteria:	shall be in accordance with the following criteria.	
(1) Container markings shall appear on a minimum of two sides of the container, preferably on one side and one end.	(a) Container markings shall appear on a minimum of two sides of a container, preferably on one side and one end.	ОК
(2) The English language shall be used. Duplicate marking may be made in other languages or in pictorial markings according to ISO Recommendation R780 Pictorial Markings For Handling of Goods (general symbols) or ANSI MH6.1.	(b) The English language shall be used. Duplicate marking may be made in other languages or in pictorial marking according to ISO Recommendation R780, Pictorial Markings for Handling of Goods (general symbols) or ANSI MH6. 1.	ОК
(3) References to weights shall be in avoirdupois units. Duplicate marking in other systems may also be indicated.	(c) References to weights shall be in avoirdupois units. Duplicate markings in other systems may also be indicated.	ОК
(4) Container markings shall be applied with waterproof ink or paint in characters no less than 3/4 inch high, container size permitting.	(d) Container markings shall be applied with waterproof ink or paint in characters that are legible. When information relative to handling and special instructions is required, such information shall be preceded by the word CAUTION in letters that are at least 1/2 in. (12.7 mm), as permitted by container size.	N45.2.2 details that "characters no less than 3/4 inch high, container size permitting" be used whereas NQA-1 states "in characters that are legible" and then provides additional details on special instructions.
(5) Where tags or labels are used, they shall be affixed to the container using a waterproof adhesive, tacks where practical, or a corrosion resistant wire.	(e) Where tags or labels are used, they shall be affixed to the container using a waterproof adhesive, tacks where practical, or a corrosion- resistant wire.	ОК
(6) Container marking shall include the following information:	(f) Container markings shall include the following information:	ОК
(a) Destination	(1) destination	ОК
(b) Return address	(2) return address	OK
(c) Package numbers showing the purchase order number, followed by the package number and the total number of packages.	(3) package numbers showing the purchase order number, followed by the package number and the total number of packages	ОК
(d) Material identification number	(4) material identification number	ОК
(e) Handling instructions Fragile, Center of Gravity, Keep Dry, This Side Up, Sling Here, Do Not Freeze, stacking limitations as appropriate.	(5) handling instructions (e.g., Fragile, Center of Gravity, Keep Dry, This Side Up, Sling Here, Do Not Freeze) and stacking limitations, as appropriate	ОК
(f) Weight of package (in excess of 100 pounds).	(6) weight of package [in excess of 100 lb (45.5 kg)]	NQA-1 added metric equivalents
(g) Special Instructions. Desiccant Inside, Special Inspection, Storage, Unpacking Restrictions, etc. as appropriate.	(7) special instructions (Desiccant Inside, Special Inspection, Storage, Unpacking Restrictions, etc.) as appropriate.	ОК
Marking of items not within a container, such as pipe, tanks and heat exchangers, shall exhibit specified information in a location which is in plain unobstructed view, but not directly applied to bare austenitic stainless steel and nickel alloy metal surfaces of the item.	Marking of items not within a container, such as pipe, tanks, and heat exchangers, shall exhibit speci- fied information in a location which is in plain unobstructed view. Marking may be applied directly to bare metal surfaces provided it has been established that the marking material is not deleterious to the item.	N45.2.2 does not allow marking directly on austenitic stainless steel and nickel alloy metal surfaces whereas NQA-1 states that marking is acceptable "provided it has been established that the marking material is not deleterious to the item."

ANSI N45.2.3 - 1973	NQA-1 (1994) Subpart 2.3 (except as noted)	Comments (NOTE: OK signifies identical or nearly identical wording)
<ol> <li>INTRODUCTION</li> <li>Scope         This standard defines the housekeeping requirements for the control of work activities, conditions, and environments that can affect the quality of important parts of a nuclear power plant during the construction phase.     </li> </ol>	General Subpart 2.3 provides housekeeping requirements for the control of work conditions and environments that can affect the quality of important parts of a nuclear power plant. It supplements the requirements of Part I and shall be used in conjunction with applicable Basic and Supplementary Sections of Part I when and to the extent specified by the organizations invoking Subpart 2.3.	N45.2.3 limited to "during the construction phase" NQA-1 addresses a larger scope of the "nuclear power plant".
These parts include the structures, systems, and components whose satisfactory performance is required for the plant to operate reliably, to prevent accidents that cause undue risk to the health and safety of the public, or to mitigate the consequences of such accidents if they were to occur.	Subpart 2.3 provides housekeeping requirements for the control of work conditions and environments that can affect the quality of important parts of a nuclear power plant. NQA-1 Part II Introduction includes similar language with the same intent: The requirements of this Part (Part II) apply to fabrication, construction, modification, repair, maintenance, and testing activities that affect the quality of structures, systems, and components for nuclear facilities.	Similar Same Intent
Housekeeping encompasses all activities related to control of cleanness of facilities, cleanness of material and equipment, fire prevention and fire protection including disposal of combustible materials and debris, control of access, and protection of equipment not denoted in other standards.		Guidance which defined "housekeeping". Scope and requirements adequately cover the areas identified.
The requirements may also be extended to other appropriate parts of nuclear power plants when specified in contract documents.	NQA-1 Part II Introduction includes similar language with the same intent: To the extent applicable to the activities being performed, the application of this Part (Part II), or portions thereof, and the provisions of Part I, Basic and Supplementary Requirements, shall be specified in written contracts, policies, procedures, or instructions.	Similar Same Intent
This standard is intended to be used in conjunction with ANSI N45.2, Quality Assurance Requirements For Nuclear Power Plants.	To the extent applicable to the activities being performed, the application of this Part (Part II), or portions thereof, and the provisions of Part I, Basic and Supplementary Requirements, shall be specified in written contracts, policies, procedures, or instructions.	Similar Same Intent
1.2 Applicability The requirements of this standard apply to the work of any individual or organization that participates in housekeeping activities during construction activities of nuclear power plants as discussed in paragraph 1 .1.	The requirements of this Part (Part II) apply to fabrication, construction, modification, repair, maintenance, and testing activities that affect the quality of structures, systems, and components for nuclear facilities.	Guidance Only. Wording does not establish requirements.
The extent to which the individual requirements of this standard apply will depend upon the nature and scope of the work to be performed and the importance of the item or service involved.	NQA-1 Part II Introduction includes similar language with the same intent: An appropriate Quality Assurance Program, based on the nature and scope of the work to be performed and the relative importance of the items or services, shall be specified in contractual documents by selective applications of portions of Part I, Basic and Supplemental	Similar Same Intent

ANSI N45.2.3 - 1973	NQA-1 (1994) Subpart 2.3 (except as noted)	Comments (NOTE: OK signifies identical or nearly identical wording)
	Requirements, for programmatic activities and of this Part (Part II) for work oriented activities.	
The requirements are intended to assure that only proper materials, equipment, processes, and procedures arc utilized in the maintenance of housekeeping during the construction of power plants and that the quality of items is not degraded as a result of housekeeping practices and techniques during construction processing.		Guidance Only. Wording does not establish requirements.
1.3 Responsibility The organization or organizations responsible for establishing the applicable requirements for the activities covered by this standard shall be identified and the scope of their responsibilities shall be documented.	NQA-1 Part I, Basic Requirement 1, Organization includes similar words: The organizational structure, functional responsibilities, levels of authority, and lines of communication for activities affecting quality shall be documented.	Similar Same Intent
The work of establishing practices and procedures and providing the resources in terms of personnel, equipment, and services necessary to implement the requirements of this standard may be delegated to other organizations, and such delegations shall also the documented.	NQA-1 Part I, Basic Requirement 1, Organization includes similar words: 2.2 Delegation of Work The individuals(s) or organization(s) responsible for establishing and executing a quality assurance program under this Standard may delegate any or all of the work to others but shall retain responsibility therefor.	Similar Same Intent
However, it is the responsibility of each organization performing work covered by this standard to comply with the procedures and instructions issued for the project and to conform to the requirements of this standard applicable to his work.	NQA-1 Part II Introduction includes similar language with the same intent: The organization upon which this Part (Part II), or portions thereof, is invoked shall be responsible for complying with the specified requirements.	Similar Same Intent
It is the responsibility of the organization performing these activities to specify the detailed methods and procedures unless they are specified in the contract documents.		These words are not included in NQA-1 or the QATR
1.4 Definitions The following definition is provided because it is used uniquely in this standard.	NQA-1 Part II Introduction includes similar language with the same intent: 6 DEFINITIONS Definitions unique to the activities described in this Part (Part II) are included in the section dealing with that activity. Definitions generic to quality assurance activities are included in Part I, Supplement S-i, Terms and Definitions.	Similar Same Intent
Construction Phase-The period of time beginning with the start of construction activity and ending as each plant area is turned over to the plant operator.		These words are not included in NQA-1 or the QATR.

ANSI N45.2.3 - 1973	NQA-1 (1994) Subpart 2.3	Comments
	(except as noted)	(NOTE: OK signifies identical or nearly identical wording)
Other terms and their definitions are contained in ANSI N45.2.I0.	NQA-1 Part II Introduction includes similar language with the same intent:	Similar Same Intent
	6 DEFINITIONS	
	Definitions unique to the activities described in this Part (Part II) are included in the section dealing with that activity. Definitions generic to	
	quality assurance activities are included in Part I, Supplement S-1, Terms and Definitions.	
1.5 Referenced Documents	NQA-1 Part II Introduction includes similar language with the same intent:	Similar Same Intent
Other documents that are required to be included as a part of this standard are either identified at the point of reference or identified in paragraph 5 of this standard	7 REFERENCED CODES, STANDARDS, AND SPECIFICATIONS	
	All codes, standards, and specifications that are referenced as a part of this Part (Part II) are listed in the Table entitled "Codes, Standards, and Specifications Referenced in Text."	
2. GENERAL REQUIREMENTS	2 GENERAL REQUIREMENTS	Similar Same Intent
This paragraph contains requirements that are to be fulfilled by the contractor who is responsible for performing any segment of work described in paragraphs 3 and 4 of this standard. Measures shall be established and implemented for documenting housekeeping operations to verify conformance to specified requirements.	Housekeeping activities shall include documented methods and techniques for control of the site area, the plant, and the materials and equipment being incorporated in the plant to preserve the requisite quality of the items being constructed or installed.	
2.4 Personnel Qualifications All personnel working in zone controlled areas shall be familiar with the necessities and requirements for cleanness control applicable to the various zones.	Personnel working in zone controlled areas shall be familiar with the necessities and requirements for cleanness control applicable to the various zones.	OK
Training programs shall be utilized for this purpose where appropriate.	Training programs shall be utilized for this purpose, where appropriate.	ОК
2.1 Planning The work and the quality assurance requirements for the housekeeping activities at the nuclear power plant site shall be delineated.	NQA-1 Part II Introduction includes similar language with the same intent: A plan shall be developed outlining the work to be performed and the work procedures or instructions required to comply with the requirements of the defined work scope.	Similar Same Intent
The planned activities shall include the methods and techniques for control of the site area, the facilities, and the materials and equipment being incorporated in the plant to preserve the requisite quality of the items being constructed or installed.	2.1 Planning and Procedures Planning and procedure preparation shall be in accordance with the requirements of the Introduction to this Part (Part II); procedures and instructions shall contain sufficient detail to provide for control of the site area, the plant, and the materials and equipment being incorporated in the plant to preserve the requisite quality of the item being constructed or installed.	Similar Same Intent

ANSI N45.2.3 - 1973	NQA-1 (1994) Subpart 2.3 (except as noted)	Comments (NOTE: OK signifies identical or nearly identical wording)
Necessary procedures and work instructions that are needed to assure compliance with the specified requirements shall be identified and provisions shall be made for their preparation, approval, release, and control.	NQA-1 Part II Introduction includes similar language with the same intent: Installation, inspection, test procedures, and work instructions identified during planning shall be pre-pared. Preparation and approval of the procedures! instructions shall be in advance of the need to use the documents	Similar Same Intent
Methods to be used for the collection, handling, and disposition of records, data, and reports shall be designated.	Basic Requirement 17 Requirements and responsibilities for record transmittal, distribution, retention, maintenance, and disposition shall be established and documented.	ОК
2.2 Procedures and Instructions The procedures and instructions for	NQA-1 Part II Introduction includes similar language with the same intent:	Similar Same Intent
may be issued in segments to conform with the project construction schedule.	work instructions identified during planning shall be pre-pared.	
The first segment establishing regulations for control of site area, site preparation, fire prevention and protection, and records shall be in force with the start of construction activity.	Procedures and instructions providing for the control of site areas, site preparation, fire prevention and protection, and records shall be in force with the start of the construction activity.	Similar Same Intent
The remaining segments shall be prepared and approved no later than the start of equipment installation work.	Other procedures and instructions shall be prepared and approved no later than the start of equipment installation work.	Similar Same Intent
Cleanness requirements for housekeeping activities shall be established on the basis of the following zone designations.	2.2 Classification of Cleaness Cleanness requirements for housekeeping activities shall be established on the basis of the following zone designations.	ОК
Time for implementation of the zone designations shall be as required by the construction progress.	The timing for implementation of the zone designations shall be as required by the need for cleanness.	Similar Same Intent
Zones Restriction List I II III IV V Clothing change Yes No No No No Clean gloves, shoe covers, head covering Yes Yes No No No Filtered air Yes No No No No Material precleaning Yes No No No No Material accountability Yes Yes Yes No No No use of tobacco/eating Yes Yes Yes Yes No	Zones Restriction List I II III IV V Clothing change Yes No No No No Clean gloves, shoe covers, head covering Yes Yes No No No Filtered air Yes No No No Material precleaning Yes Yes No No No Material accountability Yes Yes Yes No No Personnelaccountability Yes Yes Yes No No Use of tobacco or eating Yes Yes Yes Yes No	ОК
Zone I— Areas requiring the highest order of cleanness and shall be equipped with a clean clothing change facility at the vestibule or entrance, preferably with toilet facilities immediately adjacent so that personnel working in the controlled area do not have to wear the special clothing in other areas.	Zone I. Areas requiring the highest order of cleanness shall be equipped with a clean clothing change facility at the vestibule or entrance	Similar Same Intent
ANSI N45.2.3 - 1973	NQA-1 (1994) Subpart 2.3 (except as noted)	Comments (NOTE: OK signifies identical or
--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------
		nearly identical wording)
Such areas shall provide for complete outer change of clothing by personnel, including use of shoe covers, head covers, and gloves to protect all equipment surfaces from outside contamination.	Such areas shall provide for complete outer change of clothing by personnel, including the use of shoe covers, head covers, and gloves to protect all equipment surfaces from outside contamination.	OK
Material entering this zone shall have been appropriately cleaned prior to entry as specified in ANSI N45.2.I.	Material entering this zone shall have been appropriately cleaned prior to entry.	OK
Zone II— Intermediate cleanness requirements less restrictive than Zone I but where foreign matter may have detrimental effects.	Zone II. Intermediate cleanness requirements less restrictive than Zone I, but where foreign matter may have detrimental effects.	OK
Zone III— Areas less restrictive than Zones I and II but requiring access control over personnel and materials.	Zone III. Areas less restrictive than Zones I and II, but requiring access control over personnel and materials.	ок
Zone IV— Areas where it is desired to regulate the use of tobacco and eating for material and equipment protection or for health and fire hazards.	Zone IV. Areas where it is desired to regulate the use of tobacco and eating of food for material and equipment protection or for health and fire hazards.	ОК
Zone V—Unrestricted construction areas requiring good construction site housekeeping practices only.	Zone V. Unrestricted construction areas requiring good construction site housekeeping practices only.	ОК
For Zones I, II, and III a written record of the entry and exit of all personnel and material shall be established and maintained.	For Zones I, II, and III a written record of the entry and exit of all personnel and material shall be established and maintained.	ОК
2.3 Results Inspection and test results shall be documented in a suitable test report or data sheet.	NQA-1 Part I Supplement 10S-1 includes similar language with the same intent: Inspection activities shall be documented and controlled by instructions, procedures, drawings, checklists, travelers, or other appropriate means.	Similar Same Intent
	NQA-1 Part I Supplement 11S-1 includes similar language with the same intent: Test results shall be documented and evaluated by a responsible authority to assure that test requirements have been satisfied.	
Each report shall identify the item to which it applies, the procedures or instruction followed in performing the task, and the identification of the following:	NQA-1 Part I Supplement 10S-1 includes similar language with the same intent: Records shall, as a minimum, identify (a) through (f) below:	Similar Same Intent
	11S-1 includes similar language with the same intent:	
	5 Test Records	
	Test records shall, as a minimum, identify (a) through (g) below:	

ANSI N45.2.3 - 1973	NQA-1 (1994) Subpart 2.3 (except as noted)	Comments (NOTE: OK signifies identical or nearly identical wording)
(I) Conditions encountered which were not anticipated, including nonconformance.	NQA-1 Part I Supplement 10S-1 includes similar language with the same intent:	Similar Same Intent
(2) Identity of inspector or tester.	(a) Item inspected	
(3) Completion date.	<ul> <li>(c) inspection</li> <li>(d) type of observation</li> <li>(e) results or acceptability</li> <li>(f) reference to information on action taken in connection with nonconformances.</li> <li>11S-1 includes similar language with the same intent:</li> <li>(a) Item tested</li> <li>(b) date of test</li> <li>(c) tester or data recorder</li> <li>(d) type of observation</li> <li>(e) results or acceptability</li> </ul>	
Test reports and data sheets shall include an evaluation of the acceptability of inspection and test results and provide for identifying the individual who performed the evaluation.	NQA-1 Part I Supplement 10S-1 includes similar language with the same intent: (a) Item inspected (b) date of inspection (c) inspector (d) type of observation (e) results or acceptability (f) reference to information on action taken in connection with nonconformances. 11S-1 includes similar language with the same intent: (a) Item tested (b) date of test (c) tester or data recorder (d) type of observation (e) results or acceptability	Similar Same Intent
3. REQUIREMENTS	3. Requirements	ОК
3.1 Control of Site Area Areas for specific activities shall be assigned and regulated.	3.1 Control of Site Area Areas for specific activities shall be assigned and regulated.	ОК
Areas which shall be designated include where appropriate refuse and garbage dumps, refuse burning sites, storage locations, parking lots, eating places, non-smoking areas, subcontractor work areas, common areas, and waste collection container locations.	Areas that shall be designated include, where appropriate, refuse and garbage dumps, refuse burning sites, storage locations, parking lots, eating places, nonsmoking areas, subcontractor work areas, common areas, and waste collection container locations.	OK
Personnel entrance to controlled areas, admission of visitors to the work site, and identification of all personnel shall be regulated in accordance with established procedures and regulations.	Personnel entrance to controlled areas, admission of visitors to the work site, and identification of all personnel shall be controlled in accordance with established procedures and instructions.	Similar Same Intent

ANSI N45.2.3 - 1973	NQA-1 (1994) Subpart 2.3 (except as noted)	Comments (NOTE: OK signifies identical or nearly identical wording)
Grading. drainage, roads, construction facilities, plant fencing, and utilities shall be provided in accordance with specified requirements and shall he maintained as required in good condition throughout the construction phase or until replaced with the permanent facilities.	Grading, drainage, roads, construction facilities, plant fencing, and utilities shall be provided in accordance with specified requirements and shall be maintained as required in good condition throughout the construction phase or until replaced with the permanent facilities.	UK
3.2 Control of Facilities	3.2 Control of Facilities	ОК
Control of work and storage areas where important items are handled shall be established and maintained to conform to the appropriate zone defined in paragraph 2.1 of this standard.	Control of work and storage areas where important items are handled shall be established and maintained to conform to the appropriate zone defined in para. 2.2 of this Subpart.	
Atmospheric control shall be provided where necessary.	Atmospheric control shall be provided where necessary.	ОК
The control of all tools, equipment, materials, and supplies that are used in Zones I - II, and III shall be maintained to prevent the inadvertent inclusion of deleterious materials or objects in critical systems	The control of tools, equipment, materials, and supplies that are used in Zones I, II, and III shall be maintained to prevent the inadvertent inclusion of deleterious materials or objects in critical systems.	ОК
Appropriate control measures shall be provided through utilization of such items as log books and tethered tools.	Appropriate control measures shall be provided through utilization of such items as log books and tethered tools.	ОК
3.2.1 Cleanness The work areas shall be kept sufficiently clean and orderly that construction activity can proceed in an efficient manner that will produce and maintain quality in conformance with specified requirements.	3.2.1 Cleanness. The work areas shall be kept sufficiently clean and orderly so that construction activity can proceed in an efficient manner that will produce and maintain quality in conformance with specified requirements.	ОК
Where large accumulations of materials occur on a nonroutine basis, such as the stripping of concrete forms, the material shall be promptly removed or stored neatly.	Where large accumulations of materials occur on a nonroutine basis, such as the stripping of concrete forms, the material shall be promptly removed or stored neatly.	ОК
Garbage, trash, scrap, litter, and other excess materials shall be collected, removed from the job site, or disposed of in accordance with specified requirements or planned practices.	Garbage, trash, scrap, litter, and other excess materials shall be collected, removed from the job site, or disposed of in accordance with specified requirements or planned practices.	ОК
Such excess material shall not be allowed to accumulate and create conditions that will adversely affect quality.	Such excess material shall not be allowed to accumulate and create conditions that will adversely affect quality.	ок
The disposal of cleaning chemicals shall be accomplished so additional hazards are not created at the disposal site.	The disposal of cleaning chemicals shall be accomplished so additional hazards are not created at the disposal site.	ок

ANSI N45.2.3 - 1973	NQA-1 (1994) Subpart 2.3	Comments
	(except as noted)	(NOTE: OK signifies identical or nearly identical wording)
3.2.2 Environment. Areas of activity shall be adequately lighted, ventilated, protected, and accessible as appropriate to the work being performed.	3.2.2 Environment. Areas of activity shall be adequately lighted, ventilated, protected, and accessible as appropriate for the work being performed.	OK U
Temporary lighting may be utilized but shall be installed and maintained to provide good visibility.	Temporary lighting may be utilized but shall be installed and maintained to provide good visibility.	ОК
Ventilation shall be provided where necessary to prevent accumulation of dust, noxious fumes, and temperature extremes.	Ventilation shall be provided where necessary to prevent accumulation of dust, noxious fumes, and temperature extremes.	ОК
Adequate working space for construction personnel shall be provided utilizing proper work stages and platforms having accessibility by stairs or ladders.	Adequate working space for construction personnel shall be provided utilizing proper work scaffolds and platforms having accessibility by stairs or ladders.	ОК
Barriers, screens, shields, restricted access, or other protection shall be provided as necessary for isolation of areas where noise, welding arcs, dust, inclement weather, or other conditions exist that may affect the quality of work being performed.	Barriers, screens, shields, restricted access, or other protection shall be provided as necessary for isolation of areas where noise, welding arcs, dust, inclement weather, or other conditions that may affect the quality of work being performed.	ОК
3.2.3 Fire Protection and Prevention.	3.2.3 Fire Protection and Prevention.	ОК
Equipment and instructions for the protection from, and prevention of, damage by fire shall be provided in accordance with the NEPA National Fire Codes, Volume 4, Building Construction Facilities.	Equipment and instruction for the protection from, and prevention of, damage by fire shall be provided in accordance with the requirements of the NFPA National Fire Codes	Similar Same Intent
Procedures or instructions for fire protection shall include provisions for fighting fires involving the use of available community fire departments, trained project brigades, and others.	Procedures or instructions for fire protection shall include provisions for fighting fires involving the use of available community fire departments, trained project brigades, and others.	ОК
Procedures or instructions shall include plans tor provision of water supplies, hydrants, automatic sprinklers, access for fire fighting, and distribution of extinguishers and fire fighting equipment.	Procedures or instructions shall include plans for provision of water supplies, hydrants, automatic sprinklers, access for fire fighting, and distribution of extinguishers and fire fighting equipment.	OK
Fire watches during and immediately following welding operations should be specified.	Fire surveillance during and immediately following operations such as welding and heat treating shall be provided when materials are located such that flames, flying sparks, weld spatter, or excessive heat resulting from the operation could cause combustion, with resulting damage to items of the nuclear plant.	Similar Same Intent
Fire protection facilities shall be in service beginning with the initial stages of permanent construction.	Fire protection facilities shall be in service beginning with the initial stages of permanent construction.	ОК
Pre-fire planning should be considered as a requirement of the fire protection procedures or instructions which shall include evacuation of confined areas.	Pre-fire planning shall be conducted as a requirement of the fire protection procedures or instructions, which shall include evacuation of confined areas.	ОК

ANSI N45.2.3 - 1973	NQA-1 (1994) Subpart 2.3	Comments
	(except as noted)	(NOTE: OK signifies identical or nearly identical wording)
3.3 Materials and Equipment Materials and equipment delivered to the work area shall be placed so that they are accessible but do not hinder construction progress.	Materials and equipment delivered to the work area shall be so positioned, or protected when necessary, to assure that the quality of the item will not be degraded by the construction activity.	Similar Same Intent
However, material and equipment shall be so positioned that it will not be damaged by construction activity.	Materials and equipment delivered to the work area shall be so positioned, or protected when necessary, to assure that the quality of the item will not be degraded by the construction activity.	
The receiving. storage, and handling activities required by this standard shall be performed as specified in ANSI N45.2.2.	These provisions contained in NQA-1 Subpart 2.2	Similar Same Intent
The cleaning of important parts for the plant that is necessary during these activities shall be performed as specified in ANSI N45 .2. 1.	3.3 Material and Equipment The cleaning of important materials and equipment for the plant that is necessary during receiving, storage, and handling activities shall be in accordance with applicable requirements.	Similar Same Intent
3.4 Construction Tools, Supplies, and Equipment	3.4 Construction Tools, Supplies, and Equipment	ОК
The use, location, and deployment of construction tools, supplies, and equipment shall be regulated to keep access and work areas clear and prevent conditions that will adversely affect quality.	The use, location, and deployment of construction tools, supplies, and equipment shall be controlled to keep access and work areas clear and to prevent conditions that will adversely affect quality.	ОК
These provisions shall include, but are not limited to such items as the movement of materials to the work area, welding and stress relieving leads, power leads, temporary heating equipment, pumps, air and water hoses, welding machines. air compressors, hoisting equipment, air tools, grinding tools and burning tools.	These provisions shall include, but are not limited to, such items as the movement of materials to the work area, welding and stress relieving leads, power leads, temporary heating equipment, pumps, air and water hoses, welding machines, air compressors, hoisting equipment, air tools, grinding tools, and burning tools.	OK
<ul> <li>3.5 Surveillance, Inspections, and Examinations</li> <li>Periodic inspection and examination of the work areas and the construction practices shall be performed at scheduled intervals to assure adequacy of cleanness and housekeeping practices.</li> </ul>	3.5 Surveillance and Inspections Periodic inspection of work areas and construction practices shall be performed at scheduled intervals to assure adequacy of cleanness and housekeeping practices.	OK
These inspections and examinations shall include the following as appropriate:	These inspections shall include the following, as appropriate:	ОК

ANSI N45.2.3 - 1973	NQA-1 (1994) Subpart 2.3	Comments
	(except as noted)	(NOTE: OK signifies identical or
		nearly identical wording)
<ol> <li>(1) Examination of construction site roads, access ways, and ramps for conditions that may result In damage to items being transported or handled.</li> <li>(2) Examination of storage area for conformance to procedures and instructions in the following categories:         <ul> <li>(a) adequacy of access control.</li> <li>(b) evidence of damage or deterioration.</li> <li>(c) adequacy of protection from fires. weather, movement of equipment, and other factors that may result in damage to stored items.</li> <li>(d) adequacy of solvent storage facilities.</li> <li>(3) Inspection of work areas for maintenance of environmental conditions within specified limits.</li> <li>(4) Surveillance over Installed items to assure the adequacy of:</li></ul></li></ol>	<ul> <li>(a) inspection of construction site roads, access ways, and ramps for conditions that may result in damage to items being transported or handled;</li> <li>(b) inspection of storage and work areas for conformance to procedures and instructions in the following categories:</li> <li>(1) adequacy of access control</li> <li>(2) evidence of damage or deterioration</li> <li>(3) adequacy of protection from fires, weather, movement of equipment, and other factors that may result in damage to stored and installed items</li> <li>(4) adequacy of hazardous chemicals, paints, and solvent storage facilities</li> <li>(c) inspection of work areas for maintenance of environmental conditions within specified limits;</li> <li>(d) surveillance over installed items to assure the adequacy of:</li> <li>(1) maintenance of protection</li> <li>(2) preservation of item identity</li> <li>(4) protection from fire, weather, movement of materials or equipment, and other factors which may result in damage to installed items</li> </ul>	Similar Same Intent
Where these requirements duplicate the requirements of other standards such as ANSI N45.2.1, duplicate activities and reports are not required.		Guidance Only. Wording does not establish requirements.
4. RECORDS Copies of approved procedures, reports; personnel training and qualification records; controlled zone registry, fire and accident Investigations; and Inspection and examination records shall be prepared and placed with other project records.	4 RECORDS Record copies of procedures, reports, personnel qualification records, zone control registries, fire and accident investigations, surveillance, and inspection records shall be prepared as required in this Part (Part II).	Similar Same Intent
Final disposition of records shall be In accordance with ANSI N45.2.9.	These records shall be retained with other project records as required by code, standard, specification, or project procedures.	Similar Same Intent
5. REVISIONS OF AMERICAN NATIONAL STANDARDS REFERRED TO IN THIS DOCUMENT	NQA-1 Part II Introduction includes similar language with the same intent: 7 REFERENCED CODES, STANDARDS, AND SPECIFICATIONS	Similar Same Intent

ANSI N45.2.3 - 1973	NQA-1 (1994) Subpart 2.3 (except as noted)	Comments (NOTE: OK signifies identical or nearly identical wording)
When the following standards referred to in this document are superseded by a revision approved by the American National Standards Institute, the revision shall apply.		These words are not included in NQA-1
A 10.2-I Q44 Safety Code for Building Construction		
N45.2 Quality Assurance Program Requirements for Nuclear Power Plants		
N45.2.I Cleaning of Fluid Systems and Associated Components During the Construction Phase of Nuclear Power Plants		
N45.2.2 Packaging, Shipping, Receiving, Storage and Handling of Items for Nuclear Power Plants (During the Construction Phase		
N45.2.9 Requirements for Collection, Storage and Maintenance of Quality Assurance Records		
N45.2.10 Quality Assurance Terms and Definitions.		

ANSI N45.2.4 - 1972 (IEEE 336-1971)	NQA-1 (1994) Subpart 2.4 (except as noted)	Comments (NOTE: OK signifies identical or nearly identical wording.
	Subpart 2.4 consists of ANSI/IEEE Std. 336- 1985,1 IEEE Standard Installation, Inspection, and Testing Requirements for Power, Instrumentation, and Control Equipment at Nuclear Facilities.	Guidance Only. Wording does not establish requirements.
<ol> <li>Introduction</li> <li>Introduction</li> <li>Scope. This standard sets forth the requirements for installation, inspection, and testing of Class I and Class IE electric power, instrumentation, and control equipment and systems during the construction phase of a nuclear power generating station.</li> </ol>	1. Introduction 1.1 Scope. This standard sets forth the requirements for installation, inspection, and testing of power, instrumentation, and control equipment and systems during the construction phase of a nuclear facility.	Similar Same intent
	These requirements also cover modifications and those operating phase activities that are comparable in nature and extent to related initial construction activities of the facility.	These words were added in NQA-1
These requirements are intended to assure that only materials and equipment of acceptable quality are incorporated into the plant, that quality is maintained and quality workmanship prevails throughout the construction process, and that completed installations conform to specified requirements, so as to promote public safety, prevent accidents and mitigate the consequences of accidents if they occur, and provide a high degree of plant reliability.		Guidance Only. Wording does not establish requirements.
1.1.1 In addition to the Class I and Class IE systems, the requirements also apply to the following auxiliary equipment that are a part thereof.	The intent of this standard is to establish requirements for safety systems equipment. (Safety systems equipment is defined in IEEE Std 603-1980 [5].') However, this standard may also be applied to non-safety systems equipment.	Similar Same Intent
<ol> <li>Connecting cables and raceways</li> <li>Electric and instrumentation containment penetrations</li> <li>Instrumentation sensing lines from the process root valves to and including input transducers</li> <li>Primary sensing devices (for example, orifices, flow nozzles, venturi tubes, and reference columns)</li> <li>Pneumatic instrumentation</li> <li>Output control transducers, including tubing and piping</li> <li>Fluid systems associated with standby generators and transformer cooling systems</li> <li>Switchgear fluid systems</li> <li>Panels, enclosures, and mountings</li> </ol>	IEEE Std 603-1980 includes direction and definitions which provide for the determination of the components or elements of a safety system which, when applied would define the equipment that the requirements of subpart 2.4 would apply to. This would include the equipment similar to that listed in N45.2.4.	Similar Same Intent
1.1.2 These requirements may also be extended to other appropriate parts of nuclear power generating stations when specified in contract documents.	NQA-1 Part II Introduction includes similar language with the same intent: To the extent applicable to the activities being performed, the application of this Part (Part II), or portions thereof, and the provisions of Part I, Basic and Supplementary Requirements, shall be specified in written contracts, policies, procedures, or instructions.	Similar Same Intent

ANSI N45.2.4 - 1972 (IEEE 336-1971)	NQA-1 (1994) Subpart 2.4 (except as noted)	Comments (NOTE: OK signifies identical or nearly identical wording.
1.1.3 This standard does not set forth specific requirements for the following, though related to the above equipment and systems:	1.1.1 This standard does not set forth specific requirements for the following, though they are related to the above equipment and systems.	ОК
<ol> <li>Inspection or testing, or both, of welds</li> <li>Cleaning and flushing of instrument sensing lines</li> <li>Aligning or verifying alignment, or both, of Class I rotating equipment</li> <li>Verifying structural integrity of support for Class I or Class IE electric equipment</li> </ol>	<ol> <li>Installation, inspection, and testing of welds</li> <li>Cleaning and flushing of instrument sensing lines</li> <li>Aligning or verifying alignment, or both, of rotating equipment</li> <li>Verifying structural integrity of supports for equipment</li> <li>Activity governed by Section III of [6]</li> <li>Preoperational tests of the integrated systems and equipment</li> <li>Periodic testing and maintenance after initial operation</li> <li>Receiving inspection and test</li> <li>Non-destructive examination when required</li> </ol>	Similar Same Intent Items 5 - 9 added
	1.1.2 During the construction phase and when modifications are being performed, this standard shall be used in conjunction with the applicable portions of ANSI/ASME NQA-1-1983 [1) and ANSI/ASME NQA-2-1983 [2).	Redundant. NQA-1 has incorporated IEEE 336 as Subpart 2.4 of NQA-1.
	During the operations phase this standard shall be used with the applicable portions of ANSI/ANS 3.2-1982 [3].	These words were added in NQA-1 NMC substitutes the QATR for ANS 3.2.
For applicable codes on the above refer to Section 9.		Guidance Only. Wording does not establish requirements.
1.2 Applicability. The requirements set forth in this standard apply to the work of any organization that participates in the construction phase of electric and instrumentation equipment and systems from the time that the equipment is turned over to the installers until the time it is integrated into systems in a condition to commence system performance testing.	1.2 Applicability. The requirements set forth in this standard apply to the work of any organization that participates in the installation, inspection, testing, or modification of power, instrumentation, and control equipment and systems in a nuclear facility from the time that the equipment is turned over for installation until it is integrated into a system.	Similar Same Intent
	The extent to which the individual requirements of this standard apply either wholly or in part depends upon the nature and scope of the work to be performed and the importance of the item or service involved.	These words were added in NQA-1
The requirements of this standard are basic minimum requirements which relate to nuclear power generating stations during construction or construction phases of modification or expansion.		Guidance / Informational

ANSI N45.2.4 - 1972	NQA-1 (1994) Subpart 2.4	Comments
(IEEE 336-1971)	(except as noted)	(NOTE: OK signifies identical or nearly identical wording.
For supplementary requirements applicable to the construction phase of multi-unit stations, including expansions to existing stations, refer	NQA-1 Part II Introduction includes similar language with the same intent:	Similar Same Intent
to Appendix A.	8 MULTI-UNIT FACILITY PROVISIONS	
	For construction activities in a nuclear power plant where one or more units is already operating or has reached a stage where the fuel has been loaded in the reactor and associated systems energized, the following measures shall be taken in addition to the provisions defined elsewhere in this Part (Part II).	
1.3 Responsibility. The organization or organizations responsible for establishing the applicable requirements for the activities covered by this standard shall be identified, and the scope of their responsibility shall be documented.	Basic Requirement 1 The organizational structure, functional responsibilities, levels of authority, and lines of communication for activities affecting quality shall be documented.	ОК
	Supplement 1S-1	
	3.1 Where more than one organization is involved in the execution of activities covered by this Part (Part 1), the responsibility and authority of each organization shall be clearly established and documented.	
	The planning operations stipulated in Section 3.2 shall specify the inspections and tests to be performed on the identified equipment and systems consistent with this standard.	These words were added in NQA-1
The work of establishing practices and procedures and providing the resources in terms of personnel, equipment, and services necessary to implement the requirements of this standard may be delegated to other organizations, and such delegations shall also be documented.	The work of establishing practices and procedures and providing the resources, in terms of personnel, equipment, and services, to implement the requirements of this standard, may be delegated to other organizations. Such delegation shall be documented.	OK
	In any case, the organization invoking this standard shall retain responsibility for overall program effectiveness.	These words were added in NQA-1
It is the responsibility of each organization participating in site construction activities to comply with the procedures and instructions	NQA-1 Part II Introduction includes similar language with the same intent:	Similar Same Intent
issued for the project.	The organization upon which this Part (Part II), or portions thereof, is invoked shall be responsible for complying with the specified requirements.	
1.4 Definitions. The following definitions are provided to assure uniform understanding of select terms as they are used in this standard.	NQA-1 Part II Introduction includes similar language with the same intent:	Similar Same Intent
	6 DEFINITIONS	
	Definitions unique to the activities described in this Part (Part II) are included in the section dealing with that activity. Definitions generic to quality assurance activities are included in Part I, Supplement S-i, Terms and Definitions. IEEE 336 also refers to IEEE 603: Safety Systems equipment is defined in IEEE Std 603- 1980	

ANSI N45.2.4 - 1972 (IEEE 336-1971)	NQA-1 (1994) Subpart 2.4 (except as noted)	Comments (NOTE: OK signifies identical or nearly identical wording.
Class I equipment. Equipment that is essential to the safe shutdown and isolation of the reactor or whose failure or damage could result in significant release of radioactive material.	Defined in IEEE 603-1980	Similar Same Intent
Class IE electric systems. The systems that provide the electric power used to shut down the reactor and limit the release of radioactive material following a design basis event.	Defined within IEEE 603-1980	Similar Same Intent
system performance testing. Tests performed on completed systems, including all their electric, instrumentation, controls, fluid and mechanical subsystems under normal or simulated normal process conditions of temperature, flow, level, pressure, etc.	7.2.2 System Tests Tests shall be made to verify that all parts of a system properly coordinate with each other.	Similar Same Intent
set point. A predetermined level at which a bistable device changes state to indicate that the quantity under surveillance has reached the selected value.		Term now commonly used in the nuclear industry. NQA/IEEE chose not to include them in later revisions of NQA-1 and IEEE-336
lay-up. Idle condition of equipment and systems during and after installation, with protective measures applied as appropriate.		Term now commonly used in the nuclear industry. NQA/IEEE chose not to include them in later revisions of NQA-1 and IEEE-336
1.5 Referenced Documents. Other documents that are required to be included as a part of this standard, as well as the issue or edition of such documents, are either identified at the point of reference or described in Section 9 of this standard.		Guidance Only. Wording does not establish requirements. QATR A.7.3 identifies applicable reference documents.
2. General Requirements Measures shall be established and implemented for documenting installation, inspection, and testing operations to verify conformance to specified requirements.	3. General Requirements Measures shall be established and implemented for planning and control of installation, inspection, and testing activities to verify conformance to specified requirements.	Similar Same Intent
2.1 Planning. The installation, inspection, and testing activities shall be planned and outlined to define the operations to be used and the systematic, sequential progression of operations for each item or system, the responsibilities of parties concerned for each operation, and the measures employed to preserve the quality of equipment.	3.2 Planning. The installation, inspection, and testing activities shall be performed in accordance with documented plans that define the operations to be used, the systematic, sequential progression of operations for each item or system, the responsibilities of parties concerned for each operation, and the measures employed to preserve the quality of equipment.	OK

ANSI N45.2.4 - 1972 (IEEE 336-1971)	NQA-1 (1994) Subpart 2.4 (except as noted)	Comments (NOTE: OK signifies identical or nearly identical wording.
Planning shall take into account the need for the preparation and control of procedures and work instructions necessary to comply with the requirements for installation, inspection, and testing of components and systems.	Planning shall take into account the need for the preparation and control of procedures and work instructions necessary to comply with the requirements for installation, inspection, and testing of equipment and systems.	ОК
Planning shall include a review of the system and component design specifications and drawings, and of the construction work plans and schedules, to assure that installation, inspection, and testing activities have been incorporated, that they can be accomplished as specified, and that time and resources are sufficient to accomplish the required actions.	Planning shall include a review of the system and equipment specifications and drawings and of the construction work plans and schedules to assure that installation, inspection, and testing activities have been incorporated and that they can be accomplished as specified.	Same except for the omission from NQA-1 of "and that time and resources are sufficient to accomplish the required actions".
2.2 Prerequisites.	3.1 Prerequisites.	ОК
The following conditions shall have been met as required by other standards before the requirements set forth in this standard are applied.		Guidance
(1) Qualification of personnel assigned to the construction phase has been in accordance with the requirements of appropriate codes and standards.	3.7 Personnel Qualification. Personnel performing the verifications required by this standard shall be qualified in accordance with an approved quality assurance program.	Similar Same Intent
(2) Systems have been designed and engineered and equipment has been specified in accordance with the published applicable standards and specifically within the frame- work of the Quality Assurance program described in the Safety Analysis Report.		QATR B.2 invokes Basic Requirement 3 and Supplement 3S-1 which provides for design controls that achieve the same intent.
(3) Materials have been selected, and equipment has been fabricated and shop assembled, in accordance with the specifications and the applicable published codes and standards, the conformance to which has been demonstrated by the manufacturer.		QATR B.5 invokes Basic Requirement 7 and Supplement 7S-1 which provides for purchasing controls that achieve the same intent.
(4) Materials and equipment have been shipped, received, handled and stored in accordance with the requirements of applicable codes, standards, and manufacturers' recommendations to preserve their integrity and prevent physical, mechanical, and/or electrical damage.		QATR B.7 invokes Basic Requirement 13 and Supplement 13S-1 which provides for shipping, handling and receiving controls that achieve the same intent.

ANSI N45.2.4 - 1972 (IEEE 336-1971)	NQA-1 (1994) Subpart 2.4 (except as noted)	Comments (NOTE: OK signifies identical or
(5) The following documents relating to the specific equipment to be installed are available at the construction site:	The following applicable documents relating to the specific equipment to be installed shall be available in legible form at a predetermined retention area or area of usage.	nearly identical wording. Similar Same Intent
<ul> <li>(a) The latest applicable approved-for- construction drawings</li> <li>(b) Installation specifications</li> <li>(c) Manufacturers' instructions</li> <li>(d) Evidence of compliance by manufacturer with purchase requirements, including quality assurance requirements</li> <li>(e) Records of inspections and tests during on- site storage and handling.</li> </ul>	<ol> <li>The latest applicable approved-for- construction drawings</li> <li>Installation specifications</li> <li>Manufacturers' instructions</li> <li>Evidence of compliance by manufacturer with purchase requirements, including quality documentation</li> <li>Records of inspections and tests during receiving and on-site storage, handling, and maintenance</li> </ol>	Similar Same Intent
2.3 Procedures and Instructions. Installation, inspection, and test procedures and work instructions shall be prepared and documented for those activities falling within the scope of this standard.	3.3 Procedures and Instructions. Procedures shall be prepared and documented as determined by the planning in 3.2.	Similar Same Intent
	These procedures and instructions may be in the form of manuals or drawings.	These words were added in NQA-1
These documents shall be kept current and revised as necessary to assure that installation, inspections, and tests are performed in accordance with latest information and shall include as appropriate:	These documents shall be kept current by controlled supervision so that installation, inspections, and tests are performed in accordance with the latest approved design and manufacturers' instructions. The documents shall include or reference:	Similar Same Intent
<ol> <li>Installation specifications</li> <li>Inspection and test objectives</li> <li>Precautions to avoid component or sys-tem damage during testing or inspection</li> <li>Inspection and test equipment required</li> <li>Sequence of tests (if applicable)</li> <li>Sequential actions to be followed</li> <li>Frequency of inspection or test</li> <li>Prerequisites</li> <li>Approvals</li> <li>Data report form</li> <li>Identification of test required for interpretation of test results</li> <li>Inspection and test acceptance limits</li> </ol>	<ol> <li>Installation specifications</li> <li>Inspection and test objectives</li> <li>Precautions to avoid equipment or system damage during installation, testing, or inspection</li> <li>Inspection and test equipment required</li> <li>Sequence of tests</li> <li>Sequential actions to be followed</li> <li>Frequency of inspection or test</li> <li>Test prerequisites</li> <li>Appropriate approvals</li> <li>Suitable form for reporting data</li> <li>Provision for identification of test equipment and date of next required recalibration (where required) for interpretation of test results</li> <li>Inspection and test acceptance limits</li> <li>References</li> <li>Other pertinent items</li> </ol>	Similar Same Intent
	The above items shall be included as a check list and shall be marked as required or not appropriate when preparing procedures or instructions.	These words were added in NQA-1
2.4 Results. Inspection and test results shall be documented in a suitable test report or data sheet.	3.4 Results. Inspection and test results shall be documented in a suitable test report or data sheet.	ОК
Each report shall identify the item to which it applies, the procedures or instruction followed in performing the task, and the identification of the following:	Each report shall identify the item to which it applies, the procedures or instructions and its revision number used in performing the task, and the identification of the following:	ОК

ANSI N45.2.4 - 1972 (IEEE 336-1971)	NQA-1 (1994) Subpart 2.4 (except as noted)	Comments (NOTE: OK signifies identical or nearly identical wording.
<ul> <li>(1) Conditions encountered which were not anticipated, including nonconformance</li> <li>(2) Identity of inspector or tester</li> <li>(3) Completion date</li> </ul>	<ol> <li>Conditions encountered that were not anticipated, including nonconformance</li> <li>Identity of inspector or tester</li> <li>Completion date</li> </ol>	OK
Test reports and data sheets shall include an evaluation of the acceptability of inspection and test results and provide for identifying the individual who performed the evaluation.	Test reports or data sheets shall include an evaluation of the acceptability of the results and provide for identifying the individual who performed the evaluation.	ОК
2.5 Measuring and Test Equipment.	3.5 Measuring and Test Equipment.	ОК
2.5.1 Selection. Inspection and testing equipment with acceptable accuracy for performing the	NQA-1 Basic Requirement 12 includes similar language with the same intent: 2 Selection	Similar Same Intent
	Selection of measuring and test equipment shall be controlled to assure that such times are of proper type, range, accuracy, and tolerance to accomplish the function of determining conformance to specified requirements.	
	Measuring and test equipment used to determine compliance with specifications shall be controlled in accordance with the requirements of IEEE Std 498-1985 [4].	These words were added in NQA-1
When general voltage levels, flow directions, or other parameters are checked, an instrument without high precision may be used.	NQA-1 Basic Requirement 12 includes similar language with the same intent: 3.3 Commercial Devices Calibration and control measures may not be required for rulers, tape measures, levels and other such devices, if normal commercial	Similar Same Intent
When characteristics, efficiencies, capabilities, or other properties are measured to appraise compliance with specifications, the instrument must have adequate accuracy to determine the measured quantity to the precision required by the stated limits of the specifications.	equipment provides adequate accuracy. NQA-1 Basic Requirement 12 includes similar language with the same intent: 2 Selection Selection of measuring and test equipment shall be controlled to assure that such items are of proper type, range, accuracy, and tolerance to accomplish the function of determining conformance to specified requirements.	Similar Same Intent
Use shall be made of approved industry standards relating to measuring procedures.		These words are not in NQA-1 or the QATR
Test equipment and/or apparatus supplying electrical, mechanical, or other test inputs shall have adequate capacity and be compatible with items under test so that the results will not be distorted.	NQA-1 Basic Requirement 12 includes similar language with the same intent: 2 Selection Selection of measuring and test equipment shall be controlled to assure that such items are of proper type, range, accuracy, and tolerance to accomplish the function of determining conformance to specified requirements.	Similar Same Intent

ANSI N45.2.4 - 1972	NQA-1 (1994) Subpart 2.4	Comments
(IEEE 336-1971)	(except as noted)	(NOTE: OK signifies identical or nearly identical wording.
2.5.2 Calibration and Control. Measuring and test equipment used to determine compliance with specifications, shall be adjusted and	NQA-1 Basic Requirement 12 includes similar language with the same intent:	Similar Same Intent
calibrated at prescribed intervals against certified equipment having known valid	3 Calibration and Control	
relationships to nationally recognized standards.	3.1 Calibration	
	Measuring and test equipment shall be calibrated, adjusted, and maintained at prescribed intervals or prior to use, against certified equipment having known valid relationships to nationally recognized standards.	
If no national standards exist, the basis for calibration shall be documented.	NQA-1 Basic Requirement 12 includes similar language with the same intent:	Similar Same Intent
	If no nationally recognized standards exist, the bases for calibration shall be documented.	
Records of the calibrations shall be maintained and equipment suitably marked to indicate date of next required calibration.	NQA-1 Basic Requirement 12 includes similar language with the same intent:	Similar Same Intent
	5 Records	
	Records shall be maintained and equipment shall be suitably marked to indicate calibration status.	
When inspection and testing equipment are found to be out of calibration, an evaluation shall be made of the validity of previous inspection or test results and of the acceptability of items previously inspected or tested.	NQA-1 Basic Requirement 12 includes similar language with the same intent: When inspection and testing equipment are found to be out of calibration, an evaluation shall be made and documented of the validity of previous inspection or test results and of the acceptability of items previously inspected or tested.	Similar Same Intent
Test equipment found to be out of calibration shall be clearly identified as such.	NQA-1 Basic Requirement 12 includes similar language with the same intent: Out-of-calibration devices shall be tagged or segregated	Similar Same Intent
2.6 Nonconforming Items. Defects, deficiencies, discrepancies, or other nonconforming situations shall be resolved in accordance with established procedures.	3.6 Nonconforming Items. Defects, deficiencies, discrepancies, or other nonconforming situations shall be resolved in accordance with established procedures.	ОК
These procedures shall provide for identifying, documenting, and obtaining authorization for resolving each nonconforming situation.	These procedures shall provide for identifying, documenting, and obtaining authorization for resolving each nonconforming situation.	ОК
3. Preconstruction Verification	4. Preinstallation Verification	Similar Same Intent
While it is recognized that the requirements for initial receipt inspections and storage are covered by another standard, it is necessary to verify that the quality of an item has not suffered during the interim period.	Verifications shall be performed just prior to installation.	
It is not intended to duplicate inspections but rather to verify that items are in a satisfactory condition for installation.		Guidance / Information
The verifications shall include:	(1) The following, relating to the specific equipment to be installed, shall be available at the construction site in legible form:	Similar Same Intent

ANSI N45.2.4 - 1972	NQA-1 (1994) Subpart 2.4	Comments
(IEEE 336-1971)	(except as noted)	(NOTE: OK signifies identical or nearly identical wording.
<ol> <li>Verification that materials and equipment received by the installers are identified in accordance with the latest approved-for- construction drawings, equipment lists, and specifications</li> <li>Verification that approved procedures, instruction manuals, and/or any special work instructions if required for specific equipment are available</li> <li>Checking of records of protective measures maintained during storage for conformance to storage requirements</li> <li>Visual examination of materials and equipment to assure physical integrity such as absence of physical damage, rust or corrosion, contact contamination, and condensation</li> </ol>	<ul> <li>(a) The latest applicable approved-for- construction drawings</li> <li>(b) Installation specifications, procedures, or any special work instructions</li> <li>(2) Identification of materials and equipment in accordance with the latest approved-for- construction drawings, equipment lists, and specifica-tions</li> <li>(3) Documentation of protective measures taken during storage</li> <li>(4) Physical integrity by visual examination of materials and equipment for damage, corrosion, contamination, and condensation.</li> </ul>	Similar Same Intent
Equipment shall be located, installed, assembled, and/or connected in strict accord- ance with the following as applicable:	5.1 Equipment Placement. Equipment shall be located, installed, assembled, and connected in strict accordance with the following:	Similar Same Intent
<ol> <li>(1) Latest approved-for-construction drawings</li> <li>(2) Manufacturers' instructions</li> <li>(3) Installation specifications and procedures</li> </ol>	<ol> <li>Latest approved-for-construction drawings</li> <li>Installation specifications and procedures, where required by the planning of 3.2</li> </ol>	Similar Same Intent NQA-1 omitted "(2) Manufacturers' instructions"
Care shall be especially exercised in following the provisions of the above documents for operations such as:	5.2 Precautions. Care shall be exercised in following the provisions of the documents listed in 5.1 for operations such as:	Similar Same Intent
<ul> <li>(1) Cable pulling</li> <li>(2) Cable splicing</li> <li>(3) Cable terminating</li> <li>(4) Cable routing including maintaining required separation between redundant systems</li> <li>(5) Tagging and/or identifying various items including cable</li> <li>(6) Installing electric and instrumentation penetration assemblies and assuring the integrity of the containment seals</li> </ul>	<ul> <li>(1) Cable pulling</li> <li>(2) Cable splicing</li> <li>(3) Cable terminating</li> <li>(4) Cable and instrument sensing line routing, including maintenance of required separation between redundant systems</li> <li>(5) Tagging or identifying, or both, various items, including cable, and temporary conditions</li> <li>(6) Installing electric and instrumentation penetration assemblies and assuring the integrity of the containment seals</li> <li>(7) Installation of fire stops and fire barriers</li> <li>(8) Installation of instrumentation piping or tubing -</li> <li>(9) Mounting and supporting of equipment</li> <li>(10) Removal of temporary shipping supports and holddown bolts</li> <li>(11) Installation of environmental and pressure seals</li> </ul>	Similar Same Intent Items 7 - 10 added in NQA-1
5. Verification During Construction	6. Verification During Installation	Similar Same Intent
5.1 Inspections. Surveillance of construction activities shall include inspections of the work areas and the work in progress to assure conformance to applicable requirements.	Verification during installation shall include inspections and tests performed in accordance with the QA program requirements.	Similar Same Intent
Inspections shall include the following, as appropriate:	6.1 Inspections. Inspections performed during installation shall include the following.	Similar Same Intent

ANSI N45.2.4 - 1972 (IEEE 336-1971)	NQA-1 (1994) Subpart 2.4 (except as noted)	Comments (NOTE: OK signifies identical or nearly identical wording.
5.1.1 Inspections to Verify Correctness of Installation. Inspection shall be made to verify that equipment is being located, installed, assembled, and/or connected to comply with latest approved-for-construction drawings, manufacturers' instructions, and installation specifications.	6.1.1 Inspections to Verify Correctness of Installation. Inspections shall be performed to verify that equipment is being located, installed, assembled, and connected to comply with latest approved-for-construction drawings and installation specifications and procedures.	Similar Same Intent
Such inspections shall include, as appropriate, verification of:	Inspections shall include such items as verification of:	ок
<ul> <li>(1) Leveling and alignment</li> <li>(2) Clearances and tolerances</li> <li>(3) Proper location and routing of cables and sensing lines</li> <li>(4) Tightness of connections and fastenings</li> <li>(5) Freedom of movement</li> <li>(6) Correct polarity</li> <li>(7) Proper grounding</li> <li>(8) Terminations</li> <li>(9) Fluid levels and pressures</li> <li>(10) Absence of leaks</li> <li>(11) Physical integrity</li> <li>(12) Identifications</li> </ul>	<ul> <li>(1) Leveling and alignment (nonrotating equipment)</li> <li>(2) Clearances and tolerances</li> <li>(3) Location, support, and routing of cables and sensing lines</li> <li>(4) Tightness of connections and fastenings and use of proper tools</li> <li>(5) Freedom of movement</li> <li>(6) Polarity</li> <li>(7) Grounding and shielding</li> <li>(8) Terminations</li> <li>(9) Fluid levels and pressures</li> <li>(10) Absence of leaks</li> <li>(11) Physical integrity</li> <li>(12) Identifications</li> <li>(13) Circuit fusing</li> <li>(14) Equipment rating</li> <li>(15) Fire stops and fire barriers</li> <li>(16) Installation of mountings and supports</li> <li>(17) Lubrication of bearings</li> <li>(18) Environmental and pressure seals</li> </ul>	Similar Same Intent Items 13 - 18 added in NQA-1
5.1.2 Inspections to Verify Housekeeping. Inspections shall be made to verify adequacy of housekeeping in work areas.	6.1.2 Inspections to Verify Housekeeping and Protective Measures. Inspections shall be performed to verify the adequacy of housekeeping in work areas [2].	ОК
	Inspections shall be performed on a regular schedule and properly documented to verify that the following protective measures are adequate.	These words were added in NQA-1
	(1) Protective measures applied for lay-up during construction are in accordance with procedures or specifications	These words were added in NQA-1
Adequacy of barriers and protective covers shall be evaluated to assure that items will not be damaged as a result of adjacent construction activity.	(2) Protective measures to prevent damage as a result of adjacent activity	Similar
Adequacy of protective measures shall be evaluated to assure that equipment being used for testing will not be damaged.	(3) Protective measures to prevent damage to measuring and test equipment during field use	Similar
5.1.3 Inspection of Temporary Conditions.	6.1.3 Inspections of Temporary Conditions.	ОК

ANSI N45.2.4 - 1972	NQA-1 (1994) Subpart 2.4	Comments
(IEEE 336-1971)	(except as noted)	(NOTE: OK signifies identical or nearly identical wording.
Inspections shall be made to verify adequacy of protective measures applied for layup during construction.	<ol> <li>Protective measures applied for lay-up during construction are in accordance with procedures or specifications</li> </ol>	Similar Same Inten
All temporary connections, such as jumpers and bypass lines, and temporary set points of control equipment shall be clearly identified and documented so that subsequent restoration can be ascertained prior to placing the item in service.	Inspections shall be performed to verify that all temporary connections, such as jumpers and bypass lines and temporary setpoints of control equipment, are clearly identified and documented so that subsequent restoration can be ascertained prior to placing the item in service.	
5.2 Tests.	6.2 Tests.	ОК
Surveillance of construction activities shall include tests performed in accordance with written test procedures to verify that items being installed comply with specified quality and performance requirements. These tests should be performed at appropriate points in the construction phase as access permits or when questions arise as to the quality of components or workmanship. Where preliminary operation of equipment, during construction, is utilized for a testing function, the purpose of the test, its scope, and results shall be clearly established and documented. Tests shall be repeated if construction or associated activity affects the results of the tests. The need to repeat a test shall be ascertained at the time of preparing for post-construction testing in accordance with 6.2. Tests during construction shall include the following:	NQA-1 Part II Introduction includes similar language with the same intent: Installation, inspection, test procedures, and work instructions identified during planning shall be prepared. When these tests serve as a prerequisite or a part of the test of the completed system, a review of construction activity that may have affected the results shall be made. Manufacturers' tests on fabricated items may be accepted for equipment not disturbed during the construction phase. Tests performed during installation shall be those specified in the planning in 3.2 and shall include a selection of the following.	Similar Same Intent
5.2.1 Electrical Tests.	6.2.1 Electrical Tests	ОК
The following electrical tests shall be performed:		Editorial difference. Same effect
<ul> <li>(1) tests to ascertain circuit continuity, absence of short circuits, correct polarity and correct direction of rotation</li> <li>(2) Tests to ascertain proper functioning of systems, including indicating meters, recorders, transducers, targets and lamps, annunciators and alarms, controls and interlocks</li> <li>(3) Voltage breakdown tests on liquid insulation</li> <li>(4) Overpotential tests as specified</li> <li>(5) Insulation resistance measurements as specified</li> </ul>	<ul> <li>(1) Tests to ascertain circuit continuity, absence of improper grounds and short circuits, correct polarity and correct direction of rotation</li> <li>(2) Tests to ascertain proper phasing and functioning of equipment, including indicating meters, recorders, transducers, targets and lamps, annunciators and alarms, controls, interlocks, protective relays and breakers</li> <li>(3) Voltage breakdown tests on fluid insulation</li> <li>(4) Overpotential tests as specified</li> <li>(5) Insulation resistance measurements as specified</li> </ul>	Similar Same Intent "Protective relays and breakers" added to item 2
When overpotential tests are performed, the values shall conform to the applicable codes and standards. The manufacturers' recommendations shall always be considered.	When overpotential tests are performed, the manufacturers' recommendations shall be considered.	Similar Same Intent

ANSI N45.2.4 - 1972 (IEEE 336-1971)	NQA-1 (1994) Subpart 2.4 (except as noted)	Comments (NOTE: OK signifies identical or nearly identical wording.
5.2.2 Mechanical Tests. Mechanical tests shall be performed to ascertain that electric and/or instrumentation components or systems can withstand systems pressure ratings. As a minimum, such tests shall be applied to pressure sensing and transmitting devices operating in steam, hydraulic, and vacuum systems and their hydraulic or pneumatic interconnecting piping or tubing and associated instruments.	6.2.3 Mechanical Tests. Leak or flow tests shall be performed to demonstrate the operation of electric instrumentation equipment or systems. As a minimum, such tests shall be applied to pressure sensing and transmitting devices operating in steam, hydraulic, or pneumatic interconnecting piping or tubing and associated instruments to ascertain that they can withstand systems pressure ratings.	Similar Same Intent
Pressurized equipment which is a part of electric apparatus such as heat exchangers, circulating systems, actuating systems, and electric and instrumentation containment penetrations shall likewise be tested if site assembled or fabricated.	Pressurized equipment that is a part of electric apparatus, such as heat exchangers, circulating systems, actuating systems, and electric and instrumentation containment penetrations, shall be tested.	Similar Same Intent
Manufacturers' tests on fabricated items may be accepted for equipment not disturbed during the construction phase.	6.2 Tests. Manufacturers' tests on fabricated items may be accepted for equipment not disturbed during the construction phase.	OK
These tests shall be in accordance with the applicable codes and standards.	(3.2) Planning shall take into account the need for the preparation and control of procedures and work instructions necessary to comply with the requirements for installation, inspection, and testing of equipment and systems.	Planning per 3.2 establishes appropriate requirements
If equipment is assembled at the construction site, tests shall be conducted after the assembly is complete even though the components may have been previously tested.	(1.2) . The requirements set forth in this standard apply to the work of any organization that participates in the installation, inspection, testing, or modification of power, instrumentation, and control equipment and systems in a nuclear facility from the time that the equipment is turned over for installation until it is integrated into a system.	Applicability of this part is to activities related to final installation and construction
5.2.3 Physical and Chemical Tests. These tests shall include, as appropriate:	6.2.2 Physical and Chemical Tests	Similar Same Intent
<ul> <li>(1) Chemical analyzing of fluids for oxygen or moisture content and purity</li> <li>(2) Radiation sensitivity testing to confirm that radiation sensors and controlling devices are properly functioning</li> </ul>	<ul> <li>(1) Chemical analysis of fluids for oxygen or moisture content and purity</li> <li>(2) Radiation testing to confirm that radiation sensors and controlling devices are properly functioning.</li> </ul>	OK
These tests shall be in accordance with the applicable codes in Appendix B.		Planning per 3.2 establishes appropriate requirements
<ul><li>6. Post-Construction Verification</li><li>6.1 Inspections. Installed equipment and systems shall be inspected to verify the following:</li></ul>	<ul><li>7. Post-Installation Verification</li><li>7.1 Inspections. Installed equipment and systems shall be inspected to verify that:</li></ul>	ОК

ANSI N45.2.4 - 1972 (IEEE 336-1971)	NQA-1 (1994) Subpart 2.4 (except as noted)	Comments (NOTE: OK signifies identical or
<ul> <li>(1) That equipment and materials have not sustained damage during installation</li> <li>(2) That good and proper workmanship has prevailed</li> <li>(3) That the installation has been made in accordance with specified requirements</li> <li>(4) That all nonconforming items have been satisfactorily resolved</li> <li>(5) That appropriate protective measures are applied for lay-up after installation</li> </ul>	<ol> <li>Equipment and materials have not sustained damage during installation</li> <li>Good and proper workmanship has prevailed</li> <li>The installation has been made in accordance with specified requirements</li> <li>All nonconforming items have been satisfactorily resolved</li> <li>Appropriate protective measures are applied for lay-up after installation</li> </ol>	OK
(6) That all temporary conditions such as jumpers, bypass lines, and temporary set points have been clearly identified so that subsequent restoration can be ascertained prior to placing the items in service	(6) All temporary conditions, such as jumpers, lifted leads, bypass lines, and temporary set- points, have been clearly identified so that subsequent restoration can be ascertained prior to placing the items in service.	ОК
To satisfy the above objectives, inspections defined in 5.1 shall be repeated, as appropri- ate.	To satisfy the above objectives, it may be necessary to repeat some of the inspections defined in 6.1.	Similar Same Intent
6.2 Tests. Installed equipment and systems shall be tested to demonstrate that the installation has been made in accordance with design requirements and that the operation gives the desired result.	7.2 Tests. Installed equipment and systems shall be tested to demonstrate that they have been in- stalled in accordance with design requirements and that the operation gives the desired result.	OK
Temporary electrical connections, temporary piping sections, abnormal chemical solutions, unspecified setting of devices, the fixing of a moving component, or the effecting of any other abnormality if made previously shall be rectified before final testing except in cases where fuel loading or other critical operations prevent using the complete assembly for the test.	Temporary electrical connections, temporary piping sections, abnormal chemical solutions, unspecified setting of devices, the temporary blocking or the effecting of any other abnormality previously made shall be rectified before final testing except in cases where fuel loading or other operations prevent using the complete assembly for the test.	ОК
In these instances, a documented notice shall be prepared stating the substitutions that existed for the test.	In these instances, a documented notice stating the temporary test conditions shall be prepared and be referenced to the appropriate test report or data sheet.	Similar Same Intent
In final testing that precedes system performance testing, normal system readout devices and installed transducers shall be used as far as possible to monitor the operation.	In final testing that precedes preoperational testing, normal system readout devices and installed transducers shall be used as far as possible to monitor the operation.	ок
Where the installed equipment is not adequate for the purpose of conducting tests, special measuring instruments and simulating devices shall be used.	Where the installed equipment is not adequate for the purpose of conducting tests, special measuring instruments and simulating devices shall be used.	ОК
Test equipment used shall have adequate capacity and be compatible with system under test so that the results will not be distorted.	Test equipment used shall have adequate capacity and tolerance and be compatible with the system under test.	Similar Same Intent
6.2.1 Equipment Tests. Tests shall be performed to verify that the quality of installed equipment has not deteriorated during the construction phase.	7.2.1 Equipment Tests. Tests shall be performed to demonstrate that the installed equipment is in an acceptable condition to be energized where manufacturers' tests or calibrations cannot be accepted (see 6.2).	Similar Same Intent

ANSI N45.2.4 - 1972 (IEEE 336-1971)	NQA-1 (1994) Subpart 2.4 (except as noted)	Comments (NOTE: OK signifies identical or nearly identical wording.
Tests and shakedown runs shall be made on energized systems where necessary to evaluate operations and to properly condition for service (for example, the seating of brushes or bearings, the stabilization of instrumentation and burn-in of electronic devices).	Tests and shakedown runs shall be made on energized systems where necessary to evaluate operation and to properly condition for service (for example, the seating of brushes or bearings, the stabilization of instrumentation and burn-in of electronic devices).	ОК
Tests shall be made to assure that instrumentation and control channels are properly calibrated.	Tests shall be made to assure that instrumentation and control channels are properly calibrated.	ОК
In addition, specific tests shall be made at critical levels such as "set points" in a manner simulating the approach toward the set point.		Properly calibrated and proper operation imply operating correctly at the "set points"
These calibrations shall be made with these devices in their normal positions if the calibration is dependent upon location or attitude.	If the calibration is dependent upon location or orientation, then calibrations shall be made with these devices in their normal positions.	Similar Same Intent
Tests shall be made to determine that proper response is obtained over the operating range of the device.	Tests shall be made to determine that proper operation is obtained over the range of the device.	Similar Same Intent
Particular attention shall be given to verifying independence and dependence, as appropriate, of the elements of the systems.	Particular attention shall be given to verifying independence and dependence, as appropriate, of the elements of the systems.	ОК
Items requiring calibration shall be tagged or labeled on completion indicating date of calibration and identity of person that performed the calibration.	Items requiring calibration shall be identified by tags or labels indicating the identity of the person who performed the calibration and the date of the next required calibration.	Similar Same Intent
6.2.2 System Tests. These tests shall be made to verify that all parts of a system properly coordinate with each other.	7.2.2 System Tests. Tests shall be made to verify that all parts of a system properly coordinate with each other.	ОК
Tests shall be made with attention given to demonstrating required independence and dependence of subsystems.	Tests shall be made with attention given to demonstrating required independence and dependence of subsystems.	ОК
Consideration shall be given to demonstrating freedom from unwanted or harmful effects of conducted or induced electrical noise.	Consideration shall be given to the need for demonstrating freedom from unwanted or harmful effects of conducted or induced electrical noise.	Similar Same Intent
A review shall be made of all testing that has preceded the final integrated system testing including both the tests made on assemblies and components with particular attention given to those that demonstrate functional or operational results.	A review shall be made of testing that has preceded the final integrated system testing, including the tests made on equipment with particular attention given to those that demonstrate functional or operational results.	ОК
When these tests serve as a prerequisite or a part of the final system test, a review of construction activity which may have affected the results shall be made.	When these tests serve as a prerequisite or a part of the test of the completed system, a review of construction activity that may have affected the results shall be made.	ОК

ANSI N45.2.4 - 1972 (IEEE 336-1971)	NQA-1 (1994) Subpart 2.4 (except as noted)	Comments (NOTE: OK signifies identical or nearly identical wording.
The final construction-phase testing shall be made with all assemblies and components of subsystems complete except where a critical operation requires that temporary electrical connections, piping sections, or structural supports be installed to make the tests.	The final construction-phase testing shall be made with all equipment of subsystems complete except where an operation requires that temporary electrical connections, piping sections, or structural supports be installed to make the tests.	Similar Same Intent
<ol> <li>Data Analysis and Evaluation</li> <li>Procedures shall be established for process-ing inspection and test data and their analysis and evaluation.</li> </ol>	8. Data Analysis and Evaluation Procedures shall be established for processing inspection results and analyzing and evaluating test data.	Similar Same Intent
These procedures shall include acquisition and reduction of inspection and test data for prompt evaluation against acceptance criteria, operating limits and performance standards.	These procedures shall include requirements for reduction of inspection and test data for review or evaluation against acceptance criteria.	Similar Same Intent
The data processing procedures shall provide for "on-the-spot" evaluation to determine the validity of the inspection and test results, the appropriateness of continuing the inspection or test.		These words are not in NQA-1 or the QATR
The data shall be analyzed and evaluated to verify completeness of results, achievement of inspection and test objectives, and operational proficiency of equipment and systems; to identify additional inspection and/or tests required; and to identify necessary changes to the installation inspection or test procedures	The data shall be analyzed and evaluated to verify completeness, achievement of objectives, and correct operation of equipment and systems, and to identify any additional inspection or tests required.	Similar Same Intent
Inspection and test results that include inspection and test data, together with a report of data analysis and evaluation, shall be provided as specified in Section 8.	<ul> <li>3.4 Results. Inspection and test results shall be documented in a suitable test report or data sheet.</li> <li>Each report shall identify the item to which it applies, the procedures or instructions and its revision number used in performing the task, and the identification of the following: <ol> <li>Conditions encountered that were not anticipated, including nonconformance</li> <li>Identity of inspector or tester</li> <li>Completion date</li> </ol> </li> <li>Test reports or data sheets shall include an evaluation of the acceptability of the results and provide for identifying the individual who performed the evaluation.</li> </ul>	Similar Same Intent
8. Records	9 Records	Similar Same Intent
Record copies of completed procedures, re- ports, personnel qualification records, test equipment calibration records, test deviation or exception records, and inspection and examination records shall be prepared.	Copies of construction records such as approved procedures, personnel qualifications, test equipment calibration records, deviation or exception records, and inspection and test records shall be prepared.	
These shall be placed with other project records as required by code, standard, specification, or project procedures.	These shall be placed with other project records as required by code, standard, specification, or project procedures.	OK

ANSI N45.2.4 - 1972 (IEEE 336-1971)	NQA-1 (1994) Subpart 2.4 (except as noted)	Comments (NOTE: OK signifies identical or nearly identical wording.
9. Applicable Codes, Standards, and Guides	2. References	QATR A.7.3
guides shall be used.		
In cases where codes or standards were intended to cover the manufacturing phase of an item, these codes shall be used as guides.		QATR A.7.3
Refer to Appendix B for a listing, not necessarily complete, of additional codes, standards, and guides that should be considered during the construction phase.	NQA-1 Part II Introduction includes similar language with the same intent: 7 REFERENCED CODES, STANDARDS, AND SPECIFICATIONS All codes, standards, and specifications that are referenced as a part of this Part (Part II) are listed in the Table entitled "Codes, Standards, and Specifications Referenced in Text."	Similar Same Intent
The following guides or standards refer specifically to nuclear power generating stations and their construction, and shall be considered applicable.		QATR A.7.3
	When the following standards referred to in this document are superseded by a revision approved by the American National Standards Institute, the revision is not mandatory until it has been incorporated as part of this standard.	QATR A.7.3

ANSI N45.2.4 - 1972	NQA-1 (1994) Subpart 2.4	Comments
(IEEE 336-1971)	(except as noted)	(NOTE: OK signifies identical or nearly identical wording.
<ul> <li>(1) IEEE Std 279-1971, Criteria for Protection Systems for Nuclear Power Generating Stations</li> <li>(2) IEEE Std 308-1971, Criteria for Class IE Electric Systems for Nuclear Power Generating Stations</li> <li>(3) IEEE Std 317-1971, Electric Penetration Assemblies in Containment Structures for Nuclear Fueled Power Generating Stations</li> <li>(4) IEEE Std 323-1971, Guide for Qualification of Class I Electric Equipment for Nuclear Power Generating Stations</li> <li>(5) ANSI 18.2-1965, Nuclear Safety Criteria for the Design of Stationary Pressurized Water Reactor Plants</li> <li>(6) ANSI B31.7-1969, Nuclear Power Piping</li> <li>(7) IEEE Std 334-1971, Guide for Type Tests of Continuous-Duty Class I Motors In- stalled Inside the Containment of Nuclear Power Generating Stations</li> <li>(8) IEEE Std 336-1971, Installation, Inspection and Testing Requirements for Instrumentation and Electric Equipment During the Construction of Nuclear Power Generating Stations</li> <li>(9) IEEE Std 338-1971, Trial-Use Criteria for the Periodic Testing of Nuclear Power Generating Station Protection Systems</li> <li>(10) IEEE Std 344-1971, Trial-Use Guide for Seismic Qualification of Class I Electric Equipment for Nuclear Power Generating Stations</li> </ul>		QATR A.7.3
	<ol> <li>ANSI/ASME NQA-I-1983, Quality Assurance Program Requirements for Nuclear Power Plants.2</li> <li>ANSI/ASME NQA-2-1983, Quality Assurance Requirements for Nuclear Power Plants.</li> <li>ANSI/ANS 3.2-1982, Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants.</li> <li>IEEE Std 498-1985, IEEE Standard Requirements for the Calibration and Control of Measuring and Test Equipment Used in the Construction and Maintenance of Nuclear Power Generating Stations.</li> <li>IEEE Std 603-1980, IEEE Standard Criteria for Safety Systems for Nuclear Power Generating Stations.</li> <li>1984 ASME Boiler and Pressure Vessel Code.</li> </ol>	QATR A.7.3

ANSI N45.2.4 - 1972	NQA-1 (1994) Subpart 2.4	Comments
(IEEE 336-1971)	(except as noted)	(NOTE: OK signifies identical or nearly identical wording.
(These Appendixes are not a part of IEEE Standard Installation. Inspection, and Testing Requirements for Instrumentation and Electric Equipment During the Construction of Nuclear Power Generating Stations.) Appendix A Supplementary Provisions for Multi-Unit Stations For construction activity in nuclear power generating stations where one or more units are already operating or have reached a stage in their own construction where the fuel has been loaded in the reactor and associated systems energized for whatever purpose, the following measures shall be taken in addition to the provision defined in the body of this document.	10. Supplementary Provisions for Multiunit Stations and Operating Plants For construction activity in nuclear facilities where one or more units are already operating or have reached a stage in their construction where the fuel has been loaded in the reactor and associated systems energized for whatever purpose, the following measures shall be taken in addition to the provisions defined elsewhere in this standard.	Similar Same Intent
<ul> <li>Al. Planning and Preparation</li> <li>Instructions, procedures or drawings shall be prepared to control installation, inspection and testing activities at areas of interface between the new and existing units. These instructions and procedures or drawings shall define: <ol> <li>The areas of interface between the new and existing units</li> <li>Access control and authority for work at these interface areas</li> <li>Nature of potential hazards to and/or from the existing equipment</li> <li>Precautions required to be taken during installation</li> <li>Supplementary objectives for inspection and testing</li> </ol> </li> </ul>	<ul> <li>10.1 Planning and Preparation. Instructions, procedures, or drawings shall be prepared to control installation, inspection, and testing activities at areas of interface between the new and existing units. These instructions and procedures or drawings shall define the following:</li> <li>(1) The areas of interface between the new and existing units -</li> <li>(2) Access control and authority for work at these interface areas</li> <li>(3) Nature of potential hazards to or from the existing equipment</li> <li>(4) Precautions required to be taken during installation</li> <li>(5) Supplementary objectives for inspection and testing</li> </ul>	OK
A2. Documentation A2.1 The instructions, procedures or drawings described in Section AI shall be documented and shall be kept current by revisions as necessary.	10.2 Documentation 10.2.1 The instructions, procedures, or drawings described in 10.1 shall be kept current by revisions.	Similar Same Intent "documented" and "as necessary" are omitted from NQA-1

ANSI N45.2.4 - 1972 (IEEE 336-1971)	NQA-1 (1994) Subpart 2.4 (except as noted)	Comments (NOTE: OK signifies identical or nearly identical wording.
A2.2 The equipment and/or systems which are associated with existing unit(s) that are electrically energized or charged with pressurized and/or radioactive fluids and which are in the vicinity of the construction activity associated with the new unit shall be properly tagged or identified.	10.2.2 The equipment or systems which are associated with existing unit(s) that are electrically energized or charged with pressurized or radioactive fluids and which are in the vicinity of the construction activity associated with the new unit shall be properly tagged or identified.	OK
A2.3 The documentation associated with installation described in Section 2.2 of the main document shall additionally include: A2.3.i The identification of the equipment and/or system defined in 2.2 above, which poses a potential hazard in the vicinity of current construction activity. A2.3.2 Level of potential hazard from such neighboring energized systems, such as: volt- age, radiation level, fluid pressure and/or temperatures.	10.2.3 The documentation associated with installation described in 10.2.2 shall also include: (1) The identification of the equipment or sys-tem defined in 10.2.2 which poses a potential hazard in the vicinity of current construction activity (2) Identification of the potential hazard of such neighboring energized systems as voltage, radiation level, fluid pressure, or temperatures	ОК
A2.4 Authorizations for access to and work at the areas of interface between the new and existing units shall be documented.	10.2.4 Authorizations for access to and work at the areas of interface between the new and existing units shall be documented.	ОК
	10.2.5 Provisions of Section 9 shall be implemented to supplement or supersede documents or records as required.	These words were added in NQA-1
A3. Installation A3.1 Suitable protective barriers shall be erected to prevent damage to equipment and/or systems associated with the existing unit(s).	10.3.1 Suitable protective barriers shall be erected where needed, to prevent damage to equipment or systems associated with the existing unit(s).	ОК
A3.2 Spare capacities available in existing facility such as in cable raceways or in panelboards shall not be used unless expressly indicated on the latest applicable approved-for- construction drawings or installation specification.	10.3.2 Spare capacities available in the existing facility, such as in cable raceways or in panelboards, shall not be used unless expressly indicated on the latest applicable approved-for-construction drawings or installation specification.	OK

ANSI N45.2.4 - 1972	NQA-1 (1994) Subpart 2.4	Comments
(IEEE 336-1971)	(except as noted)	(NOTE: OK signifies identical or nearly identical wording.
	This does not prohibit authorized temporary use of such spare capacities.	These words were added in NQA-1
A3.3 When working in an area common to the new and the existing units, such as the cable spreading room, control room, radio-active waste building or the battery room, care shall be especially exercised to avoid interference with existing facilities and to maintain required separation, where appropriate, between the systems associated with existing and new units.	10.3.3 When working in an area common to the new and the existing units, such as the cable spreading room, control room, or radioactive waste building, care shall be especially exercised to avoid interference with existing facilities and to maintain required separation, where appropriate, between the systems associated with existing and new units.	ОК
A4. Inspection A4.1 Inspection shall be performed to verify that existing equipment and/or systems neighboring current construction activity are properly tagged and identified, and potential hazards therefrom identified and documented.	10.4 Inspection 10.4.1 Inspection shall be performed to verify that the requirements of 10.2 and 10.3 have been satisfied.	Similar Same Intent
A4.2 Inspection shall be performed to verify that the existing facilities are properly protected from current construction activity.	10.4.2 Inspection shall be performed to verify that the existing facilities are properly protected from construction activity.	OK
A5. Testing A5.1 In testing integrated electrical, control, and/or instrumentation systems where the plant design calls for interconnection between the existing and new systems, care shall be especially exercised to prevent tripping or otherwise dislocating the operation of equipment and/or systems associated with the existing unit(s).	10.5 Testing In testing integrated electrical control or instrumentation systems, or both, where the plant design calls for interconnection between the ex- isting and new systems, care shall be exercised to prevent tripping or otherwise disturbing the operation of equipment or systems associated with the existing unit(s).	OK
Appendix B Additional Codes, Standards and Guides		QATR A.7.3
<ol> <li>ANSI C1-1968,' National Electrical Code (NFPA 70-1968) (to be used as a guide when appropriate)</li> <li>ANSI C29.1-1961, Test Methods for Electrical Power Insulators</li> <li>ANSI Appendix C57.93, Guide for Installation and Maintenance of Oil-Immersed Transformers</li> <li>ANSI Appendix C57.94, Guide for Installation and Maintenance of Dry-Type Transformers</li> <li>ANSI Appendix C57.94, Guide for Installation and Maintenance of Dry-Type Transformers</li> <li>ANSI C96.1-1969, Temperature Measurement Thermocouples</li> <li>API RP550-1965,2 Manual on Installation of Refinery Instruments and Control Systems, Part I — Process Instrumentation and Control 7. API RP550-1965, Manual on Installation of Refinery Instruments and Control Systems, Part II — Process Stream Analyzers</li> <li>ASME Boiler and Pressure Vessel Code, Section III, Nuclear Power Plant Components, 1971</li> <li>IEEE Std 4-1968, Techniques for Dielectric</li> </ol>		QATR A.7.3

ANSI N45.2.4 - 1972	NQA-1 (1994) Subpart 2.4	Comments
(IEEE 336-1971)	(except as noted)	(NOTE: OK signifies identical or nearly identical wording.
Tests (ANSI C68.1-1968)		
10. IEEE Std 43-1961, Recommended Practice		
Machinery		
11. IEEE Std 51-1955, Guiding Principles for		
Dielectric Tests		
12. IEEE Std 56-1958, Guide for Insulation		QATR A.7.3
Maintenance for Large AC Rotating Machinery 13. IEEE Std 62-1958, Guide for Making		
Dielectric Measurements in the Field		
14. IEEE Std 64-1969, Guide for Acceptance		
15 IEEE Std 81-1962 Guide for Measuring		
Ground Resistance and Potential Gradients in		
the Earth		
16. IEEE Std 95-1962. Guide for Insulation		
Lesting of Large AC Rotating Machinery with		
17. IEEE Std 112A-1964. Test Procedure for		
Polyphase Induction Motors and Generators		
18. IEEE Std 114-1969, Test Procedure for		
Single-Phase Induction Motors		
19. IEEE Std 115-1965. Test Procedure for Synchronous Machines		
20. IEEE Std 118-1949, Master Test Code for		
Resistance Measurement		
21. IEEE Std 120-1955 (withdrawn), Master		
Lest Code for Electrical Measurement in Power		
22. IEEE Std 262-1968. Test Code for		
Distribution, Power and Regulating Trans-		
formers, and Shunt Reactors (ANSI C57.12.90-		
1968)		
23. IEEE Std 283-1968, Guide for Installation of		QATR A.7.3
OII-IMMERSED TRANSFORMERS		
and Condensate Chambers. 1960		
25. ISA-S5.1, Instrumentation Symbols and		
Identification, 1968		
26. ISA-RP7.1, Pneumatic Control Circuit Prossure Test 1956		
27 ISA-RP7.2 Color Code for Panel Tubing		
1957		
28. ISA-RP8.1, Instrument Enclosures for		
Industrial Environments		
29. ISA-RP25. I, Materials for Instruments in Radiation Service, 1957		
30. ISA-526, Dynamic Response Testing of		
Process Control Instrumentation, 1968		
31. ISA-537.I, Electrical Transducers		
Nomenciature and Terminology, 1969		
Tubing Fittings (Threaded) 1965		
33. NEMA ICS-1970,5 Industrial Controls and		
Systems		
34. NEMA IS1.1-1969, Enclosures for Indus-		
trial Controls and Systems		
Circuit Breakers		
36. NEMA SG 5-197 1, Power Switchgear		
Assemblies		
37. NEMA VE 1-1965, Ventilated Cable Trays		

ANSI N45.2.5 1978	NQA-1 (1994) Subpart 2.5 (except as noted)	Comments
1.1 SCOPE	1 GENERAL	Similar Same Intent
This standard sets forth the supplementary quality assurance requirements for installation, inspection, and testing of nuclear safety related structural concrete, structural steel, soils, and foundations for nuclear power plant construction.	Subpart 2.5 provides amplified requirements for installation, inspection, and testing of structural concrete, structural steel, soils, and foundations,	
It applies to the following: 1. Formwork 2. Steel Reinforcement 3. Embedded Items 4. Foundation Preparation 5. Concrete 6. Structural Steel 7. Soils and Earthwork 8. Special Foundations	and applies to the following: (a) formwork (b) steel reinforcement (c) embedded items (d) foundation preparation (e) concrete (f) structural steel (g) soils and earthwork (h) special foundations (i) foundation underpinning	OK
The requirements may also be extended to other appropriate parts of nuclear rower plants when specified in contract documents.	It supplements the requirements of Part I and shall be used in conjunction with applicable Basic and Supplementary Sections of Part I when and to the extent specified by the organization invoking Subpart 2.5.	Similar Same Intent
This standard is intended to be used in conjunction with ANSI N45.2.	It supplements the requirements of Part I and shall be used in conjunction with applicable Basic and Supplementary Sections of Part I when and to the extent specified by the organization invoking Subpart 2.5.	Similar Same Intent
1.2 APPLICABILITY The requirements of this standard apply to the work of any organization or individual participating in the production, preparation, placement, inspection, and testing of structural concrete, structural steel, soils and foundations, as identified in Section 1.1.	2 GENERAL REQUIREMENTS The requirements of Subpart 2.5 apply to any organization or individual participating in work relating to production, preparation, placement, installation, inspection, and testing of structural concrete, structural steel, soils, and foundations, and applies to the following:	Similar Same Intent
The extent to which the individual requirements of this Standard apply will depend upon the nature and scope of the work to be performed and the importance of the item or service involved.	NQA-1 Part II Introduction includes similar language with the same intent: An appropriate Quality Assurance Program, based on the nature and scope of the work to be performed and the relative importance of the items or services, shall be specified in contractual documents by selective applications of portions of Part I, Basic and Supplemental Requirements, for programmatic activities and of this Part (Part II) for work oriented activities.	Similar Same Intent

ANSI N45.2.5 1978	NQA-1 (1994) Subpart 2.5 (except as noted)	Comments
The requirements are intended to assure that only specified materials and workmanship are incorporated into the plant; that quality of materials and quality of workmanship are maintained throughout the construction process; that the work is performed in accordance with applicable construction procedures; and that the completed installation conforms to the specified requirements.	NQA-1 Part II Introduction includes similar language with the same intent: This Part (Part II) sets forth the quality assurance requirements for the planning and execution of identified tasks during the fabrication, construction, modification, repair, maintenance, and testing of systems, components, and structures for nuclear facilities.	Similar Same Intent
The ASME Boiler and Pressure Vessel Code, Section III, Divisions 1 and 2, as well as other American National Standards, have been considered in the development of this standard; and this standard is intended to be compatible with their requirements.		Guidance only. Wording does not establish requirements
This standard applies to structural concrete, structural steel, and foundation components of nuclear power plants not covered by the Code.	Subpart 2.5 provides amplified requirements for installation, inspection, and testing of structural concrete, structural steel, soils, and foundations.	Similar Same Intent
However, this Standard does not apply to activities covered by Section III, Divisions 1 and 2 and Section XI of the Code for those activities covered by the Code,		Guidance only. Wording does not establish requirements
1.3 RESPONSIBILITY The organization or organizations responsible for establishing the applicable requirements for the activities covered by this standard shall be identified, and the scope of their responsibilities shall be documented.	NQA-1 Basic Requirement 1 includes similar words: The organizational structure, functional responsibilities, levels of authority, and lines of communication for activities affecting quality shall be documented. Supplement 1 S-1 3.1 Responsibility Where more than one organization is involved in the execution of activities covered by this Part (Part II), the responsibility and authority of each organization shall be clearly established and documented.	Similar Same Intent
The work of establishing practices and procedures and providing the resources in terms of personnel, equipment, and services necessary to implement the requirements of this Standard may be delegated to other organizations, and such delegation also shall be documented.	NQA-1 Supplement 1S-1 2.2 Delegation of Work includes similar words: The individuals(s) or organizations(s) responsible for establishing and executing a quality assurance program under this Standard may delegate any or all of the work to others but shall retain responsibility therefor.	Similar Same Intent
It is the responsibility of each organization performing work covered by this standard to comply with the procedures and instructions issued for the project and to conform to the requirements of this standard applicable to their work.	The organization upon which this Part (Part II), or portions thereof, is invoked shall be responsible for complying with the specified requirements.	Similar Same Intent
It is the responsibility of the organization performing these activities to specify the detailed methods and procedures unless they are specified in the procurement documents.	Part II Introduction 2 Applicability Planning shall define the operations to be performed, the systematic sequential progression of operations, and the overall measures to be employed to preserve the quality of the work.	Similar Same Intent

ANSI N45.2.5 1978	NQA-1 (1994) Subpart 2.5 (except as noted)	Comments
1.4 DEFINITIONS	1.1 Definitions	ОК
The following definitions are provided to assure a uniform understanding of select terms as they are used in this standard.	The following definitions are provided to assure a uniform understanding of unique terms as they are used in Subpart 2.5.	
Additional definitions of terms are included in ANSI N45.2.10.	NQA-1 Part II Introduction includes similar language with the same intent: 6 DEFINITIONS	Similar Same Intent
	Definitions unique to the activities described in this Part (Part II) are included in the section dealing with that activity. Definitions generic to quality assurance activities are included in Part I, Supplement S-1, Terms and Definitions.	
Class of Concrete — Identifies each individual design mix.	class of concrete — identifies each individual design mix	ОК
Correlation Testing - A form of in-process testing accomplished consistent with established procedures and which provides for the comparison on results of specified tests of concrete samples taken of corresponding batches from two different points to establish to what extent the conditions and method of transit has impacted on specified requirements for plastic concrete at the placement point.	correlation testing — a form of in-process testing accomplished consistent with established procedures, which provides for the comparison of results of specified tests of concrete samples taken of corresponding batches from two different points to establish to what extent the conditions and method of transit have impacted on specified requirements for plastic concrete at the placement point	ОК
Curing — The process of maintaining a satisfactory moisture content and a favorable temperature in concrete during hydration of the cementitious materials so that desired properties of the concrete are developed.	curing — the process of maintaining a satisfactory moisture content and a favorable temperature in concrete during hydration of the cementitious materials so that desired properties of the concrete are developed	ОК
Delivery Point - The point of discharge in the case of a truck agitator unit, or non-agitating unit when another conveying device is to be used to transport the plastic concrete to the placement point. Where a truck agitator unit is used in the transit of concrete, the delivery point and the mixing point are considered coincident when: (1) the delivery point is not more than a distance of two miles and an average of one half-hour in transit from the mixing point, and (2) the delivered concrete commences to be placed within an average of one-half hour from the time the transporting vehicle arrives at the delivery point.	delivery point — the point of discharge in the case of a truck agitator unit, or non-agitating unit when another conveying device is to be used to transport the plastic concrete to the placement point. Where a truck agitator unit is used in the transit of concrete, the delivery point and the mixing point are considered coincident when: (a) the delivery point in not more than a distance of 2 mi (3.22 kin) and a maximum time of 1/2 hr in transit from the mixing point, and (b) the delivered concrete commences to be placed within a maximum time of 1/2 hr from the transporting vehicle arrives at the delivery point. When a non-agitating unit is used, the delivery point and the mixing point shall not be considered coincident.	Similar Same Intent Statement "When a non-agitating unit is used, the delivery point and the mixing point shall not be considered coincident." was added in NQA-1.
Finishing — The process of obtaining specified surface characteristics of hardened concrete.	tinishing — the process of obtaining specified surface characteristics of hardened concrete	ОК

ANSI N45.2.5 1978	NQA-1 (1994) Subpart 2.5 (except as noted)	Comments
Mixing Point - The point of discharge of plastic concrete from a central mix plant. For truck mixed concrete the mixing point and delivery point are defined as coincident.	mixing point — the point of discharge of plastic concrete from a central mix plant. For truck mixed concrete, the mixing point and delivery point are defined as coincident.	OK
Placement Point-The point of discharge of plastic concrete into the forms. Except for pumped concrete the placement point and the delivery point are considered coincident when 5 minutes or less is used in transit of the concrete from the delivery point to the placement point.	placement point — the point of discharge of plastic concrete into the forms. Except for pumped concrete, the placement point and the delivery point are considered coincident when 5 min or less is used in transit of the concrete from the delivery point to the placement point.	ОК
Qualified Procedures — Procedures which incorporate applicable codes and standards, manufacturer's parameters, and engineering specifications.	ASME NQA-1 Section I Introduction Subsection 4 Terms and Definitions: Qualified procedure – an approved procedure that has been demonstrated to meet the specified requirements for its intended purpose.	OK
Qualification Tests — Tests performed to qualify the basic material source or manufacturer. These tests are mandatory unless current documentary test data is available to establish complete confidence in conformance to specification requirements.	<ul> <li>qualification tests — tests performed to qualify the basic material source or manufacturer to assure conformance to specification requirements</li> <li>also</li> <li>4.2 To assure that materials meet specified requirements, preconstruction qualification tests and inspections of the materials to be used and in-process tests of materials being used shall be conducted. Qualification tests shall be performed and the results evaluated prior to the initial use of the material to establish conformance of the materials to the aspecified</li> </ul>	OK
	requirements. These tests are mandatory unless current documentary test data are available to establish complete confidence in conformance to specification requirements.	
In-Process Tests - Tests performed during the course of construction to determine compliance with specified requirements and to maintain control of structural materials. These tests may be performed by the purchaser (or his agent), contractor, manufacturer or supplier, but samples for these tests must be taken from the lot or batch of materials supplied and used at the site of construction.	in-process tests — tests performed during the course of construction to determine compliance with specified requirements and maintain control of materials. These tests may be performed by the purchaser (or his agent), constructor, manufacturer, or supplier, but samples for these tests must be taken from the lot or batch of materials supplied and used at the site of construction.	OK
2. GENERAL REQUIREMENTS	3 REQUIREMENTS	ОК
2.1 PLANNING Measures shall be established and implemented for documenting installation, inspection, and testing operations to verify conformance to specified requirements.	Measures shall be established and implemented for documenting installation, inspection, and testing activities to verify conformance to specified requirements.	

ANSI N45.2.5 1978	NQA-1 (1994) Subpart 2.5 (except as noted)	Comments
Planning shall take into account the need for the preparation and control of procedures and work instructions necessary to comply with requirements for installation, inspection, and testing.	3.1 Planning and Procedures Planning and procedure preparation shall be in accordance with the Introduction to this Part (Part II) NQA-1 Part II Introduction includes similar language with the same intent: "A plan shall be developed outlining the work to be performed and the work procedures or instructions required to comply with the requirements of the defined work scope."	Similar Same Intent
Planning shall include a review of the structure, system, or component design and procurement specifications, materials lists, drawings, construction work plans, procedures, and schedules to assure that installation, inspection, and testing activities have been incorporated; that they can be accomplished as specified; and that time and resources are sufficient to accomplish the scheduled construction without degradation of quality.	NQA-1 Part II Introduction includes similar language with the same intent: "Planning shall include a review of the structure, sys-tem or component design/procurement specifications, materials, lists, drawings, construction work plans, and schedules to ensure that fabrication, installation, modification, inspection, testing, etc., activities have been incorporated; that the work can be accomplished as specified; and that time and resources, plus training, are sufficient to accomplish the work in accordance with the specified requirements.	Similar Same Intent
2.2 Procedures and Instructions Installation, inspection and test procedures, and work instructions shall be prepared and documented for those activities falling within thc scope of this Standard.	NQA-1 Part II Introduction includes similar language with the same intent: Installation, inspection, test procedures, and work instructions identified during planning shall be pre-pared.	Similar Same Intent
These documents shall be revised and controlled as necessary to assure that installation, inspections, and tests are performed in accordance with latest information and shall include as appropriate:	NQA-1 Part II Introduction includes similar language with the same intent: The documents shall be kept current and revised as necessary to assure that the work is per-formed in accordance with the latest approved information. The documents shall include the following as applicable:	Similar Same Intent

ANSI N45.2.5 1978	NQA-1 (1994) Subpart 2.5 (except as noted)	Comments
<ol> <li>Installation specifications.</li> <li>Inspection and test objectives and requirements.</li> <li>Precautions to avoid component or system damage during installation, inspection, and following inspection but prior to use.</li> <li>Inspection and test equipment required.</li> <li>Sequence of tests (if applicable).</li> <li>Sequential actions to be followed.</li> <li>Frequency of inspections and tests.</li> <li>Prerequisites.</li> <li>Approvals.</li> <li>Data report form.</li> <li>Identification of test equipment and date of required recalibration where required for interpretation of test results.</li> <li>Inspection and test acceptance limits.</li> </ol>	NQA-1 Part II Introduction includes similar language with the same intent: (a) personnel safety and structure or facility protection considerations (b) precautions to be observed (c) work requirements including installation specifications (d) sequence of activities to be followed and steps within a given activity (e) prerequisites including preparatory checks and inspections (f) test and inspection objectives (g) special equipment required (h) identification of inspection and test equipment and related calibration requirements including recalibration dates (i) sequence and frequency of inspection or test (i) acceptance criteria and methods for verifying (k) responsibility and required qualifications of personnel (l) approvals and authorizing or verifying signatures (in) specific document references (n) data or test report forms (o) information to be collected for plant records (p) processing inspection and test data and their analysis, evaluation, and final acceptance	Similar Same Intent
2.3 RESULTS Inspection and test results shall be documented in a suitable test report or data sheet.	<ul> <li>9.1</li> <li>Inspection and test results that include inspection and test data, together with a report of data analysis and evaluation, shall be provided as specified in Section 10.</li> <li>Also</li> <li>10S-1</li> <li>2 INSPECTION REQUIREMENTS</li> <li>Inspection activities shall be documented and controlled</li> </ul>	Similar Same Intent
Each report shall identify the item to which it applies, the procedures or instructions followed in performing the task, and the following:	Supplement 10 S-1: 9 Records Records shall as a minimum, identify (a) through (f) below:	Similar Same Intent
<ol> <li>Pertinent inspection and test data such as identification of location where testing was performed or where test samples were taken.</li> <li>Significant dates and times.</li> <li>Inspection acceptance and test completion signatures.</li> <li>Conditions encountered which were not anticipated1 including nonconformance.</li> </ol>	<ul> <li>(a) item inspected</li> <li>(b) date of inspection</li> <li>(c) inspector</li> <li>(d) type of observation</li> <li>(e) results or acceptability</li> <li>(f) reference to information on action taken in connection with nonconformances</li> </ul>	Similar Same Intent
Test reports and data sheet shall include an evaluation of the acceptability of inspection and test results and provide for identifying the individual who performed the evaluation.	Supplement 11 S-1: 5 Test Records (d) type of observation (e) results and acceptability (f) action taken in connection with any deviations noted (g) person evaluating test results	Similar Same Intent

ANSI N45.2.5 1978	NQA-1 (1994) Subpart 2.5 (except as noted)	Comments
2.4 PERSONNEL QUALIFICATIONS Personnel performing tests and inspections required by this standard shall be qualified in accordance with ANSI N45.2.6.	NQA-1 Part II Introduction includes similar language with the same intent: 5 QUALIFICATION OF PERSONNEL Inspection, test, and nondestructive examination personnel and laboratory technicians shall be trained and qualified/certified in accordance with the applicable portions of Part I, Basic and Supplementary Requirements. Professional personnel shall meet the requirements defined by the implementing organization in its position descriptions.	Similar Same Intent
<ul> <li>2.5 MEASURING AND TEST EQUIPMENT</li> <li>2.5.1 Selection. Measuring and test equipment used to implement the requirements of this standard shall be selected on the basis of accuracy sufficient to determine conformance to specified requirements.</li> <li>These measuring devices shall include but not be limited to thermometers, balances, scales, air entrainment meters, humidity meters, volumetric buckets, field moisture testing and soil density measuring devices, pressure gages, and torque wrenches.</li> </ul>	<ul> <li>3.2 Measuring and Test Equipment</li> <li>Measuring and test equipment used to implement the requirements of Subpart 2.5 shall include (but not be limited to) thermometers, balances, scales, air entrainment meters, volumetric buckets, field measuring devices, pressure gages, and torque wrenches.</li> <li>Also Supplement 12 S-1, 2 Selection:</li> <li>Selection of measuring and test equipment shall be controlled to assure that such items are of proper type, range, accuracy, and tolerance to accomplish the function of determining conformance to specified requirements.</li> </ul>	Similar Same Intent
2.5.2 Calibration and Control. The equipment shall be adjusted or calibrated or both at prescribed intervals against certified standards having known valid relationships to national standards where such exist.	Supplement 12 S-1, 3.1 Calibration: Measuring and test equipment shall be calibrated, adjusted, and maintained at prescribed intervals or, prior to use, against certified equipment having known valid relationships to nationally recognized standards.	Similar Same Intent
If no national standards exist, the basis for the adjustment or calibration shall be documented.	Supplement 12 S-1, 3.1 Calibration: If no nationally recognized standards exist, the bases for calibration shall be documented.	ОК
Records shall be maintained and equipment suitably marked to indicate calibration status.	Supplement 12 S-1, 5 Records: Records shall be maintained and equipment shall be suitably marked to indicate calibration status.	OK
Measures shall be taken to assure proper handling, storage and care of installation of inspection and testing equipment after adjustment of calibration in order to maintain the required accuracy of such equipment.	Supplement 12 S-1, 4 Handling and Storage: Measuring and test equipment shall be properly handled and stored to maintain accuracy.	Similar Same Intent
Test equipment found to be out of calibration shall be clearly identified as such.	Supplement 12 S-1, 3.2 Control: Out-of-calibration devices shall be tagged or segregated and not used until they have been recalibrated.	Similar Same Intent

ANSI N45.2.5 1978	NQA-1 (1994) Subpart 2.5 (except as noted)	Comments
When discrepancies, malfunctions or inaccuracies in inspection and testing equipment are found during calibration, all items inspected with that equipment since the last previous calibration shall be considered unacceptable until an evaluation has been made by the responsible authority and appropriate action taken.	Supplement 12 S-1, 3.2 Control: When measuring and test equipment is found to be out of calibration, an evaluation shall be made and documented of the validity of previous inspection or test results and of the acceptability of items previously inspected or tested.	Similar Same Intent
2.6 Laboratory Testing. Laboratory operations and testing associated with concrete and soils shall be controlled using a Quality Assurance program.	3.3 Laboratory Testing Laboratory operations and testing associated with concrete and soils shall be controlled using a Quality Assurance Program.	OK
2.7 HOUSEKEEPING In areas, facilities and environments where installation, inspection and testing activities are performed in accordance with the requirements of this standard, the housekeeping requirements shall be in accordance with ANSI N45.2.3.	N45.2.3 incorporated into NQA-1 as Subpart 2.3.	QATR Section B.7 commits to Subpart 2.3.
3 PRECONSTRUCTION VERIFICATION 3.1 GENERAL Receipt inspections and storage are covered by another standard, ANSI N45.2.2. Interim inspections shall be used to verify that items are in satisfactory condition for installation.	<ul> <li>4 PRECONSTRUCTION VERIFICATION</li> <li>4.1 General</li> <li>Receipt and interim storage inspections shall be used to verify that items are in a satisfactory condition for installation.</li> </ul>	Similar Same Intent
The verification shall include:	The verification shall include the following:	ок
<ol> <li>Visual examination of materials for proper identification, physical damage, and contamination.</li> <li>Review of manufacturer's documentation, test reports, or other evidence of quality conformance for correctness and compliance with specifications if not reviewed at time of receipt.</li> </ol>	<ul> <li>(a) visual inspection of material for proper identification, physical damage, and contamination;</li> <li>(b) review of manufacturer's documentation, test reports, or other evidence of quality conformance for correctness and compliance with specifications if not reviewed at time of receipt.</li> </ul>	OK
3.2 MATERIALS SUITABILITY To assure that materials meet specified requirements, preconstruction qualification tests and inspections of the materials to be used and in-process tests of the materials being used shall be conducted.	4.2 Materials Suitability To assure that materials meet specified requirements, preconstruction qualification tests and inspections of the materials to be used and in-process tests of materials being used shall be conducted.	ОК
ANSI N45.2.5 1978	NQA-1 (1994) Subpart 2.5 (except as noted)	Comments
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3.2.1 Qualification Tests. Qualification tests shall be performed and the results evaluated prior to the initial use of the materials to establish conformance of the materials to the specified requirements.	Qualification tests shall be performed and the results evaluated prior to the initial use of the material to establish conformance of the materials to the specified requirements.	OK
	The specifications shall identify the required qualification tests and the frequency for their repetition.	These words were added in NQA-1
	The tests required for concrete, concrete constituents, materials for reinforcing systems, materials for prestressing systems and welding materials shall be in accordance with the ASME Boiler and Pressure Vessel Code, Section III, Division 2 (ACI Standard 359).	These words were added in NQA-1
	Lightweight concrete mix designs shall be made in accordance with ACI 211.2.	These words were added in NQA-1
	Lightweight concrete aggregates shall be qualified by tests for conformance with ASTM C 330.	These words were added in NQA-1
	When splitting tensile strengths are required for lightweight concrete mix, the methods given in ASTM C 330 shall be used.	These words were added in NQA-1
A list of normally required qualification tests or certifications is contained in Table A. (Table A lists various test standards)	Qualification and certification testing is addressed in 4.2 as noted above as well as in 5.2	Test Standards are now included in the body of subpart 2.5 at the appropriate location. This area is similar with the same intent.
This list contains tests to qualify materials for normal application.		Since Test Standards are now included in the body of subpart 2.5 at the appropriate location, this guidance is no longer applicable.
Additional tests may be required to qualify materials for special applications.	Additional tests may be required to qualify materials for special application.	ОК
3.3 CONSTRUCTION PROCESSES Inspections shall be performed to verify that the prerequisites for control of construction processes such as welding, bolting, structural reinforcement, splicing, and concrete measuring, mixing, transporting, placing, and curing have been accomplished.	4.3 Construction Processes Inspections shall be performed to verify that the prerequisites for control of construction processes such as welding, structural bolting, mechanical splicing of reinforcement, and concrete measuring, mixing, transporting, placing, and curing have been accomplished.	OK

ANSI N45.2.5 1978	NQA-1 (1994) Subpart 2.5 (except as noted)	Comments
<ol> <li>These inspections shall include:</li> <li>Verification that the process has been qualified as required.</li> <li>Verification that process controls are in effect.</li> <li>Verification that qualified procedures, instruction manuals, or both, if required for specific equipment, are available for use during construction.</li> <li>Verification that the process is suitable for the particular application.</li> <li>Verification that manpower, equipment, and materials are readily available and adequate to perform the work in accordance with drawing and specification requirements.</li> </ol>	These inspections shall include verification of the following: (a) the process has been qualified as required; (b) process controls are in effect; (c) approved procedures, instruction manuals, or both, if required for specific equipment, are available for use during construction; (d) the process is suitable for the particular application; (e) manpower, equipment (including measuring and testing equipment), and materials are readily available and adequate to perform the work inaccordance with drawing and specification requirements.	Similar Same Intent The words in item (e) " (including measuring and testing equipment)" were added in NQA-1
4 INSPECTION OF SOILS AND EARTHWORK 4.1 GENERAL Inspection of soils and earthwork shall include preparations for earthwork as well as in-process inspections of placing and compacting operations to assure conformance to specified requirements.	5 INSPECTION OF SOILS AND EARTHWORK 5.1 General Inspection of soils and earthwork shall include preparations for earthwork, as well as in- process inspections of placing and compacting operation, to assure conformance to specified requirements.	OK
4.2 MATERIALS	5.2 Materials	OK
Inspections of stockpiles or borrow pits shall be performed to verify conformance to specified requirements.	Inspections and qualification testing of stockpiles or borrow pits shall be performed to verify conformance to specified requirements.	
	Qualification tests of soil fill materials shall be performed for: (a) grain size analysis using ASTM D 422; (b) moisture-density relationship of soil using ASTM D 1557, and D 698; (c) maximum and minimum index density of soils using ASTM D 4253 and D 4254; (d) liquid limit, plastic limit, and plasticity index of soils using ASTM D 4318; and (e) unified soil classification using ASTM D 653, D 2487, and D 2488.	These words were added in NQA-1
	Other qualification tests of soil fill materials may be used when specified.	These words were added in NQA-1
4.3 PLACING AND COMPACTING EQUIPMENT	5.3 Placing and Compacting Equipment	ок
Inspections shall be performed prior to compacting operations to verify the adequacy of compacting equipment.	Inspections shall be performed prior to compacting operations to verify the adequacy of compacting equipment.	
These inspections shall include the following:	These inspections shall include the following:	ОК

ANSI N45.2.5 1978	NQA-1 (1994) Subpart 2.5 (except as noted)	Comments
<ol> <li>Inspections to verify that compacting equipment has the specified weight, if applicable.</li> <li>Inspections to verify that the specified type of equipment is available and in operating condition.</li> <li>Inspections of vibratory compaction equipment to verify correct vibration frequency.</li> </ol>	<ul> <li>(a) inspections to verify that compacting equipment has specified weight, if applicable;</li> <li>(b) inspections to verify that the specified type of equipment is available and in operating condition;</li> <li>(c) inspections of vibratory compaction equipment to verify correct vibration frequency.</li> </ul>	ОК
4.4 PREPLACEMENT PREPARATIONS Inspections of preparations for fill placement shall include the following:	5.4 Preplacement Preparations Inspections of preparations for fill placement shall include the following:	ОК
<ol> <li>Inspections to assure compliance with site preparation requirements.</li> <li>Inspections to assure that the subgrade surface is level within specified limits.</li> <li>Inspections to assure that the subgrade surface is free of deleterious materials and voids and in compliance with specified requirements.</li> <li>Inspections to assure that the subgrade surface is free of excess moisture, snow, frost or frozen lumps.</li> <li>Inspections to verify that subgrade compaction meets specified requirements.</li> <li>Documentation of the inspections required by items (1) through (5) shall be verified as being complete and indicating that all inspection results are satisfactory.</li> </ol>	<ul> <li>(a) inspections to assure compliance with site preparation requirements;</li> <li>(b) inspections to assure that the subgrade surface is within specified limits;</li> <li>(c) inspections to assure that the subgrade is free of deleterious materials and voids and in compliance with specified requirements;</li> <li>(d) inspections to assure that the subgrade is free of excess moisture, snow, frost, or frozen lumps;</li> <li>(e) inspections to verify that subgrade preparation meets specified requirements;</li> <li>(f) documentation of the inspections required by</li> <li>(a) through (e) above shall be verified as being complete and indicating that all inspection</li> </ul>	OK
4. SOIL COMPACTION Inspections of soil compaction during construction shall be performed to verify the following:	5.5 Soils Compaction Inspections of soil compaction during construction shall be performed to verify the following:	ОК
<ol> <li>That fill material meets specified requirements.</li> <li>That segregation of the fill material does not occur as it is dumped and spread.</li> <li>That specified lift thicknesses are not exceeded.</li> <li>That when specified a "knitting technique" is used when joining lifts.</li> <li>That the compacting equipment makes the specified number of passes over each lift and that passes overlap.</li> </ol>	<ul> <li>(a) fill material meets specified requirements;</li> <li>(b) segregation of the fill material does not occur as it is dumped and spread;</li> <li>(c) specified lift thicknesses are not exceeded;</li> <li>(d) when specified, a knitting technique is used when joining lifts and where fill is placed against existing earth slopes or adjacent to previously compacted fills;</li> <li>(e) the compacting equipment makes the specified number of passes over each lift and that passes over-lap;</li> <li>(f) heavy compaction equipment does not impose overloads of subsurface structures or foundations, unless otherwise stated in the specifications;</li> <li>(g) heavy compact equipment does not overload buried structures before backfill is placed to grade.</li> </ul>	Similar Same Intent Words in (d) "and where fill is placed against existing earth slopes or adjacent to previously compacted fills;", (f) "heavy compaction equipment does not impose overloads of subsurface structures or foundations, unless otherwise stated in the specifications, that are based on design considerations;" and (g) "heavy compact equipment does not overload buried structures before backfill is placed to grade." added in NQA-1

ANSI N45.2.5 1978	NQA-1 (1994) Subpart 2.5 (except as noted)	Comments
4.6 In-process test on compacted fill	5.6 In-Process Tests on Compacted Fill	ОК
In-process tests shall be performed during the course of construction to maintain control of soil compaction.	In-process tests shall be performed during the course of construction to maintain control of soil compaction.	
A list of the required in-process tests is contained in Table B.	A list of the in-process tests for soils is shown in Table 5.6	ОК
Table B	Table 5.6	The tests for soils listed in Table 5.6 the same as those listed in N45.2.5 Table B with one exception, for Moisture Density relationships (compaction tests per 45.2.5) the frequency is increased in Subpart 2.5 through the increase in field density testing. This is more conservative and results in similar requirements with same intent.
In-process tests shall be performed more frequently if the test results are erratic or if the trend of results or an apparent change in material characteristics indicates that the frequency should be increased.	The need for each specific test shall be established in the specifications. In-process tests shall be performed more frequently if the test results are erratic, or if the trend of results or an apparent change in material characteristics indicates that the frequency should be increased.	Similar Same Intent OK
5 INSPECTION OF FOUNDATION FILES AND CAISSONS CONSTRUCTION 5.1 Pile	6 INSPECTION OF FOUNDATION PILE AND CAISSON CONSTRUCTION	ОК
5.1.1 Pile Receiving Handling and Storage. Inspections shall be performed to verify that specified material has been received and to verify the adequacy and proper maintenance of pile storage and handling techniques.	6.1 Piles 6.1.1 Pile Receiving, Handling, and Storage. Inspections shall be performed to verify that the specified material has been received and to verify the adequacy and proper maintenance of pile storage and handling techniques.	
These inspections shall include the following:	These inspections shall include the following:	ОК
<ol> <li>Receiving inspection</li> <li>Inspection of handling procedure to verify that proper lifting points and lifting techniques are utilized.</li> <li>Inspection of storage procedure to verify that suitable storage areas have been designated, blocking is adequate and properly located, and that piles can be rehandled without damage.</li> <li>Inspection of procedure for transporting piles from storage area to driving location to verify that proper support and lifting points are utilized, that pile for driving, and that pile to be driven is undamaged and as specified.</li> </ol>	<ul> <li>(a) receiving inspection;</li> <li>(b) inspection of handling procedure to verify that proper lifting points and lifting techniques are utilized;</li> <li>(c) inspection of storage procedure to verify that suitable storage areas have been designated, that blocking is adequately and properly located, and that piles can be rehandled without damage;</li> <li>(d) inspection of procedure for transporting piles from storage area to driving location to verify that proper support and lifting points are utilized, that proper lifting technique is used to position the pile for driving, and that pile to be driven is undamaged and as specified.</li> </ul>	

ANSI N45.2.5 1978	NQA-1 (1994) Subpart 2.5 (except as noted)	Comments
<ul> <li>5.1.2 Pile Driving and Cast in Place Pile Construction.</li> <li>Pile driving and cast in place pile construction shall be inspected to verify that piles are properly located from site base lines and elevation benches, located according to length and capacity, and that pile driving surface has been properly prepared, excavated to the designated driving elevation, and drained or dewatered and that pile driving equipment in compliance with the specification is available.</li> </ul>	<ul> <li>6.1.2 Pile Driving and Cast-in-Place Pile Construction.</li> <li>Pile driving and cast-in-place pile construction shall be inspected to verify that the specified piles are properly located from site baselines and elevation benches (located according to length and capacity), that the surface from which the piles will be driven has been properly prepared, excavated to the designated driving elevation, and drained or dewatered, as specified, and that pile driving equipment in compliance with the specification is available.</li> </ul>	ОК
5.1.2.1 Wood, Steel and Precast Concrete Piles, and Cast In P1ace Concrete Piles with Permanent Casing. The driving of wood, steel and precast concrete piles, and the shells for cast in place concrete piles shall be inspected to verify the following:	6.1.2.1 Installation of Wood, Steel, and Precast Concrete Piles, and Cast-in-Place Concrete Piles With Permanent Casing and Shell. The installation of wood, steel, and precast concrete piles, and the shells or casing for cast-in-place concrete piles shall be inspected to verify the following:	Similar Same Intent The words "or casing" added to NQA-1 OK
1. The specified pile hammer is being used and is operating at the required speed.     2. The pile being driven is the specified type, capacity and length.     3. The pile is driven plumb or to the specified batter, to the specified tip elevation and that the blow count at that elevation is as specified     4. The proper type of cushioning material is used between the hammer and the pile.     5. The follower used on piles with the final top elevation below the existing grade is compatible with the driving characteristics of the pile.     6. The piles adjacent to the pile being driven are checked for heave and redriven if required.     7. The sequence of pile driving is as specified in order to avoid displacement of piles in place.     5.1.2.2 Concrete Placement in Cast in Place	<ul> <li>a) the specified pile hammer is being used and is operating at the required speed;</li> <li>(b) the pile being installed is the specified type and length;</li> <li>(c) the pile is installed within specified tolerances of locations, plumb, and rotation or to the specified batter, to the specified tip elevation, and that the blow counts are as specified;</li> <li>(d) the proper type of cushioning materials is used between the hammer and the pile and to assure that piles are not being damaged during driving;</li> <li>e) the follower used on piles with the final top elevation below the existing grade is compatible with the driving characteristics of the pile;</li> <li>(f) the piles that are adjacent to the pile being installed are checked for heave and reinstalled if required;</li> <li>(g) the sequence of pile installation is as specified in order to avoid displacement of piles in place;</li> <li>(h) adjacent structures, fresh concrete, etc., are not damaged due to driving vibrations;</li> <li>(i) drilling and jeting are only done when specified and are performed in accordance with the specification;</li> <li>(j) complete records are made of pile driving resistance</li> <li>6.1.2.2 Concrete Placement in Cast-in-Place</li> </ul>	Similar Same Intent Items H, I, and J were added in NQA-1
5.1.2.2 Concrete Placement in Cast in Place Piles with Permanent Casing. Prior to concreting cast in place concrete piles, inspection shall be performed to verify the following:	6.1.2.2 Concrete Placement in Cast-in-Place Piles With Permanent Casing. Prior to concreting cast-in-place concrete piles, inspection shall be performed to verify the following:	ЮК

ANSI N45.2.5 1978	NQA-1 (1994) Subpart 2.5 (except as noted)	Comments
<ul> <li>(1) The casing has not buckled or ruptured.</li> <li>(2) The casing is straight.</li> <li>(3) The casing is dewatered if necessary.</li> <li>(4) The reinforcement is installed and positioned as specified and is secured against displacement during concreting.</li> <li>The placement of concrete in the pile casing shall be inspected to verify that it conforms with subsection 6.5, Concrete Placement.</li> <li>5.1.2.3 Cast in Place Piles Without Permanent Casing. The construction of cast in place piles without permanent casing shall he inspected to be readed to be re</li></ul>	<ul> <li>a) the casing has not buckled or ruptured;</li> <li>b) the casing is straight;</li> <li>c) the casing is dewatered, if necessary, and inside of casing has been cleaned to the tip elevation;</li> <li>d) the reinforcement is installed and positioned as specified and is secured against displacement during concreting;</li> <li>e) the volume of concrete used is consistent with the estimated required volume;</li> <li>f) grouting pressure or compaction energy used to form the pile is as specified.</li> <li>The placement of concrete in the pile casing shall be inspected to verify that it conforms with paras. 7.5 and 7.7, as applicable.</li> <li>6.1.2.3 Concrete Placement for Cast-in-Place Piles Without Permanent Casing. The construction of cast-in-place piles without</li> </ul>	Similar Same Intent Items E and F were added in NQA-1 OK
<ul> <li>(1) The size and tip elevation of the pile is as specified.</li> <li>(2) The completed pile is plumb or to the specified batter.</li> <li>(3) The quantity of concrete placed in the pile is consistent with the size and length specified.</li> <li>(4) The method for withdrawing the casing will not cause separation of the pile concrete.</li> <li>(5) The method for withdrawing the casing during the placing of concrete maintains a level of concrete sufficiently above the bottom of the casing to avoid soil intruding or necking down the concrete pile.</li> <li>(6) The placement of concrete in the pile concrete Placement.</li> </ul>	<ul> <li>a) the volume of concrete used is consistent with the following:</li> <li>a) the volume of concrete used is consistent with the estimated required volume;</li> <li>b) the method for withdrawing the casing will not cause separation of the pile concrete;</li> <li>c) the method for withdrawing the casing during the placing of the concrete maintains a level of concrete sufficiently above the bottom of the casing to avoid soil intruding or necking down the concrete pile;</li> <li>d) the placement of concrete in the pile casing conforms with paras. 7.5 and 7.7;</li> <li>e) grouting pressure or compaction energy used to form the pile is specified.</li> </ul>	Similar Same Intent Items (1) and (2) were omitted in NQA-1. Item (e) was added in NQA-1
5.1.2.4 Pile Splicing. The construction of composite piles and the splicing of piles with the same section above and below the splice shall be inspected to verify the following:	6.1.2.4 Pile Splicing. The construction of composite piles and the splicing of piles with the specified section above and below the splice shall be inspected to verify the following:	OK
<ul> <li>(1) The top section is properly aligned with the bottom section.</li> <li>(2) The splice interface is clean and is properly prepared and spaced for application of the splicing material.</li> <li>(3) The pile is at the specified temperature limits for splicing and that the splice is installed in accordance with applicable standards and specifications.</li> </ul>	<ul> <li>a) the top section is properly aligned with the bottom section;</li> <li>b) the splice interface is clean and is properly prepared and spaced for application of the splicing material;</li> <li>c) the pile is at the specified temperature limits for splicing and that the splice is installed in accordance with applicable standards and specifications.</li> </ul>	OK

ANSI N45.2.5 1978	NQA-1 (1994) Subpart 2.5 (except as noted)	Comments
5.1.2.5 Inspection of Concrete Construction. Concrete construction of cast in place piles and protective concrete cast around piles shall be inspected in accordance with Section 6, Inspection of Concrete Construction.	.1.2.5 Inspection of Concrete Construction. Concrete construction of cast-in-place piles and protective concrete cast around piles shall be inspected in accordance with Section 7.	OK
5.1.2.6 Test Piles. Test piles shall. be inspected to verify that:	6.1.2.6 Test Piles. Test piles shall be inspected to verify that:	OK
<ol> <li>Load tests are made on piles driven or cast. in place in the same manner as production piles.</li> <li>The driving or construction is in accordance with the applicable paragraphs above.</li> <li>The performance of load testing is in accordance with ASTM D1143, Load Settlement Relationship for Individual Vertical Piles Under Static Axial Load.</li> </ol>	<ul> <li>(a) load tests are made on piles driven or cast- in-place in the same manner as production piles;</li> <li>(b) the driving or construction is in accordance with the applicable paragraphs above;</li> <li>(c) the performance of load testing is in accordance with ASTM D 1143, Method of Testing Piles Under Static Axial Compressive Load.</li> </ul>	OK
5.2 CAISSONS Caisson excavation shall be inspected to verify that:	<ul><li>6.2 Caissons</li><li>6.2.1 Caisson excavation shall be inspected to verify that:</li></ul>	OK
<ol> <li>(1) Caissons are correctly located.</li> <li>(2) The caisson shaft is straight and plumb or to the specified batter, and suitable means are employed to maintain the shaft diameter.</li> <li>(3) The bottom of the caisson is at the specified elevation and is level or is excavated in steps as necessary to provide level and uniform bearing over the full base area.</li> <li>(4) There are no unacceptable voids, caverns or strata of compressable material below the bottom of caisson.</li> <li>(5) Underreamed caissons have the specified bottom diameter and side slope.</li> <li>(6) The rock socket of drilled in caissons is the specified diameter and depth.</li> <li>(7) The shear rings of friction caissons are the specified size and spacing.</li> </ol>	<ul> <li>a) caissons are correctly located;</li> <li>b) the caisson shaft is straight and plumb, or to the specified batter, and suitable means are employed to maintain the shaft diameter;</li> <li>c) the bottom of the caisson is at the specified elevation and is level, or is excavated in steps as necessary to provide level and uniform bearing over the full base area;</li> <li>d) there are no unacceptable voids, caverns, or strata of compressible material below the bottom of the caissons have the specified bottom diameter and side slope;</li> <li>f) the rock socket of drilled-in caissons is the specified diameter and depth;</li> <li>g) the shear rings of friction caissons are the specified size and spacing.</li> </ul>	OK
5.2.2 Caisson concrete construction shall be inspected in accordance with subsection 6.4, Preplacement Preparations, subsection 6.5, Concrete Placement, and subsection 6.7, Curing, of Section 6.	6.2.2 Caisson concrete construction shall be inspected in accordance with Section 7.	OK
In addition caisson concreting shall be inspected to verify that:	In addition, caisson concrete shall be inspected that:	OK

ANSI N45.2.5 1978	NQA-1 (1994) Subpart 2.5 (except as noted)	Comments
<ol> <li>All loose spoil has been removed from the bottom of the caisson excavation prior to concreting.</li> <li>The caisson excavation has been dewatered or that approved means of placing concrete underwater are employed.</li> <li>Sufficient head of concrete is maintained above the bottom of the casing while it is being withdrawn to avoid soil intrusion or necking down of the concrete shaft.</li> <li>Method of withdrawal of the casing prevents voids in or separation of the concrete shaft.</li> <li>Approved methods of proportioning and placing concrete are employed in slurry stabilized caisson to prevent segregation or mixing with slurry and to assure specified concrete strength.</li> </ol>	<ul> <li>a) all loose soil has been removed from the bottom of the caisson excavation prior to concreting;</li> <li>b) the caisson excavation has been dewatered or that approved means of placing concrete underwater are employed;</li> <li>c) sufficient head of concrete is maintained above the bottom of the casing while it is being withdrawn to avoid soil intrusion or necking down of the concrete shaft;</li> <li>d) method of withdrawal of the casing prevents voids in or separation of the concrete shaft;</li> <li>e) approved methods of proportioning and placing concrete are employed in slurry stabilized caisson to prevent segregation or mixing with slurry and to assure specified concrete strength;</li> <li>f) the volume of concrete used is consistent with the estimated required volume.</li> </ul>	Similar Same Intent Item (f) was added in NQA-1
5.3 REQUIRED QUALIFICATION TESTS The required qualification tests are covered in Table A.	<ul> <li>6.3 Required Qualification Tests</li> <li>The required qualification tests are as follows:</li> <li>(a) Wood piles shall conform to specifications such as ASTM D 25, and AWPA C3, and ASTM D 1760 for wood preservation treatment.</li> <li>(b) Steel piles shall conform to specifications such as ASTM A 252 for pipe, and ASTM A 6 and A 36 for structural shapes.</li> <li>(c) Concrete piles (precast, cast in place and pre-stressed) shall conform to approved specifications used in the manufacturer's certification, or as specified.</li> </ul>	The tests listed are the same as those listed in Table A of N45.2.5 with additional tests listed for wood piles regarding the wood preservative treatment. Therefore subpart 2.5 is more conservative than N45.2.5
6 INSPECTION OF CONCRETE CONSTRUCTION 6 6.1 GENERAL inspection of concrete construction shall include inspections of preparations for concreting, as well as in-process inspections of concrete measuring, mixing, transporting, placement, curing, and protection to assure conformance to specified requirements.	7 INSPECTION OF CONCRETE CONSTRUCTION 7.1 General Inspection of concrete construction shall include inspection of preparations for concreting, as well as in-process inspections of concrete measuring, mixing, transporting, placement, curing, and protection to assure conformance to specified requirements.	OK
The inspection of pre- or post-tensioning systems shall be included, if applicable. The inspection shall follow the Recommended Practice for Concrete Inspection, ACI 311 and the PCI Manual for Quality Control.	The inspection of pretensioning or post- tensioning systems shall be included, if applicable. The inspection shall follow ACI 311.4R, Guide for Concrete Inspection, and PCI MNL-116 and MNL-117.	OK Similar Same Intent

ANSI N45.2.5 1978	NQA-1 (1994) Subpart 2.5 (except as noted)	Comments
6.2 PROTECTION OF MATERIALS Inspections shall be performed to verify the adequacy and proper maintenance of material storage conditions and handling techniques.	7.2 Protection of Materials Inspections shall be performed to verify the adequacy and proper maintenance of material storage conditions and handling techniques.	ОК
These inspections shall Include the following:	These inspections shall include the following:	ОК
<ol> <li>Inspection of cement storage facilities to verify weather tightness, cement temperature and the absence of lumps, and review of records to verify type and age of cement.</li> <li>Inspection of aggregate stockpiles to verify: handling techniques are not resulting in segregation; storage and handling adequately prevent contamination with deleterious substances; proper temperature and uniform moisture control; and use of frozen materials is prevented.</li> <li>Inspection of admixture storage and handling facilities to verify that deterioration and contamination are prevented.</li> <li>Inspection of water sources and cooling and heating facilities to verify the specifications for concrete temperature are met.</li> <li>Inspection of reinforcing material, embedments, and prestressing system materials (wire, strand, tendons, tendon tubes and temporary or permanent anchor hardware) to verify protection against corrosion, contamination and physical damage.</li> </ol>	<ul> <li>a) inspection of cement storage facilities to verify weather tightness, cement temperature and the absence of lumps, and review of records to verify type and age of cement;</li> <li>b) inspection of aggregate stockpiles to verify that:</li> <li>l) handling techniques are not resulting in segregation;</li> <li>2) storage and handling adequately prevent contamination with deleterious substances;</li> <li>3) specified temperature and uniform moisture control are maintained; and</li> <li>4) use of frozen materials is prevented;</li> <li>c) inspection of admixture storage and handling facilities to verify that deterioration and contamination are prevented;</li> <li>d) inspection of water sources and cooling and heating facilities to verify the specified water quality and to assure that the specifications for concrete temperatures are met;</li> <li>e) inspection of reinforcing material, embedments, and prestressing systems materials (wire, strand, tendons, tendon tubes, and temporary or permanent anchor hardware) to verify protection against excessive corrosion, contamination, and physical damage.</li> </ul>	OK
6.3 MEASURING, MIXING, AND TRANSPORTING EQUIPMENT Inspections shall be performed prior to and during the production of concrete to verify the adequacy and proper operation of measuring, mixing, and transporting equipment in accordance with ACI 304, ASTM C—94, and National Ready Mix Concrete Association — Concrete Plant Standard and Truck Mixer and Agitator Standard.	7.3 Measuring, Mixing, and Transporting Equipment Inspections shall be performed prior to and during the production of concrete to verify the adequacy and proper operation of measuring, mixing, and transporting equipment in accordance with ACI 304, ASTM C 94, and National Ready Mix Concrete Association Concrete Plant Standard and Truck Mixer and Agitator Standard.	OK
The inspections shall include time following:	I hese inspections shall include the following:	UK

ANSI N45.2.5 1978	NQA-1 (1994) Subpart 2.5 (except as noted)	Comments
<ul> <li>(1) Inspection of measuring facilities for time specified accuracy of measuring, weighing and weight recording devices to control time following: <ul> <li>(a) Proportions of cement, water and aggregates</li> <li>(b) Quantities of admixtures</li> <li>(c) Aggregate moisture compensation</li> <li>(d) Mixing time</li> <li>(e) Temperature control: Heating or cooling of concrete.</li> <li>(f) Method of adding water when batching lightweight aggregates in accordance with ACI 301.</li> </ul> </li> </ul>	<ul> <li>7.3.1 Inspection of measuring facilities for the specified accuracy of measuring, weighing, and weight recording devices to control the following: <ul> <li>(a) proportions of cement, water, and aggregates</li> <li>(b) quantities of admixtures</li> <li>(c) aggregate moisture compensation</li> <li>(d) mixing time</li> <li>(e) temperature control, heating or cooling of concrete</li> <li>(f) method of adding water when batching light-weight aggregates in accordance with ACI 301.</li> </ul> </li> </ul>	OK
(2) Inspection of central mix plant and truck mixers for wear of drum blades, availability of revolution counter and water measuring device, proper speed of rotation and ability to mix concrete completely in the specified time.	7.3.2 Inspection of central mix plant and truck mixers for wear of drum blades, availability of revolution counter and water measuring devices, proper speed of rotation, and ability to mix concrete completely in the specified time.	OK
6.4 PREPLACMENT PREPARATIONS Inspection of preparations for concrete placement shall include the following:	7.4 Preplacement Preparations Inspection of preparations for concrete placement shall include the following:	ОК
<ol> <li>Inspection of compacted structural fill during placement to verify correct condition.</li> <li>Inspection of rock surfaces which will be in contact with structural concrete to verify surface cleanness, removal of loose rock and free water, correct contour and specified subgrade condition.</li> <li>Inspection of previously placed concrete to verify proper preparation for the next lift.</li> <li>Inspection of formwork to verify: correct location and configuration of formwork; installation and integrity of water stops and membrane waterproofing; condition of form material to produce the specified concrete finish; installation of ties, anchors, bracing, shoring and supports; correct location and dimensions of blackouts; proper form coating and cleanliness inspection of forms for water tightness and placement of grout and vent pipes when preplaced aggregate concrete is used.</li> <li>Inspection of reinforcing steel, prestressing components (if applicable) and other embedded items to verify: correct size, number, location, position</li> </ol>	<ul> <li>a) inspection of the compacted structural fill or undisturbed soil to verify correct condition;</li> <li>b) inspection and field testing, in accordance with the specifications of all structural fill, undisturbed soil, and rock surfaces which will be in contact with structural concrete to verify surface cleanness, removal of loose rock and free water, correct contour, and specified subgrade condition;</li> <li>c) inspection of previously placed concrete to verify proper preparation for the next lift;</li> <li>d) inspection of formwork to verify:</li> <li>i) correct location and configuration, dimensional accuracy, and proper line and grade of form-work;</li> <li>2) installation and integrity of water stops and membrane waterproofing;</li> <li>3) condition of form material to produce the specified concrete finish, installation of ties, anchors, bracing, shoring, and supports to prevent movement during concrete placement;</li> <li>4) correct location and vent pipes when preplaced aggregate concrete is used;</li> <li>e) inspection of reinforcing steel, prestressing components (if applicable), and other embedded items to verity;</li> <li>(1) correct size, number, location, position, cleanness and leak tightness, if applicable;</li> <li>(2) proper stringing and absence of physical damage to pretensioning strands or tendons;</li> </ul>	ISimilar Same Intent

ANSI N45.2.5 1978	NQA-1 (1994) Subpart 2.5 (except as noted)	Comments
<ul> <li>6. Inspection of mechanical reinforcing bar splicing operations to verify conformance to the requirements of Section 6.12.</li> <li>7. Inspection by use of a mandrel or similar device to ensure that the tendons conduits are open and remain open during the concrete placing operation.</li> <li>8. Inspection of pretensioning load cells and/or pressure sages for accuracy and calibration if applicable.</li> <li>9. Inspection of pretensioning system strand vises for cleanliness, proper lubrication, wear, distortion and cracking if applicable.</li> <li>10. Inspection of the pretensioning operation if applicable, to verlfy: initial tensioning of each strand to eliminate slack and to provide a uniform initial stress condition in all strands prior to final stressing; proper measurement and correlation of Jack pressure (or load cell reading) and strand or tendon elongation; proper correction for elongation losses due to strand slippage in the rises and movement of anchorage abutments.</li> </ul>	<ul> <li>f) inspection of mechanical reinforcing bar splicing operations to verify conformance to the requirements of para. 7.12;</li> <li>g) inspection by use of a mandrel or similar device to ensure that the tendon conduits are open and remain open during the concrete placing operation;</li> <li>h) inspection of pretensioning load cells and pressure gages for accuracy and calibration, if applicable;</li> <li>i) inspection of pretensioning system strand vises for cleanness, proper lubrication, wear, distortion, and cracking, if applicable;</li> <li>j) inspection of the pretensioning operation, if applicable, to verify:</li> <li>(1) initial tensioning of each strand to eliminate slack and to provide a uniform initial stress condition in all strands prior to final stressing;</li> <li>(2) proper measurement and correlation of jack pressure (or load cell reading) and strand or tendon elongation;</li> <li>(3) proper correction for elongation losses due to strand slippage in the rises and movement of anchorage abutments;</li> </ul>	Similar Same Intent Item "k" added in NQA-1
	<ul><li>(k) inspection of groundwater control, as specified;</li><li>(I) inspection of imbedments.</li></ul>	
Documentation of the inspections required by steps 1 through 10 above shall be verified as being complete and indicating that all inspection results are satisfactory.	Documentation of the inspections required by steps (a) through (I) above shall be verified as being complete and indicating that all inspection results are satisfactory.	OK
6.5 CONCRETE PLACEMENT	7.5 Concrete Placement	ОК
Inspection of concrete placement shall be performed to verify the following:	Inspection of concrete placement shall be performed to verify the following:	
<ol> <li>Specified tests of concrete have been performed.</li> <li>Adherence to specified requirements for class of concrete, age, rate of placement, lift height, placing sequence and hot or cold weather concreting practice. (ACI 305 or 306 respectively.)</li> <li>Proper use of adequate conveying and placing equipment.</li> <li>That harmful materials are not used in covering or placing equipment.</li> <li>Adequate concrete consolidation equipment and technique of operation.(ACI 309)</li> <li>Embedded items are not disturbed nor forms displaced.</li> </ol>	<ul> <li>a) specified tests of concrete have been performed;</li> <li>b) adherence to specified requirements for class of concrete, age, rate of placement, lift height, placing sequence, concrete temperature, and hot or cold weather concreting practice (ACI 305 or ACI 306, respectively);</li> <li>c) proper use of adequate conveying and placing equipment;</li> <li>(d) harmful materials are not used in covering or placing equipment;</li> <li>e) adequate concrete consolidation equipment and technique of operation (ACI 309);</li> <li>f) embedded items are not disturbed nor forms displaced.</li> </ul>	OK
6.6 FINISHING AND REPAIRS Inspections shall be performed to verify that specified finishes are obtained; i.e., wood float, steel trowel, as cast or other type.	7.6 Finishing and Repairs Inspections shall be performed to verify that specified finishes are obtained, i.e., wood float, steel trowel, as cast, or other type.	OK

ANSI N45.2.5 1978	NQA-1 (1994) Subpart 2.5 (except as noted)	Comments
After forms have been removed, inspections shall be performed to verify that the formed surfaces have been repaired and finished in accordance with specified requirements.	After forms have been removed, inspections shall be performed to verify that the formed surfaces have been repaired and finished in accordance with specified requirements.	OK
Any indications of voids or contamination, such as at a construction joint, shall be explored by physical removal of concrete if necessary to determine the extent of such voids or contamination.	Any indication of voids or contamination, such as at a construction joint, shall be explored by physical removal of concrete, if necessary, to determine the extent of such voids or contamination.	ОК
Appropriate repairs shall be made.	Appropriate repairs shall be made.	ОК
6.7 Curing	7.7 Curing	OK
	Qualification tests shall be performed on liquid membrane forming curing compounds and sheet materials for concrete curing for compliance with ASTM C 309 in accordance with test methods given therein or ASTM C 171, as applicable.	These words were added in NQA-1
Inspections shall be performed throughout the specified curing period to verify the following:	Inspections shall be performed throughout the specified curing period to verify the following:	OK
<ol> <li>Correct curing method is used, i.e., use of ponding, fog spray, wet burlap, curing compound, or other method in accordance with specified requirements.</li> <li>Concrete is kept continuously, i.e., not periodically, wet during the entire curing period, if one of the wet curing methods is used.</li> <li>Membrane curing compounds are specifically approved for use prior to application.</li> <li>Curing temperature is maintained within specified limits during the entire curing period.</li> <li>Shoring and forms are left in place and precast concrete members are left in the forms until concrete has reached the specified strength necessary to preclude the possibility of damage from construction loads.</li> <li>Concrete test cylinders are subjected to the same curing process as the concrete when field cured cylinders are required to evaluate curing methods.</li> </ol>	<ul> <li>a) correct curing method is used, i.e., use of ponding, fog spray, wet burlap, curing compound, or other methods in accordance with specified requirements;</li> <li>b) concrete is kept continuously, i.e., not periodically, wet during the entire curing period, if one of the wet curing methods is used;</li> <li>c) membrane curing compounds are specifically approved for use prior to application;</li> <li>d) curing temperature is maintained within specified limits during the entire curing period;</li> <li>e) shoring and forms are left in place, and precast concrete members are left in the forms until concrete has reached specified strength necessary to preclude the possibility of damage from construction loads;</li> <li>f) concrete test cylinders are subjected to the same curing process as the concrete when field cured cylinders are required to evaluate curing methods.</li> </ul>	OK
6.8 Stress Transfer of Pretensioned Members	7.8 Stress Transfer of Pretensioned Members	ОК
If applicable, inspections shall be performed to verify that:	If applicable, inspections shall be performed to verify the following:	

ANSI N45.2.5 1978	NQA-1 (1994) Subpart 2.5 (except as noted)	Comments
1. The concrete strength, as indicated by test cylinders, is in accordance with the specified transfer strength prior to the transfer of prestressing load from the bed to the member.	a) the concrete strength, as indicated by test cylinders, is in accordance with the specified transfer strength prior to the transfer of prestressing load to the member;	Similar Same Intent
2. Stress transfer is performed within the specified temperature limits for heat-cured members.	<ul> <li>b) stress transfer is performed within the specified temperature limits for heat cured members;</li> </ul>	
3. Forms, ties, inserts, hold downs or other devices that would restrict longitudinal movement of the member(s) along the bed are removed, or loosened in a specific sequence prior to or in conjunction with stress transfer.	c) forms, ties, inserts, hold downs, or other devices that would restrict longitudinal movement of the member(s) are removed, or loosened in a specific sequence to or in conjunction with stress transfer;	
4. The stress transfer is performed in a sequence which avoids overstressing or cracking of the member due to unacceptable non-symmetrical loading.	d) the stress transfer is performed following an approved stressing procedure.	
6.9 Post Tensioning	7.9 Post-Tensioning	ОК
Inspections shall be performed prior to and during post-tensioning, if applicable, to verify the following:	Inspections shall be performed prior to and during post-tensioning, if applicable, to verify the following:	
<ol> <li>The concrete strength, as indicated by test cylinders is in accordance with the specified strength at time of prestress or at the time of post-tensioning.</li> <li>The tendons and tendon ducts of ungrouted tendons have been treated with the specified lubricant and/or corrosion inhibiting compound prior to tendon installation.</li> <li>The tendons are tensioned (from both ends if so specified) in accordance with the specified pre-stressing sequence.</li> <li>The re is proper measurement and correlation of jack pressure (or load cell reading) and tendon elongation as well as proper correction for elongation and/or prestress seating losses.</li> <li>The anchorage details (buttonheads, friction grip, wedge grip, threaded, etc.) are in accordance with the specified requirements both prior to and after tensioning.</li> <li>The grouted tendon ducts are free from excessive moisture prior to tendon installation and kept dry prior to grouting; the grout material and the grouting operation are</li> </ol>	<ul> <li>a) the concrete strength, as indicated by test cylinders, is in accordance with the specified strength at the time of prestress or at the time of post-tensioning;</li> <li>b) the tendons and tendon ducts of ungrouted ten-dons have been treated with the specified lubricant, or corrosion-inhibiting compound, prior to tendon installation;</li> <li>c) the tendons are tensioned (from both ends if so specified) in accordance with the specified prestressing sequence;</li> <li>d) there is proper measurement and correlation of jack pressure (or load cell reading) and tendon elongation as well as proper correction for elongation, or prestress seating losses;</li> <li>e) the anchorage details (buttonheads, friction grip, wedge grip, threaded, etc.) are in accordance with the specified requirements both prior to and after tensioning;</li> <li>f) the grouted tendon ducts are free from excessive moisture prior to grouting; the grout material and the grouting operation are in accordance with specified requirements.</li> </ul>	OK
6.10 Shipping and Handling of Precast Concrete Members	7.10 Shipping and Handling of Precast Concrete Members	ок
Shipping and handling of precast concrete members shall be in accordance with the requirements of ANSI N45.2.2.	N45.2.2 incorporated into NQA-1 as Subpart 2.2.	QATR Section B.7 commits to Subpart 2.2.

ANSI N45.2.5 1978	NQA-1 (1994) Subpart 2.5 (except as noted)	Comments
Specifically, inspections shall be performed prior to and during erection to verify the following:	Inspections shall be performed prior to and during erection to verify the following:	ОК
1. Members are handled only by means of approved devices at designated locations or pick-up points.	<ul> <li>a) members are handled only by means of approved devices at designated locations or pick-up points;</li> </ul>	ОК
<ol> <li>Suitable foundations are provided for storage of precast members.</li> </ol>	b) suitable foundations are provided for storage of precast members;	
3. Stacked members are separated and supported by battens placed across the full width of the designated bearing points.	<ul> <li>c) stacked members are separated and supported by battens placed across the full width of the designated bearing points;</li> </ul>	
4. Shipping and handling has not caused unacceptable cracking, spalling, or chipping of the precast members, using acceptance criteria at least equivalent to those of ACI Committee Report 533, "Design of Concrete Wall Panels, Chapter 17, Cracking Acceptability."	d) cracking, spalling, and other defects caused by shipping and handling of the precast members do not exceed the specified limits.	
6.11 In-Process Tests on Concrete and Reinforcing and Prestressing Steels	7.11 In-Process Tests on Concrete and Reinforcing and Prestressing Steel	ОК
In-process tests shall be performed during the course of construction to maintain control of structural, prestressed and precast concrete.	In-process tests shall be performed during the course of construction to maintain control of structural, prestressed, and precast concrete.	
A list of the required in-process tests is contained in Table B.	The tests which are required and the frequency shall be in accordance with the ASME Boiler and Pressure Vessel Code, Section III, Division 2 (ACI Standard 359) except as follows. The ASME Boiler and Pressure Vessel Code, Section III, Division 2 (ACI Standard 359) test frequencies for the following tests shall be considered minimum, unless current documentary test data are available to establish adequate confidence in conformance of materials to specified requirements. a) for concrete materials — unit weight/yield b) for aggregate materials 1) unit weight of aggregate 2) fixed water and iron content of aggregate only for radiation-shielding concrete 3) organic impurities 4) flat and elongated particles 5) lightweight particles 6) soft fragments 7) specific gravity and absorption 8) Los Angeles abrasion 9) potential reactivity 10) soundness	Similar Same Intent

ANSI N45.2.5 1978	NQA-1 (1994) Subpart 2.5 (except as noted)	Comments
The test frequencies given shall be considered minimums.	The reduction of frequency of testing must be documented, and referenced documentation must be representative of the material currently being certified with the results of prior testing.	Similar Similar Intent
In-process tests shall be performed more frequently if test results are erratic or if the trend of results or an apparent change in material characteristics indicates that the frequency should be increased.	In-process tests shall be performed more frequently if test results are erratic, or if the trend of results or an apparent change in material characteristics indicates that the frequency should be increased.	ОК
Samples for in-process tests of concrete shall be taken following the procedures of ASTM C- 172 except as defined herein regarding location of sampling.	Samples for in-process tests of concrete shall be taken following the procedures of ASTM C 172, except as defined herein regarding location of sampling.	OK
No water or other ingredients may be added to any concrete batch after making the in-process tests.	No water or other ingredients may be added to any concrete batch after making the in-process tests.	ОК
Samples shall not be taken from concrete deposited in the form.	Samples shall not be taken from concrete deposited in the form.	ок
Except as noted below for pumped concrete and when correlation testing is performed, the sampling point for taking in-process test samples of plastic concrete shall be performed at the placement point, or other points coincident thereto.	Except as noted below, the sampling point for taking in-process test samples of plastic concrete shall be performed at the placement point or other points coincident thereto.	ОК
In the case where concrete is pumped during its movement from the delivery point to the placement point, in-process strength samples shall be taken at the placement point, unless correlation tests of air content, slump, and temperature are performed.	When concrete is pumped during its movement from the delivery point to the placement point, in-process strength samples shall be taken at the placement point, unless correlation tests of air content, slump, and temperature are performed.	OK
Where correlation testing is in effect, in-process strength samples may be taken at the delivery point.	When correlation testing is in effect, in-process strength samples may be taken at the delivery point.	ОК
In-process strength testing conducted at the mixing point is permitted, but unless the mixing point and the delivery point are considered coincident, correlation strength tests between samples taken at the mixing point and the delivery point are required.	In-process strength testing conducted at the mixing point is permitted, but unless the mixing point and the delivery point are considered coincident, correlation strength tests between samples taken at the mixing point and the delivery point are required.	OK
In this case the frequency of the correlation of strength samples taken at the delivery point shall be each 500 cubic yards of concrete or twice each week, which-ever provides the greater number of samples.	In this case, the frequency of the correlation of strength samples taken at the delivery point shall be taken each 500 cu yd (382 in3) of concrete or twice each week, whichever provides the greater number of samples.	OK

ANSI N45.2.5 1978	NQA-1 (1994) Subpart 2.5 (except as noted)	Comments
If sampling is not accomplished at the placement point and if the delivery point and the placement point are not considered coincident, correlation tests will be established and performed for air content, slump, and temperature.	If sampling is not accomplished at the placement point and if the delivery point and the placement point are not considered coincident, correlation tests will be established and performed for air content, slump, and temperature.	OK
The frequence of correlation tests shall be at an interval four times greater than that noted in Table B for in-process tests.	The frequency of the correlation tests shall be at an interval of four times greater than the required test frequency.	Similar Same Intent
When any of the specified limits and tolerances on loss of air content, slump, or temperature are exceeded at the placement point, correlation strength tests between the delivery point and the placement point shall be accomplished for each 100 cubic yards of concrete placed as long as limits and tolerances are exceeded. If no limits and tolerances are specified, the ASTM C-94 shall apply.	When any of the specified limits and tolerances on loss of air content, slump, or temperature are exceeded at the placement point, correlation strength tests between the delivery point and the placement point shall be accomplished for each 100 cu yd (76.5 in3) of concrete places as long as limits and tolerances are exceeded. If no limits and tolerances are specified, ASTM C 94 shall apply.	OK
6.12 Mechanical (Cadweld) Splice Testing	7.12 Mechanical (Sleeve With Ferrous Filler Metal) Splice Testing	ОК
	The mechanical (sleeve with ferrous filler metal) splice testing shall be done in accordance with the requirements of the ASME Boiler and Pressure Vessel Code, Section III, Division 2 (ACI Standard 359).	These words were added in NQA-1
6.12.1 Qualification of Operators. Prior to the production splicing of reinforcing bars, each member of the splicing crew (or each crew if the members work as a crew) shall prepare two qualification splices on the largest bar size for each of the splice positions (e.g., horizontal, vertical, diagonal) to be used.	The mechanical (sleeve with ferrous filler metal) splice testing shall be done in accordance with the requirements of the ASME Boiler and Pressure Vessel Code, Section III, Division 2 (ACI Standard 359).	Similar Same Intent
The qualification splices shall be made using the same materials (e.g., bar, sleeve, powder) as those to be used in the structure.	The mechanical (sleeve with ferrous filler metal) splice testing shall be done in accordance with the requirements of the ASME Boiler and Pressure Vessel Code, Section III, Division 2 (ACI Standard 359).	Similar Same Intent
To qualify, the completed splices must meet the specified visual inspection acceptance requirements of paragraph 6.12.2 and meet the tensile test requirements of paragraph 6.123.	The mechanical (sleeve with ferrous filler metal) splice testing shall be done in accordance with the requirements of the ASME Boiler and Pressure Vessel Code, Section III, Division 2 (ACI Standard 359).	Similar Same Intent

ANSI N45.2.5 1978	NQA-1 (1994) Subpart 2.5 (except as noted)	Comments
Each member of the splicing crew (or each crew if the members work as a crew) is subject to requalification (1) if the specific splice position (e.g., horizontal, vertical, diagonal) has not been used by member or crew for a period of three months or more or (2) if there has been an increase in bar size beyond one bar size up or (3) if there is a reason to question their ability, such as the completed splices not passing visual inspection or tensile testing.	The mechanical (sleeve with ferrous filler metal) splice testing shall be done in accordance with the requirements of the ASME Boiler and Pressure Vessel Code, Section III, Division 2 (ACI Standard 359).	Similar Same Intent
The requalification procedure should be identical to the initial qualification procedure.	The mechanical (sleeve with ferrous filler metal) splice testing shall be done in accordance with the requirements of the ASME Boiler and Pressure Vessel Code, Section III, Division 2 (ACI Standard 359).	Similar Same Intent
6.12.2 Visual Inspection. All completed mechanical splices shall be cooled to ambient temperature prior to being visually inspected at both ends of the splice sleeve and at the tap hole in the center of the splice sleeve for longitudinal centering of sleeve on the spliced ends, allowable voids in filler metal, extent of leaking of filler metal, gas blowout, amount of packing and slag at the tap hole.	The mechanical (sleeve with ferrous filler metal) splice testing shall be done in accordance with the requirements of the ASME Boiler and Pressure Vessel Code, Section III, Division 2 (ACI Standard 359).	Similar Same Intent
Splices that fail to pass visual inspection shall be discarded and replaced and shall not be used as tensile test samples.	The mechanical (sleeve with ferrous filler metal) splice testing shall be done in accordance with the requirements of the ASME Boiler and Pressure Vessel Code, Section III, Division 2 (ACI Standard 359).	Similar Same Intent
6.12.3 Tensile Testing. Splice samples may be production splices (i.e., those cut directly from in- place reinforcing) or sister splices (i.e., those removable splices made in place next to production splices and under the same conditions).	The mechanical (sleeve with ferrous filler metal) splice testing shall be done in accordance with the requirements of the ASME Boiler and Pressure Vessel Code, Section III, Division 2 (ACI Standard 359).	Similar Same Intent
A record shall be kept of all splices tested, showing the splice location, splice identification number, and whether the tested splice was a production or sister splice. Splice samples shall be subjected to tensile tests in accordance. with the sampling frequency specified in Section 6.12.4 to determine conformance with the tensile requirements set forth in Table CB-4330-I of the ASME Code Sec. III, Div. 2.	The mechanical (sleeve with ferrous filler metal) splice testing shall be done in accordance with the requirements of the ASME Boiler and Pressure Vessel Code, Section III, Division 2 (ACI Standard 359).	Similar Same Intent
Splice samples shall be subjected to tensile tests in accordance. with the sampling frequency specified in Section 6.12.4 to determine conformance with the tensile requirements set forth in Table CB-4330-I of the ASME Code Sec. III, Div. 2.	The mechanical (sleeve with ferrous filler metal) splice testing shall be done in accordance with the requirements of the ASME Boiler and Pressure Vessel Code, Section III, Division 2 (ACI Standard 359).	Similar Same Intent

ANSI N45.2.5 1978	NQA-1 (1994) Subpart 2.5 (except as noted)	Comments
Since curved reinforcing bars will not tensile test accurately, production splice samples shall not be re-moved from curved reinforcing bars for tensile testing.	The mechanical (sleeve with ferrous filler metal) splice testing shall be done in accordance with the requirements of the ASME Boiler and Pressure Vessel Code, Section III, Division 2 (ACI Standard 359).	Similar Same Intent
Straight sister splice samples shall be made for each of the required curved reinforcing bar production splices.	The mechanical (sleeve with ferrous filler metal) splice testing shall be done in accordance with the requirements of the ASME Boiler and Pressure Vessel Code, Section III, Division 2 (ACI Standard 359).	Similar Same Intent
Production samples shall also not be cut from the structure where the mechanical splicing sleeve is welded to an anchorage in a region of high stress concentration, or at a leak tight barrier (e.g., embedded structural steel sections or liner plate	The mechanical (sleeve with ferrous filler metal) splice testing shall be done in accordance with the requirements of the ASME Boiler and Pressure Vessel Code, Section III, Division 2 (ACI Standard 359).	Similar Same Intent
Representative sister splice samples shall be used in such cases.	The mechanical (sleeve with ferrous filler metal) splice testing shall be done in accordance with the requirements of the ASME Boiler and Pressure Vessel Code, Section III, Division 2 (ACI Standard 359).	Similar Same Intent
The sampling frequency specified in Section 6.12.4(2) shall then be followed, except that all splices tested shall be sister splices.	The mechanical (sleeve with ferrous filler metal) splice testing shall be done in accordance with the requirements of the ASME Boiler and Pressure Vessel Code, Section III, Division 2 (ACI Standard 359).	Similar Same Intent
6.12.4 Tensile Test Frequency. Separate test cycles shall be established for mechanical splices in horizontal, vertical, and diagonal bars, for each bar size as follows:	The mechanical (sleeve with ferrous filler metal) splice testing shall be done in accordance with the requirements of the ASME Boiler and Pressure Vessel Code, Section III, Division 2 (ACI Standard 359).	Similar Same Intent
<ol> <li>Test Frequency for Production Splice Test Samples. If only production splices are tested, the sample frequency shall be:         <ul> <li>One of the first 10 splices.</li> <li>One of the next 90 splices.</li> <li>Two of the next and subsequent units of 100 splices.</li> </ul> </li> </ol>	The mechanical (sleeve with ferrous filler metal) splice testing shall be done in accordance with the requirements of the ASME Boiler and Pressure Vessel Code, Section III, Division 2 (ACI Standard 359).	Similar Same Intent
<ul> <li>2. Test Frequency for Combination of Production and Sister Splices. If production and sister splices are tested, the sample frequency shall be:</li> <li>a. One production splice of the first 10 splices.</li> <li>b. One production and three sister splices for the next 90 production splices.</li> <li>c - One splice either production or sister splice, for the next and subsequent units of 33 splices.</li> <li>At least ¼ of the total number of splices tested shall be production splices -</li> </ul>	The mechanical (sleeve with ferrous filler metal) splice testing shall be done in accordance with the requirements of the ASME Boiler and Pressure Vessel Code, Section III, Division 2 (ACI Standard 359).	Similar Same Intent

ANSI N45.2.5 1978	NQA-1 (1994) Subpart 2.5 (except as noted)	Comments
6.13 Welded Reinforcing Bar Splices Welded reinforcing bar splices shall be subject to the requirements of Section 7.5 of this Standard except that provisions of Subsection CC-4334 of ASME Code Section III, Division 2 shall apply.	7.13 Welded Reinforcing Bar Splices Welded reinforcing bar splices shall be subject to the requirements of para. 8.5, except that provisions of the ASME Boiler and Pressure Vessel Code, Section III, Division 2 (ACI Standard 359) shall also apply.	Similar Same Intent
7. INSPECTION OF STEEL CONSTRUCTION 7.1 General	8 INSPECTION OF STEEL CONSTRUCTION 8.1 General	OK
	Structural steel qualification shall be documented by manufacturer's certification showing conformance to specifications such as ASTM A 36, A 441, or as otherwise specified.	These words were added in NQA-1
Inspection of steel construction in accordance with the "AISC Specification for the Design, Fabrication, and Erection of Structural Steel for Buildings" as contained in the AISC Manual of Steel Construction shall include inspection of assembly and erection operations, fastening or connecting operations such as high strength bolting and welding and finishing operations to include cleaning and protective painting or coating.	Inspection of steel construction in accordance with the AISC S326, Specification for the Design, Fabrication, and Erection of Structural Steel for Buildings shall include inspection of assembly and erection operations, fastening or connecting operations such as high strength bolting and welding, and finishing operations to include cleaning and protective painting or coating.	ОК
Inspection of steel construction shall include inspection of related items, such as anchor bolts and base plates, which may be part of the supporting structure and installed as part of structural concrete work.	Inspection of steel construction shall include inspection of related items, such as anchor bolts and baseplates, which may be part of the supporting structure and installed as part of the structural concrete work.	OK
Table B Required In-Process Test	Required tests are delineated within body of Subpart 2.5	Similar Same Intent
7.2 Supporting Structures Prior to erection of steel, anchor bolts, base plates, and other structural embedments shall be checked for correct orientation, spacing, and elevation. Base plate surfaces and supporting concrete surfaces shall be checked to verify satisfactory condition for grouting.	8.2 Supporting Structures Prior to erection of steel, anchor bolts, baseplates, and other structural embedments shall be checked for correct orientation, spacing, and elevation. Baseplate surfaces and supporting concrete surfaces shall be checked to verify satisfactory conditions for grouting.	OK
Grouting of base plates, beam pockets, etc., shall be controlled and inspected to verify that only specified materials are used, proportioned properly, placed correctly, and cured properly to achieve the specified compressive strength -	Grouting of baseplates, beam pockets, etc., shall be controlled and inspected to verify that only specified materials are used, proportioned properly, placed correctly, and cured properly to achieve the specified compressive strength.	OK

ANSI N45.2.5 1978	NQA-1 (1994) Subpart 2.5 (except as noted)	Comments
7.3 Assembly and Erection	8.3 Assembly and Erection	ОК
Assembly and erection operations shall be inspected to verify compliance with installation procedures and work instructions. Alignment operations shall be carried out early enough and as often as is necessary as erection progresses to ensure that specified requirements are met	Assembly and erection operations shall be inspected to verify compliance with installation procedures and work instructions. Alignment operations shall be carried out early enough and as often as is necessary as erection progresses to ensure that specified requirements are met.	
Particular attention shall be given to verification of the condition of contact surfaces of friction type connections and bolt hole alignment.	Particular attention shall be given to verification of the condition of contact surfaces of friction type connections and bolt hole alignment.	OK
Correction of fabrication errors shall be closely controlled to prevent correction of misaligned holes by reaming in excess of AISC tolerances.	Correction of fabrication errors shall be closely controlled to prevent correction of misaligned holes by reaming in excess of AISC tolerances.	OK
Burning of bolt holes is not permitted.	Burning of bolt holes is not permitted.	ОК
All equipment used in connecting operations shall be inspected to verify conformance with specification requirements.	Equipment used in connecting operations shall be inspected to verify conformance with specification requirements.	ОК
For example, air compressors must be of sufficient capacity to maintain the required operating pressures for impact tools.	For example, air compressors shall be of sufficient capacity to maintain the required operating pressures for impact tools.	ок
7.4 High Strength Bolting	8.4 High Strength Bolting	ок
Bolt tightening shall be in accordance with the specified method, i.e., automatic cut-off impact wrench, turn-of-nut method, or direct-tension indicator. If the turn-of-nut method is used, inspections shall be made to verify that the bolting crews understand the meaning of "snug tight" condition before the nut is turned through the required angle	Bolt tightening shall be in accordance with the specified method, e.g., automatic cut-off impact wrench, turn-of-nut method, or direct-tension indicator. If the turn-of-nut method is used, inspections shall be made to verify that the bolting crews understand the meaning of snug tight condition before the nut is turned through the required angle.	
If an automatic cut-off impact wrench is used, it shall be calibrated at least twice daily.	If an automatic cut-off impact wrench is used, it shall be calibrated at least twice daily.	ОК
The calibration of automatic cut-off impact wrenches shall be performed by tightening in a device capable of indicating actual bolt tension, using no less than three typical bolts of each diameter from the bolts being installed.	The calibration of automatic cut-off impact wrenches shall be performed by tightening in a device capable of indicating actual bolt tension, using no less than three typical bolts of each diameter from the bolts being installed.	OK
Installation of bolts shall be done in accordance with "Specifications for Structural Joints Using ASTM A-325 or A-490 Bolts."	Installation of bolts shall be done in accordance with AISC 5329, Specifications for Structural Joints Using ASTM A 325 or A 490 Bolts.	OK
	Qualification of bolts shall be documented by manufacturer's certification or as otherwise specified	These words were added in NQA-1

ANSI N45.2.5 1978	NQA-1 (1994) Subpart 2.5 (except as noted)	Comments
7.4.1 Inspection of Bolting. Inspection of bolting shall include visual inspections of bolting operations and torque wrench inspection of completed connections.	8.4.1 Inspection of Bolting. Inspection of bolting shall include visual inspection of bolting operations and torque wrench inspection of completed connections.	ОК
Connection points shall be visually inspected for the following items: 1. Bolts are long enough as indicated by the point of the bolts being flush with or outside the face of the nuts. 2. Correct type bolt is used as indicated by the manufacturer's marking on the head. 3. Torque has been applied as indicated by the burnishing or peening of the corners of the nut. 4. Turning elements are on the correct face; properly sized washers are used when required.	Connection points shall be visually inspected for the following items: (a) bolts are long enough as indicated by the point of the bolts being flush with or outside the face of the nuts; (b) correct type bolt is used as indicated by the manufacturer's marking on the head; Cc) torque has been applied as indicated by the burnishing or peening of the corners of the nut; (d) turning elements are on the correct face; properly sized washers are used when required.	ОК 
The schedule bolt tension inspection shall be as specified in the latest edition of "Specification for Structural Joints Using ASTM A-325 or A-490 Bolts".	Bolt tension inspection shall be as specified in AISC 5329, Specification for Structural Joints Using ASTM A 325 or A 490 Bolts.	ОК
In addition, during the initial phase of bolting operations, all bolts tightened by each bolting crew shall be checked until the results are consistently acceptable.	In addition, during the initial phase of bolting operations, all bolts tightened by each bolting crew shall be checked until the results are consistently acceptable.	ОК
7.4.2 Inspection Tools and Procedure. Hand torque wrenches used for inspection shall be controlled in accordance with paragraph 2.5.2 and must be calibrated at least weekly and more often if deemed necessary.	8.4.2 Inspection Tools and Procedure. Hand torque wrenches used for inspection shall be controlled in accordance with Part I, Basic and Supplementary Requirements, and shall be calibrated at least weekly, more often if deemed necessary.	ОК
Impact torque wrenches used for inspection must be calibrated at least twice daily.	Impact torque wrenches used for inspection shall be calibrated at least twice daily.	ОК
Feeler gauges used for inspection of direct- tension indicators shall be controlled in accordance with paragraph 2.5.2.	Feeler gauges used for inspection of direct- tension indicators shall be controlled.	Similar Same intent
7.5 Welding Inspection of structural steel welding shall be performed in accordance with the provisions of AWS DI .1, Section 6, entitled "Structural Welding Code," and supplemental addenda.	8.5 Welding Inspection of structural steel welding shall be per-formed in accordance with the provisions of Section 6.0 of AWS DI.1, Structural Welding Code— Steel.	Similar Same Intent
This inspection shall include visual examination of preparations, welding processes, and post- welding operations and if deemed necessary some NDE inspections which are appropriate to the application.	This inspection shall include visual examination of preparations, welding processes, post- welding operations, and if deemed necessary, some NDE inspections which are appropriate to the application.	OK
Prior to welding, verification of welding procedure and welder qualification shall be documented and shall include all essential variables identified in the procedure.	Prior to welding, verification of welding procedure and welder qualification shall be documented and shall include all essential variables identified in the procedures.	OK

ANSI N45.2.5 1978	NQA-1 (1994) Subpart 2.5 (except as noted)	Comments
In-process inspections shall include acceptability of environmental conditions, joint fit up prior to start of welding, preheat and interpass temperature requirements, filler metal, control of distortion, and post-weld heat treatment and cleaning requirements.	In-process inspections shall include acceptability of environmental conditions, joint fit-up prior to start of welding, preheat and interpass temperature requirements, filler metal, control of distortion, post-weld heat treatment, and cleaning requirements.	OK
Procedures shall be established to control the purchase, receiving, distribution, storage, and use of welding electrode.	Procedures shall be established to control the purchase, receiving, distribution, storage, and use of welding electrodes.	ОК
	Weld repairs necessitated by visual or nondestructive examinations shall be made in accordance with the procedure used to perform the original weld or a qualified repair procedure and reinspected by the same method that disclosed the repairable defect.	These words were added in NQA-1
	All weld repairs necessitated by nondestructive examination shall be documented.	These words were added in NQA-1
8. DATA ANALYSIS AND EVALUATION	9 DATA ANALYSIS AND EVALUATION	OK
8.1 General	9.1 General	
Procedures shall be established for processing inspection and test data and their analysis and evaluation.	Procedures shall be established for processing inspection and test data and their analysis and evaluation.	
These procedures shall provide for acquisition and preparation of inspection and test data for prompt evaluation against acceptance criteria, operating limits, and performance standards.	These procedures shall provide for acquisitions and preparation of inspection and test data for prompt evaluation against acceptance criteria, operating limits, and performance standards.	ОК
The data processing procedures shall provide for "on-the-spot" evaluation to determine the validity of the inspection and test results and the appropriateness of continuing the inspection or test.	The data processing procedures shall provide for on-the-spot evaluation to determine the validity of the inspection and test results and the appropriateness of continuing the inspection or test.	ОК
The data shall be analyzed and evaluated to verify completeness of results, achievement of inspection and test objectives, and to identify additional inspection and tests required; and necessary changes to the installation inspection or test procedures.	The data shall be analyzed and evaluated to verify completeness of results and achievement of inspection and test objectives; and to identify additional inspection and tests required, and necessary changes to the installation inspection or test procedures.	ОК
Inspection and test results that include inspection and test data, together with a report of data analysis and evaluation, shall be provided as specified in Section 9.	Inspection and test results that include inspection and test data, together with a report of data analysis and evaluation, shall be provided as specified in Section 10.	ОК
<ul> <li>8.2 Concrete and Mechanical (Cadweld) Splice Test Data Evaluation and Analysis</li> <li>8.2.1 Evaluation of Concrete Test Results. Standard deviation data shall be developed, evaluated, and maintained for permanent records in accordance with ACI 214.</li> </ul>	<ul> <li>9.2 Concrete and Mechanical (Sleeve With Ferrous Filler Metal) Splice Test Data Evaluation and Analysis</li> <li>9.2.1 Evaluation of Concrete Test Results. Standard deviation data shall be developed, evaluated, and maintained for permanent records in accordance with ACI 214.</li> </ul>	OK

ANSI N45.2.5 1978	NQA-1 (1994) Subpart 2.5 (except as noted)	Comments
Concrete quality and acceptance criteria shall conform to the requirements of ACI 318, Chapter 4.	Concrete quality and acceptance criteria shall conform to the requirements of ACI 318, Chapter 4.	ОК
8.2.2 Evaluation of Mechanical (Cadweld) Splice Test Results. The following procedure shall be used for substandard tensile test results:	9.2.2 Evaluation of Mechanical Splice Test Results. The evaluation of mechanical splice test results shall be in accordance with ASME Boiler and Pressure Vessel Code, Section III, Division 2 (ACI Standard 359).	Similar Same Intent
1. If any production or sister splice tested fails to meet the tensile test specification of paragraph 6.12.3 and the observed rate of splices that fail the tensile test at that time does not exceed one for each 15 consecutive test samples, the sampling procedure shall be started anew.	9.2.2 Evaluation of Mechanical Splice Test Results. The evaluation of mechanical splice test results shall be in accordance with ASME Boiler and Pressure Vessel Code, Section III, Division 2 (ACI Standard 359).	Similar Same Intent
If any production or sister splice used for testing fails to meet the tensile test specification in paragraph 6.12.3 and the observed rate of splices that fail the tensile test exceeds one for each 15 consecutive test samples, mechanical splicing shall be stopped.	9.2.2 Evaluation of Mechanical Splice Test Results. The evaluation of mechanical splice test results shall be in accordance with ASME Boiler and Pressure Vessel Code, Section III, Division 2 (ACI Standard 359).	Similar Same Intent
In addition, the adjacent production splices on each side of the last failed splice and four other splices distributed uniformly throughout the balance of the 100 production splices under investigation shall be tested, and an analysis shall be made to identify the cause of all failures.	9.2.2 Evaluation of Mechanical Splice Test Results. The evaluation of mechanical splice test results shall be in accordance with ASME Boiler and Pressure Vessel Code, Section III, Division 2 (ACI Standard 359).	Similar Same Intent
The results of these tests shall be evaluated by the responsible engineering organization to determine the corrective action.	9.2.2 Evaluation of Mechanical Splice Test Results. The evaluation of mechanical splice test results shall be in accordance with ASME Boiler and Pressure Vessel Code, Section III, Division 2 (ACI Standard 359).	Similar Same Intent
The responsible engineering organization shall specify the extent of repairs necessary and the actions required to prevent further failures from the identified causes.	9.2.2 Evaluation of Mechanical Splice Test Results. The evaluation of mechanical splice test results shall be in accordance with ASME Boiler and Pressure Vessel Code, Section III, Division 2 (ACI Standard 359).	Similar Same Intent
If two or more splices from any of these six additional splice samples fail to meet the tensile test specification of paragraph 6.12.3, the balance of the 100 production splices under investigation shall be evaluated by the responsible engineering organization to determine the corrective action.	9.2.2 Evaluation of Mechanical Splice Test Results. The evaluation of mechanical splice test results shall be in accordance with ASME Boiler and Pressure Vessel Code, Section III, Division 2 (ACI Standard 359).	Similar Same Intent
When mechanical splicing is resumed, the sampling procedure shall be started anew.	9.2.2 Evaluation of Mechanical Splice Test Results. The evaluation of mechanical splice test results shall be in accordance with ASME Boiler and Pressure Vessel Code, Section III, Division 2 (ACI Standard 359).	Similar Same Intent

ANSI N45.2.5 1978	NQA-1 (1994) Subpart 2.5 (except as noted)	Comments
2. If the average tensile strength of the 15 consecutive samples fails to meet the provisions of paragraph 6.12.3, the responsible engineering organization shall evaluate and assess the acceptability of the reduced average tensile strength with respect to the required strength of the location from which the samples were taken.	9.2.2 Evaluation of Mechanical Splice Test Results. The evaluation of mechanical splice test results shall be in accordance with ASME Boiler and Pressure Vessel Code, Section III, Division 2 (ACI Standard 359).	Similar Same Intent
8.2.3 Evaluation of Aggregate Test Results. When any aggregate tests specified fail to meet the specified requirements, two additional tests shall be made from samples of the same lot of aggregate.	9.2.3 Evaluation of Aggregate Test Results When any aggregate tests specified fail to meet the specified requirements, tewo additional tests shall be made from samples of the same lot of aggregate.	ОК
If one or both of the two additional tests fail to meet the specified requirements, the data shall be submitted to the responsible engineering organization for evaluation and corrective action.	9.2.3 If one or both of the two additional tests fails to meet the specified requirements, the data shall be submitted to the responsible engineering organization for evaluation and corrective action.	OK
8.3 Steel Construction Test Data Evaluation and Analysis	9.3 Steel Construction Test Data Evaluation and Analysis	Similar Same Intent
This data shall be evaluated for conformance to project specifications, the AISC Manual of Steel Construction, and AWS DI .1 and supplemental addenda.	This data shall be evaluated for conformance to project specifications of the AISC MO11, Manual of Steel Construction and AWS D1.1, Structural Welding Code — Steel.	
8.4 Soils Test Data Evaluation and Analysis	9.4 Soils Test Data Evaluation and Analysis	ОК
This data shall be evaluated daily during progress of the work for conformance to project specifications.	This data shall be evaluated daily during progress of the work for conformance to project specifications.	
The control techniques given in the specifications such as specific test methods for the type of soil compacted must be verified.	The control techniques given in the specifications, such as specific test methods for the type of soil compacted, shall be verified.	ОК
Data must include determination of parameters specified including use of proper materials, amounts and uniformity of soil moisture, thickness of layers being placed, and finally, determination of specified compacted values by specified tests of in-place density and attainment of specified values.	Data shall include determination of parameters specified, including use of proper materials, amounts and uniformity of soil moisture, and thickness of layers being placed. In-place compacted fill density shall be determined using standard approved methods and the results evaluated for compliance to specified requirements.	Similar Same Intent
Data shall include verification that the soils are fully compacted or consolidated to contours and grades specified.	Data shall include verification that the soils are fully compacted or consolidated to contours and the grades specified.	OK
When statistical methods are required by the specification, the desired level of confidence must be specified.	When statistical methods are required by the specification, the desired level of confidence shall be specified.	ОК

ANSI N45.2.5 1978	NQA-1 (1994) Subpart 2.5 (except as noted)	Comments
9. RECORDS Record copies of completed procedures, reports, personnel qualification records, test equipment	10 RECORDS Record copies of procedures, reports,	OK
calibration records, test deviation or exception records, and inspection and examination records shall be prepared.	calibration records, test deviation or exception records, and inspection and examination records shall be prepared.	
These shall be placed with other project records as required by code, standard, specification, or project procedures.	These shall be retained with other project records as required by code, standard, specification, or project procedures.	OK
Collection, storage, and maintenance of records shall be in accordance with requirements of ANSI N45.2.9.	N45.2.9 incorporated into NQA-1 as Basic Requirement 17 and Supplement 17S-1.	QATR Section B.15 commits to Basic Requirement 17 and Supplement 17 S-1.
10. REVISION OF AMERICAN NATIONAL STAN-DARDS REFERRED TO IN THIS DOCUMENT	These documents incorporated into NQA-1	
when any of the following standards referred to in this document is superseded by a revision approved by the American National Standards Institute, the revision is not mandatory until it has been incorporated as a part of this Standard.		
N45 2 Quality Assurance Program Requirements for Nuclear Power Plants N45 .2.2 Packaging, Shipping, Receiving, Storage and Handling of Items for Nuclear Power Plants. N45.2.3 Housekeeping During the Construction Phase of Nuclear Power Plants	These documents incorporated into NQA-1	
N45 .2.6 Qualifications of Inspection, Examination and Testing Personnel for the Construction Phase of Nuclear Power Plants N45 .2.9 Requirements for Collection, Storage, and Maintenance of Quality Assurance Records for Nuclear Power Plants N45.2.10 Quality Assurance Terms and Definitions		
APPENDIX	NQA-1 Part II Introduction includes similar	Similar
(This Appendix is not a part of ANSI Standard N45.2.5 but is included for information purposes only.)	7 REFERENCED CODES, STANDARDS, AND SPECIFICATIONS	Same intent
NONMANDATORY APPENDIX A	All codes, standards, and specifications that are referenced as a part of this Part (Part II) are listed in the Table entitled "Codes, Standards,	
(Ust of Reference Documents)	and Specifications Referenced in Text."	

ANSI N45.2.8 - 1975	NQA-1 (1994) Subpart 2.8	
	(except where noted)	(NOTE: OK signifies identical or
1. INTRODUCTION	Introduction	Slightly different words, but same
1.1 Soono	Section 1 "Burness"	intent.
	Section 1 Purpose	
This standard contains requirements and guidelines to assure the quality of important items of nuclear power plants including structures, systems and components.	This Part (Part II) sets forth the quality assurance requirements for the planning and execution of identified tasks during the fabrication, construction, modification, repair, maintenance, and testing of systems, components, and structures for nuclear facilities.	
The requirements and guidelines are	1 GENERAL	N45.2.8 includes "in a manner that will
items are installed, inspected and tested in a manner that will provide adequate confidence that they will perform satisfactorily in service.	Subpart 2.8 provides amplified requirements for installation, inspection, and testing of mechanical equipment and systems.	will perform satisfactorily in service."
The requirements and guidelines for installation, inspection and testing activities during construction are intended to assure the quality of mechanical items not covered by Section III of the ASME Boiler and Pressure Vessel Code.		Guidance only. Wording does not establish requirements.
The requirements of this standard deal with the protection and control necessary to assure that the requisite quality of mechanical items of the plant are preserved from the time items are removed from storage or receiving until they are incorporated into the plant up to but not including fuel loading of PWR plants and the completion of cold functional testing of BWR and HTGR plants.		Guidance only. Wording does not establish requirements.
This standard is intended to be used in conjunction with ANSI N45.2. If any conflict exists, ANSI N45.2 shall govern.	It supplements the requirements of Part I and shall be used in conjunction with applicable Basic and Supplementary Sections of Part I when and to the extent specified by the organization invoking Subpart 2.8	Slightly different words, but same intent.
1.2 Applicability	Introduction	N45.2.2 is more specific in detailing
The requirements and guidelines of this standard apply to the work of any individual or organization that participates in installation, inspection or testing of mechanical equipment during construction activities of nuclear power plants as discussed in Subsec- tion 1.1.	Section 2 "Applicability" "The requirements of this Part (Part II) apply to fabrication, construction, modification, repair, maintenance, and testing activities that affect the quality of structures, systems, and components for nuclear facilities. These activities include the performing function of attaining quality objectives and verifying that activities affecting quality have been correctly performed. These activities include planning, subsurface investigation, fabricating, handling, shipping, storing, cleaning"	that the requirements and guidelines "apply to the work of any individual or organization". Same Intent / Result
The extent to which the individual	Introduction	N45.2.8 states that application will be
depend upon the nature and scope of the work to be performed and the	Section 2 "Applicability"	of the work to be performed and the importance of the item or service
importance of the item or service	To the extent applicable to the	involved" whereas NQA-1 states "shall

ANSI N45.2.8 - 1975	NQA-1 (1994) Subpart 2.8	
	(except where noted)	(NOTE: OK signifies identical or
		nearly identical wording)
involved.	application of this Part (Part II), or portions thereof, and the provisions of Part 1, Basic and Supplementary Requirements, shall be specified in written contracts, policies,	policies, procedures, or instructions. Same Intent / Result
Important mechanical items to be	Introduction	Same Intent / Result
covered and the extent of coverage shall be identified by the individual or organization invoking this standard.	Section 2 "Applicability"	
	To the extent applicable to the activities being performed, the application of this Part (Part II), or portions thereof, and the provisions of Part 1, Basic and Supplementary Requirements, shall be specified in written contracts, policies, procedures, or instructions.	
The requirements are intended to assure that only proper materials, equipment, processes and procedures are utilized during the construction of power plants and that the quality of items is not degraded as a result of installation, inspection and testing practices and techniques during construction.		Guidance / Context Wording
The ASME Boiler and Pressure Vessel Code (herewith referred to as the Code), as well as other American National Standards has been considered in the development of this standard, and this standard is intended to be compatible with their requirements. However, this standard does not apply to activities covered by Section III Division I and 2 and Section XI of the Code for those activities covered by the Code		Section A.7 of the QATR specifies applicable Regulatory Commitments.
1.3 Responsibility	Basic Requirement 1	Similar
The organization or organizations responsible for establishing the applicable requirements for the activi- ties covered by this standard shall be identified and the scope of their responsibilities shall be documented.	The organizational structure, functional responsibilities, levels of authority, and lines of communication for activities affecting quality shall be documented. Supplement 1S-1 3.1 Where more that one organization is involved in the execution of activities covered by this Part (Part 1) the responsibility and authority of each organization shall be clearly established and documented.	Same Intent
The work of establishing practices and procedures and providing the resources in terms of personnel, equip- ment and services necessary to implement the requirements of this standard may be delegated to other organizations and such delegation shall also be documented.	Supplement 1S-1 2.2 The individual(s) or organization(s) responsible for establishing and executing a quality assurance program under this Standard may delegate any or all of the work to others but shall retain responsibility therefor.	Similar Same intent
It is the responsibility of each organiza-	Introduction	Slightly different words, but same

ANSI N45.2.8 - 1975	NQA-1 (1994) Subpart 2.8	
	(except where noted)	(NOTE: OK signifies identical or
	· · · · · · · · · · · · · · · · · · ·	nearly identical wording)
tion performing work covered by this		intent.
standard to comply with the	Section 3 "Responsibility"	
procedures and instructions issued for		
the project and to conform to the	The organization invoking this Part	
requirements of this standard	(Part II) shall be responsible for	
applicable to this work.	thereof, apply and appropriately	
	relating them to specific items and	
	services To the extent necessary	
	this organization shall invoke the	
	applicable provision of Part 1, Basic	
	and Supplementary Requirements, to	
	specify a complete Quality Assurance	
	Program appropriate for the specific	
	items or services. The organization	
	upon which this Part (Part II), or	
	portions thereof, is invoked shall be	
	specified requirements	
It is the responsibility of the	Introduction	NOA-1 does not include the words
organization performing these activities		"unless they are specified in
to specify the detailed methods and	Section 3 "Responsibility"	procurement documents".
procedures unless they are specified in	······································	
the procurement documents.	The organization invoking this Part	Differences are not relevant.
	(Part II) shall be responsible for	
	specifying which section, or portions	
	thereof, apply and appropriately	
	relating them to specific items and	
	this organization shall invoke the	
	applicable provision of Part 1 Basic	
	and Supplementary Requirements to	
	specify a complete Quality Assurance	
	Program appropriate for the specific	
	items or services. The organization	
	upon which this Part (Part II), or	
	portions thereof, is invoked shall be	
	responsible for complying with the	
1.4 Definitione	specified requirements.	OK
1.4 Definitions	1.1 Dennuons	UK .
The following definitions are provided	The following definitions are provided	
to assure a uniform understanding of	to assure a uniform understanding of	
select terms as they are used in this	unique terms as they are used in	
standard.	Subpart 2.8.	
Acceptance Criteria — A limit or limits	I Introduction	N45.2.8 is more specific in detailing
placed on the variation permitted in the	Section 4 "Terms and Definitions"	definitive engineering terms.
characteristics of an item expressed in		Differences and a tarley at
definitive engineering terms such as	acceptance criteria - specified limits	Differences are not relevant.
composition limits, density and size of	praced on characteristics of an item,	
defects temperature ranges time	standards, or other required	
limits operating parameters and other	documents	
similar characteristics.		
Checks — The tests, measurements,	checks — the tests, measurements,	ОК
verifications or controls placed on an	verifications, or controls placed on an	
activity by means of investigations,	activity by means of investigations,	
comparisons, or examinations to	comparisons, or examinations to	
determine satisfactory condition,	determine satisfactory condition,	
accuracy, safety or performance.	accuracy, satety, or performance	OK.
which if disregarded may result in	which if disregarded may result in	UN
damage to the item shortening the life	damage to the item shortening the	
of the item, or preventing the item from	life of the item, or preventing the item	
functioning as intended.	from functioning as intended	
Examination — An element of	examination — an element of	ОК

ANSI N45.2.8 - 1975	NQA-1 (1994) Subpart 2.8 (except where noted)	(NOTE: OK signifies identical or nearly identical wording)
inspection consisting of investigation of materials, components, supplies and services to determine conformance to those specified requirements which can be determined by such investigation. Examination is usually nondestructive and includes simple physical manipulation, gaging and measurement.	inspection consisting of investigation of materials, components, supplies, and services to determine conformance to those specified requirements which can be determined by such investigation. Examination is usually nondestructive and includes simple physical manipulation, gaging, and measurement.	
<i>Inspection</i> — An element of quality control which by means of examination, observation or measurement determines the conformance of materials, supplies, components, parts, appurtenances, systems, processes or structures to predetermined quality requirements.	I Introduction Section 4 "Terms and Definitions" inspection - examination or measurement to verify whether an item or activity conforms to specified requirements.	N45.2.8 includes words "an element of quality control" and "observation" and examples of what one is trying to determine conformance of (i.e., materials, supplies, etc.). In addition, N45.2.8 states that it is to "predetermined quality requirements" whereas NQA-1 states "specified requirements". Same Intent / Result
Mechanical Items — Parts, components, or systems that function primarily for pressure retaining, mass moving, or heat exchange purposes. Examples of mechanical items are rotating equipment (motors, pumps, blowers), handling equipment (cranes, hoists, conveyors), piping systems (pipe, valves, hangers), fuel handling systems, and waste effluent systems.	mechanical items — parts, components, or systems that function primarily for pressure retaining, mass moving, or heat exchange purposes. Examples of mechanical items are rotating equipment (motors, pumps, blowers), handling equipment (cranes, hoists, conveyors), piping systems (pipe, valves, hangers), fuel handling systems, and waste effluent systems	ОК
Testing — The determination or verification of the capability of an item to meet specified requirements by subjecting the item to a set of physical, chemical, environmental or operating conditions.	I Introduction Section 4 "Terms and Definitions" testing - an element of verification for the determination of the capability of an item to meet specified requirements by subjecting the item to a set of physical, chemical, environmental, or operating conditions.	ОК
Verification — An act of confirming, substantiating and assuring that an activity or condition has been implemented in conformance with the specified requirements.	I Introduction Section 4 "Terms and Definitions" verification - the act of reviewing, inspecting, testing, checking, auditing, or otherwise determining and documenting whether items, processes, services, or documents conform to specified requirements.	N45.2.8 states that it is an act of "confirming, substantiating and assuring" whereas NQA-1 defines it as an act of "reviewing, inspecting, testing, checking, auditing, or otherwise determining". In addition N45.2.8 states that it is "an activity or condition" whereas NQA-1 states it is "items, processes, services, or documents".
Other terms and their definitions are contained in ANSI <i>N45.2.10.</i>	Introduction Section 6 "Definitions"	Slightly different words, but same intent.
	Definitions unique to the activities described in this Part (Part II) are included in the section dealing with that activity. Definitions generic to quality assurance activities are included in Part 1, Supplement S-1,	

ANSI N45.2.8 - 1975	NQA-1 (1994) Subpart 2.8	
	(except where noted)	(NOTE: OK signifies identical or nearly identical wording)
	Terms and Definitions	
<b>1.5 Referenced Documents</b> Documents that are required to be included as a part of this standard are identified at the point of reference and described in Section 8 of this standard.	Introduction Section 7 "Referenced Codes, Standards, and Specifications" All codes, standards, and specifications that are referenced as a part of this Part (Part II) are listed in the Table entitled "Codes, Standards, and Specifications Referenced in Text."	Slightly different words, but same intent. Also, QATR A.7.3 establishes extent of applicability for referenced documents.
The issue or edition of the referenced document that is required will be specified either at the point of reference or in Section 8 of this standard unless otherwise specified in the contract document.	Codes, standards, and specifications referenced in this Part (Part II) may be identified with the applicable date or reference at the point of reference or in the Table "Codes, Standards, and Specifications Referenced in Text. 2 CENERAL REQUIREMENTS	N45.2.8 includes the words "unless otherwise specified in the contract document". Same Intent / Result
2. GENERAL REQUIREMENTS This section contains requirements that are to be fulfilled by the organization or organizations responsi- ble for performing any segment of work described in Section 3 through 5 of this standard.	2 GENERAL REQUIREMENTS	establish requirements.
Measures shall be established and implemented for documenting the necessary installation, inspection and testing to verify conformance to specified requirements.	Measures shall be established and implemented for documenting the necessary installation, inspection, and testing to verify conformance to specified requirements.	OK

ANSI N45.2.8 - 1975	NQA-1 (1994) Subpart 2.8	
	(except where noted)	(NOTE: OK signifies identical or
		nearly identical wording)
2.1 Planning	2.1 Planning and Procedures	Same Intent / Result
Activities shall be planned and documented to be consistent with engineering and design requirements including those which define the degree of importance to safety and reliability of the item.	Planning and procedure preparation shall be in accordance with the requirements of the Introduction to this Part (Part II). Introduction	
Planning shall define the operations to	Section 4.1 "Planning"	
be used and the systematic, sequential progression of operations, the personnel responsibilities for each activity and the measures employed to preserve the quality of the item. Planning shall take into account the need for the identification, prenaration	A plan shall be developed outlining the work to be performed and the work procedures or instructions required to comply with the requirements of the defined work scope.	
and control of procedures and work instructions necessary to comply with requirements for installation, inspection and testing of components and systems; and the need for trained personnel necessary to comply with these procedures work instructions	Planning shall define the operations to be performed, the systematic sequential progression of operations, and the overall measures employed to preserve the quality of the work	
These procedures, work instructions, and requirements. Planning shall include a review of the system and component design specifications, procurement documents and drawings and of the construction work plans and schedules to assure that applicable installation, inspection, and testing activities have been iden- tified; that they can be accomplished as specified; and that time and resources are sufficient to accomplish the required actions.	Planning shall include a review of the structure, system or component design/procurement specifications, materials, lists, drawings, construction work plans, and schedules to ensure that fabrication, installation, modification, inspection, testing, etc., activities have been incorporated; that the work can be accomplished as specified; and that time and resources, plus training, are sufficient to accomplish the work in accordance with the specified requirements.	
Deficiencies identified during reviews shall be brought to the attention of the responsible organization for action.	Basic Requirement 16 Conditions adverse to quality shall be identified promptly and corrected as soon as practical.	Same Intent / Effect
2.2 Procedures and Instructions	Introduction	N45.2.8 states that procedures and
Installation, inspection and test procedures and work instructions identified during planning shall be prepared and documented for those activities falling within the scope of this standard.	Section 4.2 "Procedures" Installation, inspection, test procedures, and work instructions identified during planning shall be prepared.	Instructions should be prepared and documented, NQA-1 states prepared.
Where the planning review identifies new procedures and inspections that are necessary, appropriate target dates and effort shall be scheduled for their preparation and approval.	Preparation and approval of the procedures/instructions shall be in advance of the need to use the documents.	Same Intent / Result
These documents shall be kept current and revised as necessary to assure that installation, inspections, and tests are performed in accordance with latest approved information and shall include as appropriate:	The documents shall be kept current and revised as necessary to assure that work is performed in accordance with the latest approved information. The documents shall include the	ОК
Droroquipitop identified in	following as applicable:	NOA 1 includes the words "including
Subsection 2.9.	preparatory checks and	preparatory checks and inspections"

(except where noied)         (NOTE: CK signifies identical or nearly identical wording)           Except where noied)         (NOTE: CK signifies identical wording)           Derecations to be observed.         (b) precations to be observed.         OK           C. Installation precifications         (c) work requirements including installation specifications         OK           C. Sequential actions to be followed.         (d) sequence of activities to be agure activity.         Slightly different words, but same intent.           e. Test objectives.         (f) test and inspection objectives is and inspection of inspection and test.         NAA-1 adds "and test equipment requirements including recalibration dates.         NAA-1 adds "and test equipment including recalibration dates.           I. Inspection and test acceptance criteria.         (n) sequence and frequency of inspection or test.         NAA-1 adds "and methods for verifying signatures.           J. Specific document references where required.         (m) specific document references where required.         NAA-1 adds "and methods for verifying signatures.           J. Aptrovals.         (i) acceptance criteria and methods ocumented in a suitable test report forms.         NAA-1 adds "and test authorizing or verifying signatures.           J. Aptrovals. <b>B to Taspection 7</b> .         NAA-1 adds "and test authorizing or verifying signatures.           J. Approvals. <b>B to Taspection 7</b> .         NAA-1 adds "and test equinters.           J. Approv	ANSI N45.2.8 - 1975	NQA-1 (1994) Subpart 2.8	
Image:		(except where noted)	(NOTE: OK signifies identical or
b. Precautions to be observed.         OK           b. Precautions to be observed.         OK           c. Installation requirements.         (c) work requirements including installation spectrometers including divertigence of activities to be sequence of activities to be divertigence of activities to be sequence of activities to be divertigence of activities and methods including recalibration dates.         NOA-1 adds "and test equipment and related calibration activers" NOA-1 adds "and test equipment and related calibration activers" (n) data provers and requency of inspection or test.         NOA-1 adds "and methods for verifying activers" (n) specific document references divertigence data sheet.         NOA-1 adds "and methods for verifying signatures" (n) data or test report forms.         NOA-1 adds "and methods for verifying signatures" (n) data report of forms.           2.3 Results         6         Data Analysis and Evaluation with it applies, the procedures or instruction followed in performing the task and include the following:         BR 10 "Inspection" (at a sheet.         These words are not included in NOA- 1           2.4 Pertinent inspection and test data.         (e) results and acceptability (a) through (f) below:         Slightly different words, but same intent.           a. Pertinent inspection and test data.         (b) dat			nearly identical wording)
		inspections	21
C. Itsanalour requirements. (C) Work requirements including (C) Work requirements (C) Wore requirements (C)	b. Precautions to be observed.	(b) precautions to be observed	OK Slightly different words, but some
d. Sequential actions to be followed.       (d) sequence of activities to be given activities to be given activity.       Slightly different words, but same intent.         e. Test objectives.       (f) test and inspection objectives       NQA-1 adds the words "and inspection"         f. Special equipment required for inspection and test.       (g) special equipment required discrete test and inspection and test equipment.       NQA-1 adds "and test equipment and related calibration requirements including recalibration dates"         h. Frequency of inspection or test.       (h) identification or inspection or test.       NQA-1 adds "and methods for error territeria.         j. Specific document references where required"       (n) data or test report forms.       NQA-1 adds "and methods for verifying"         i. Approvals.       (n) data or test report forms.       (n) data or test report forms.       NQA-1 adds "and methods for verifying ingures".         i. Approvals.       (n) approvals and authorizing or verifying ingures".       NQA-1 adds "and methods for verifying ingures".         c. Baeport forms.       (n) data or test report forms       NQA-1 adds "and methods for verifying ingures".         l. Approvals.       (n) approvals and authorizing or verifying ingures".       NQA-1 adds "and methods for verifying ingures".         state test results shall be document for a suitable test report form.       (n) data or test report data analysis and evaluation.       NA5.2.8 atales "in a suitable test report ori data sheet".         subap	c. Installation requirements.	installation specifications	intent.
e. Test objectives.     (i) test and inspection objectives     inspection:     (g) special equipment required     inspection and test     (g) dentification of inspection and test     (g) identification of inspection and test     (g) isopecial frequency of     (g) inspection and test     (g) isopecial inspection and test     (g) isopecial frequency of     (g) isopecial inspection and test     (g) isopecial intervent     (g) isopecial     (g) isopecial intervent     (g) isopecial     (g) isopecial	d. Sequential actions to be followed.	(d) sequence of activities to be	Slightly different words, but same
e. Test objectives.     (f) test and inspection objectives.     NQA-1 adds the words "and inspection"       f. Special equipment required for installation, inspection and test.     (g) special equipment required calibration requirements including recalibration adds:     OK       g. Identification of inspection and test.     (h) identification of inspection and calibration requirements including recalibration adds:     NQA-1 adds "and test equipment related calibration requirements including recalibration adds:       h. Frequency of inspection or test.     (i) sequence and frequency of inspection and test acceptance     NQA-1 adds "and methods for verifying"       j. Specific document references where required.     (i) data or test report forms.     NQA-1 adds "or test"       k. Data report forms.     (i) data or test results shall be documented in a suitable test report or warking signatures     NQA-1 adds "or test"       1. Approvals.     (ii) data or test results shall be documented in a suitable test report or warking is and test results shall be documented.     NQA-1 adds "or test"       2.3 Results     6 Data Analysis and Evaluation inspection and test results shall be documented.     NQA-1 adds "and uthorizing or warking signatures."       Each report shall identify the item to which it applies, index words are not included in NQA- instruction followed in performing the task and include the following:     BR 10 "inspection"       a. Pertiment inspection and test data.     (e) results shall be documented.     Sliphity different words, but same intent.       b. Significant dates and times.     (b)		given activity	intent.
1: Special equipment required for installation, inspection and test.       (g) special equipment required       OK         g. Identification of inspection and test.       (h) identification of inspection and test equipment and related calibration requirements including recalibration dates       NQA-1 adds "and test equipment and related calibration requirements including recalibration dates         h. Frequency of inspection or test.       (h) identification of requirements including recalibration dates       NQA-1 adds "and test equipment including recalibration dates         j. Specific document references where required.       (n) data or test resport forms.       (n) data or test resport forms.         1. Approvals.       (i) approvals and authorizing or verifying signatures       NQA-1 adds "or test"         2. Results       6       Data Analysis and Evaluation inspection and test results shall be documented in a suitable test report of data sheet.       Same Intent / Result         2. Each report shall identify the item to which it applies, the procedures or instruction followed in performing the task and include the following:       BR 10 "Inspection related as specified in Section 7.       These words are not included in NQA- 1         2. Significant dates and times.       (b) date of inspection"       Inspection function"         (a) through (f) below.       Slightly different words, but same intent.         2. Significant dates and times.       (b) date of inspection (c) inspection and test data and action taken on other confloms that were not anticipated.       (c	e. Test objectives.	(f) test and inspection objectives	NQA-1 adds the words "and inspection"
g. Identification of inspection and test equipment.         (h) Identification of inspection and test equipment and related calibration requirements including recalibration dates         NQA-1 adds "and test equipment and related calibration requirements including recalibration dates           h. Frequency of inspection or test.         (i) sequence and frequency of inspection retest.         NQA-1 adds "and test equipment and related calibration dates"           j. Specific document references where required.         (m) specific document references (m) specific document references         NQA-1 adds "and methods for verifying"           j. Specific document references where required.         (n) data or test report forms         NQA-1 adds "and authorizing or verifying signatures"           z. Barksting         6         Data Analysis and Evaluation inspection and test results supported documented in a suitable test report or data sheet.         NQA-1 adds "and authorizing or verifying signatures"           z. Each report shall identify the item to which it applies, the procedures or instruction followed in performing the task and include the following:         BR 10 "Inspection"         These words are not included in NQA- 1           a. Pertinent inspection and test data, is a a minimum, identify (a) through (f) below:         Slightly different words, but same intent.           b. Significant dates and times.         (b) date of inspection (c) inspector tester.         Slightly different words, but same intent.           d. Measuing and test equipment used where required.         (f) reference to information on action task in an	f. Special equipment required for installation, inspection and test.	(g) special equipment required	OK
equipment.       related calibration requirements including recalibration dates         h. Frequency of inspection or test.       (i) sequence and frequency of inspection or test.       inspection and test acceptance or test acceptance or test and frequency of inspectin or test.       NQA-1 adds "sequence"         j. Specific document references where required.       (ii) data or test report forms.       NQA-1 adds "under required"         k. Data report forms.       (ii) data or test report forms       NQA-1 adds "under required"         J. Approvals.       (ii) approvals and authorizing or verifying signatures?       Same Intent / Result         2.3 Results       6       Data Analysis and Evaluation inspection and test results supported by inspection and test results supported by inspection results and evaluation, shall be provided as specified in Section 7.       NESE verifying signatures?         Each report shall identify the item to which it applies, the procedures or instruction followed in performing the task and include the following:       BR 10 "Inspection"       These words are not included in NQA-1         a. Pertinent inspection and test data.       (e) results and acceptability       Sliphity different words, but same intent.         b. Significant dates and times.       (b) date of inspection       Sliphity different words, but same intent.         c. Signature or stamp of inspector or test.       (f) reference to information on action taken in connection with nonconformances ind taken in connection with nonconformances ind taken or other conditions taken in	g. Identification of inspection and test	(h) identification of inspection and	NQA-1 adds "and test equipment and
calibration requirements including recalibration dates       including recalibration dates         h. Frequency of inspection or test.       (i) sequence and frequency of inspection or test       NQA-1 adds "sequence"         i. Inspection and test acceptance criteria.       (ii) acceptance criteria and methods       NQA-1 adds "and methods for verifying"         i. Specific document references where required.       (iii) data or test report forms       NA5.2.8 adds "where required" Same Intent / Result         k. Data report forms.       (ii) data or test report forms       NQA-1 adds "and authorizing or verifying signatures         2.3 Results       6 Data Analysis and Evaluation Inspection and test results supported data sheet.       NA5.2.8 adds "in a suitable test report or data sheet"         Each report shall identify the item to which it applies, the procedures or instruction followed in performing the task and include the following:       BR 10 "Inspection"       These words are not included in NQA- 1         a. Pertinent inspection and test data.       (e) results shall be documented.       BR 11 "Test Control"       These words are not included in NQA- 1         b. Significant dates and times.       (b) date of inspection       Singhtly different words, but same intent.         c. Signature or stamp of inspector or tester.       (c) inspector       Singhtly different words, but same intent.         c. Signature or stamp of inspector or tester.       (d) type of observation       Singhtly different words, but same intent.	equipment.	test equipment and related	related calibration requirements
h. Frequency of inspection or test.       (i) Encluding recalitization dates       NQA-1 adds "sequence"         i. Inspection and test acceptance oriteria.       (ii) acceptance criteria and methods for verifying       NQA-1 adds "and methods for verifying".         j. Specific document references where required.       (iii) acceptance criteria and methods for verifying signatures       NQA-1 adds "and wethods for verifying signatures".         k. Data report forms.       (iii) data or test report forms       NQA-1 adds "and authorizing or verifying signatures".         2.3 Results       (i) data or test report forms       NQA-1 adds "and authorizing or verifying signatures".         inspection and test results shall be documented in a suitable test report data sheet.       6 Data Analysis and Evaluation verifying signatures       NQA-1 adds "and authorizing or verifying signatures".         Each report shall identify the item to which it applies, the procedures or instruction followed in performing the task and include the following:       BR 10 "Inspection"       These words are not included in NQA- 1         BR 11 "Test Control"       Test results shall be documented.       Supplement 10S-1 "Supplementary Requirements for Inspection"       Slightly different words, but same intent.         b. Significant dates and times.       (b) date or inspection       Slightly different words, but same intent.       Slightly different words, but same intent.         c. Signature or stamp of inspector or tester.       (c) inspector       Slightly different words, but		calibration requirements	including recalibration dates"
Inspection and test acceptance       (i) acceptance and expected on test         I. Inspection and test acceptance       (ii) acceptance and expected on test         I. Inspecting document references where required.       (iii) acceptance and expected on test         I. Approvals.       (iii) approvals and authorizing or verifying signatures         I. Approvals.       (i) acceptance and explorite and methods for verifying signatures         I. Approvals.       (i) approvals and authorizing or verifying signatures         I. Approvals.       (i) approvals and authorizing or verifying signatures         Inspection and test results shall be documented in a suitable test report or data sheet.       6 Data Analysis and Evaluation by inspection and test results together with a report of data analysis and evaluation, shall be provided as specified in Section 7.         Each report shall identify the item to which it applies, the procedures or instruction followed in performing the task and include the following:       BR 10 "Inspection"         Inspection and test data.       (e) results shall be documented.         Supplement 10S-1 "Supplementary Requirements for Inspection"       These words are not included in NQA-index intervences, but same intervences, but same intervences, and include in test data.         b. Significant dates and times.       (b) date of inspector or issert in connection with intervences, but same intervences, and data sheets shall be documented.         c. Signature or stamp of inspector or issetres shall be document on toneonformances in connection	h. Frequency of inspection or test	(i) sequence and frequency of	NOA-1 adds "sequence"
Inspection and test acceptance     (i) acceptance criteria and methods for     criteria.     (i) specific document references     (ii) acceptance criteria and methods     for verifying     (iii) specific document references     Same Intent / Result     NQA-1 adds "and authorizing or     verifying signatures"     NQA-1 adds "and authorizing or     verifying signatures     (i) approvals and uthorizing or     verifying signatures     (i) approvals and test results shall be     documented in a suitable test report or     data sheet.     (i) approvals usported     inspection and test data to report forms     Inspection and test data.     (i) approvals (spectrum)     Records shall analysis and     vealuation, shall be provided as     specified in Section 7.     Records shall as a minimum, identify     (a) through (f) below:     a. Pertinent inspection and test data.     (e) results shall be documented.     Supplement 10S-1 "Supplementary     Requirements for Inspection"     Records shall, as a minimum, identify     (a) through (f) below:     (b) date of inspector or     isignity different words, but same     intent.     Signity and test equipment used     where required.     (f) reference to information on action     itak and notonformances     (f) reference to information on action     itak in connection with     nonconformances     for data analysis and evaluation, and     final acceptability different words, but same     intent.     Signity different wor		inspection or test	
j. Specific document references where required.       (m) specific document references       N45.28 adds "where required" same Intent / Result         k. Data report forms.       (n) data or test report forms       NQA-1 adds "or test"         i. Approvals.       (i) approvals and authorizing or verifying signatures?       NQA-1 adds "and authorizing or verifying signatures"         2.3 Results       6 Data Analysis and Evaluation due to the states "in a suitable test report or data sheet"       N45.28 attes "in a suitable test report or data sheet"         Inspection and test results shall be documented in a suitable test report or data analysis and evaluation, shall be provided as specified in Section 7.       N45.28 attes "in a suitable test report or data analysis and evaluation, shall be provided as specified in Section 7.         Each report shall identify the item to which it applies, the procedures or instruction followed in performing the task and include the following:       BR 10 "Inspection"       These words are not included in NQA-1         BR 11 "Test Control"       Test results shall be documented.       Supplement 10S-1 "Supplementary Requirements for Inspection"       1         b. Significant dates and times.       (b) date of inspector       Siightly different words, but same intent.       Siightly different words, but same intent.         c. Signature or stamp of inspector or tester.       (c) inspector       Siightly different words, but same intent.         c. Signature or other conditions where requipment used where requipment as intent.       (d) type	i. Inspection and test acceptance criteria.	(J) acceptance criteria and methods for verifying	NQA-1 adds "and methods for verifying"
k. Data report forms.       (n) data or test report forms       NQA-1 adds "or test"         i. Approvals.       (i) approvals and authorizing or verifying signatures?       NQA-1 adds "or test"         2.3 Results       6 Data Analysis and Evaluation ductor in a suitable test report or data sheet?       N45.2.8 dats "and authorizing or verifying signatures?"         2.3 Results       6 Data Analysis and Evaluation ductor in a suitable test report or data sheet?       N45.2.8 dats "and authorizing or verifying signatures?"         2.3 Results       6 Data Analysis and Evaluation ductor in a suitable test report or data sheet?       N45.2.8 dates "in a suitable test report or data analysis and evaluation, shall be provided as specified in Section 7.         Each report shall identify the item to which it applies, the procedures or instruction followed in performing the task and include the following:       BR 10 "Inspection"       These words are not included in NQA-1         BR 11 "Test Control"       Test results shall be documented.       1         Supplement 10S-1 "Supplementary Requirements for Inspection"       Records shall, as a minimum, identify (a) through (f) below:       Slightly different words, but same intent.         b. Significant dates and times.       (b) date of inspector or tester.       (c) inspector       Slightly different words, but same intent.         c. Signature or stamp of inspector or tester.       (d) type of observation       Type of observation may include intent.         d. Measuring and test equipment used	j. Specific document references where required.	(m) specific document references	N45.2.8 adds "where required" Same Intent / Result
I. Approvals.       (i) approvals and authorizing or verifying signatures       NA2A1 adds "and authorizing or verifying signatures"         2.3 Results       6 Data Analysis and Evaluation       N45.2.8 states "in a suitable test report of data analysis and evaluation, shall be provided as specified in Section 7.       N45.2.8 states "in a suitable test report of data analysis and evaluation, shall be provided as specified in Section 7.         Each report shall identify the item to which it applies, the procedures or instruction followed in performing the task and include the following:       BR 10 "Inspection"       These words are not included in NQA-1         BR 10 "Inspection results shall be documented.       Supplement 105-1 "Supplementary Requirements for Inspection"       These words, but same intent.         a. Pertinent inspection and test data.       (e) results and acceptability       Silightly different words, but same intent.         b. Significant dates and times.       (b) date of inspection       Silightly different words, but same intent.         c. Signature or stamp of inspector or tester.       (d) type of observation       Silightly different words, but same intent.         d. Measuring and test equipment used where required.       (f) reference to information on action taken on other conditions taken or other conditions.       Silightly different words, but same intent.         d. Measuring and test shall include an evaluation of the words of the spection with anot anot fictuate.       Silightly different words, but same intent.         f. Measuring and test equipment	k. Data report forms.	(n) data or test report forms	NQA-1 adds "or test"
2.3 Results       For Marging Statutes       N45.2.8 states "In a suitable test report of data sheet".         Inspection and test results shall be documented in a suitable test report of data analysis and evaluation, shall be provided as specified in Section 7.       Same Intent / Result         Each report shall identify the item to which it applies, the procedures or instruction followed in performing the task and include the following:       BR 10 "Inspection"       These words are not included in NQA-1         BR 10 "Inspection results shall be documented.       Supplement 105-1 "Supplementary Requirements for Inspection"       These words, but same intent.         b. Significant dates and times.       (b) date of inspection       Slightly different words, but same intent.         c. Signature or stamp of inspector or tester.       (c) inspector       Slightly different words, but same intent.         d. Measuring and test equipment used where required.       (d) type of observation       Slightly different words, but same intent.         e. Identification of nonconformances and action taken on other conditions results shall be established for processing inspection and test data sheet's non a suitable test report of tase and the nonconformances and action taken on ther conditions taken in connection with incent.       Slightly different words, but same intent.         e. Identification of nonconformances and action taken on other conditions results shall be established for processing inspection and test data and their analysis and Evaluation of the acceptability of inspection and tester shall be established for processing inspection and test data a	I. Approvals.	<ul> <li>(I) approvals and authorizing or verifying signatures</li> </ul>	NQA-1 adds "and authorizing or verifying signatures"
Inspection and test results shall be documented in a suitable test report or data sheet.       Inspection and test results supported by inspection and test data, together with a report of data analysis and evaluation, shall be provided as specified in Section 7.       Same Intent / Result         Each report shall identify the item to which it applies, the procedures or instruction followed in performing the task and include the following:       BR 10 "Inspection"       These words are not included in NQA- 1         BR 11 "Test Control"       Test results shall be documented.       Supplementary Requirements for Inspection"         Records shall, as a minimum, identify (a) through (f) below:       Slightly different words, but same intent.         b. Significant dates and times.       (b) date of inspection (c) inspector       Slightly different words, but same intent.         c. Signature or stamp of inspector tester.       (d) type of observation addata sheets shall include an evaluation of the acceptability of inspection and test stall include an evaluation of the acceptability of inspection and tests results and provide for identifying the individual who performed the evaluation.       Slightly different words, but same intent.	2.3 Results	6 Data Analysis and Evaluation	N45.2.8 states "in a suitable test report
Inspection and test results shall be documented in a suitable test report or data sheet.       Inspection and test results supported by inspection and test data, together with a report of data analysis and evaluation, shall be provided as specified in Section 7.       Same Intent / Result         Each report shall identify the item to which it applies, the procedures or instruction followed in performing the task and include the following:       BR 10 "Inspection"       These words are not included in NQA- 1         BR 11 "Test Control"       Inspection and test results shall be documented.       Inspection and test results shall be documented.         BR 11 "Test Control"       Test results shall be documented.       Supplement 10S-1 "Supplementary Requirements for Inspection"         a. Pertinent inspection and test data.       (e) results and acceptability       Slightly different words, but same intent.         b. Significant dates and times.       (b) date of inspection       Slightly different words, but same intent.         c. Signature or stamp of inspector or tester.       (c) inspector       Slightly different words, but same intent.         d. Measuring and test equipment used where required.       (f) reference to information on action taken in connection with and taken no ther conditions that were not anticipated.       Stightly different words, but same intent.       Slightly different words, but same intent.         Test reports and data sheets shall individual whoperformed the evaluation.       6 Data Analysis and Evaluation processing inspection and test data and their analysis, evaluation and final a		-	or data sheet"
data sheet.       by inspection and lest data, together         data sheet.       by inspection and lest data, together         with a report of data analysis and evaluation, shall be provided as specified in Section 7.       These words are not included in NQA-         Each report shall identify the item to which it applies, the procedures or instruction followed in performing the task and include the following:       BR 10 "Inspection"       These words are not included in NQA-         Inspection results shall be documented.       BR 11 "Test Control"       Test results shall be documented.         Supplement 10S-1 "Supplementary Requirements for Inspection"       Records shall, as a minimum, identify (a) through (f) below:       Slightly different words, but same intent.         b. Significant dates and times.       (b) date of inspection       Slightly different words, but same intent.         c. Signature or stamp of inspector rester.       (c) inspector       Slightly different words, but same intent.         d. Measuring and test equipment used where required.       (d) type of observation       Type of observation and test and intent.         e. Identification of nonconformances and action take no other conditions that were not anticipated.       6 Data Analysis and Evaluation       Slightly different words, but same intent.         Test reports and data sheets shall include an provide for identifying the inalysis, evaluation, and final acceptance. These procedures shall be established for processing inspection and test data and there analysis, evaluation, and final a	Inspection and test results shall be	Inspection and test results supported	Same Intent / Result
and shows       minit of provided as specified in Section 7.         Each report shall identify the item to which it applies, the procedures or instruction followed in performing the task and include the following:       BR 10 "Inspection"       These words are not included in NQA-1         Br 10 "Inspection results shall be documented.       BR 11 "Test Control"       Inspection results shall be documented.         Br 11 "Test control"       Test results shall be documented.       Supplement 10S-1 "Supplementary Requirements for Inspection"         a. Pertinent inspection and test data.       (e) results and acceptability       Slightly different words, but same intent.         b. Significant dates and times.       (b) date of inspection       Slightly different words, but same intent.         c. Signature or stamp of inspector or tester.       (c) inspector       (c) inspector       Slightly different words, but same intent.         d. Measuring and test equipment used where required.       (d) type of observation       Type of observation may include identification of equipment as necessary         e. Identification of nonconformances and action taken on other conditions that were not anticipated.       6 Data Analysis and Evaluation intent.       Slightly different words, but same intent.         Forcedures shall be established for results and provide for identifying the individual who performed the evaluation.       6 Data Analysis and Evaluation and their analysis, evaluation, and final acceptance. These procedures shall be established for processing inspectores procedures shal	documented in a suitable test report of	with a report of data analysis and	
Each report shall identify the item to which it applies, the procedures or instruction followed in performing the task and include the following:       BR 10 "Inspection"       These words are not included in NQA-1         BR 11 "Test Control"       Inspection results shall be documented.       BR 11 "Test Control"       1         BR 21 "Test control"       Test results shall be documented.       Supplement 10S-1 "Supplementary Requirements for Inspection"       1         a. Pertinent inspection and test data.       (e) results and acceptability       Slightly different words, but same intent.         b. Significant dates and times.       (b) date of inspection       Slightly different words, but same intent.         c. Signature or stamp of inspector or tester.       (c) inspector       Slightly different words, but same intent.         d. Measuring and test equipment used where required.       (f) reference to information on action taken in connection with nonconformances       Slightly different words, but same intent.         Test reports and data sheets shall include an evaluation of the acceptability of inspection and tests results and provide for identifying the individual who performed the evaluation.       6 Data Analysis and Evaluation and test data and their analysis, evaluation, and their analysis evaluation, and their analysis, evaluation, and thevaluation, and their analysis, evaluation,		evaluation, shall be provided as	
Each report shall identify the item to which it applies, the procedures or instruction followed in performing the task and include the following:       BR 10 "Inspection"       These words are not included in NQA-1         Inspection results shall be documented.       BR 11 "Test Control"       Inspection results shall be documented.         BR 11 "Test Control"       Test results shall be documented.       Supplementary Requirements for Inspection"       Slightly different words, but same intent.         b. Significant dates and times.       (e) results and acceptability       Slightly different words, but same intent.         c. Signature or stamp of inspector or tester.       (c) inspector       Slightly different words, but same intent.         d. Measuring and test equipment used where required.       (d) type of observation       Slightly different words, but same intent.         Test reports and data sheets shall include an evaluation of the acceptability of inspection and tests shall include an evaluation of the acceptability of inspection and tests shall include an evaluation of the acceptability of inspection and tests shall include an evaluation of the acceptability of inspection and tests shall include an evaluation of the acceptability of inspection and tests shall include an evaluation.       Slightly different words, but same intent.         Fresults and provide for identifying theninvictuaes or shall be established for pro		specified in Section 7.	
which it applies, the procedures of instruction followed in performing the task and include the following:       Inspection results shall be documented.       1         BR 11 "Test Control"       Test results shall be documented.       Supplement 10S-1 "Supplementary Requirements for Inspection"         a. Pertinent inspection and test data.       (e) results and acceptability (a) through (f) below:       Slightly different words, but same intent.         b. Significant dates and times.       (b) date of inspection       Slightly different words, but same intent.         c. Signature or stamp of inspector or tester.       (c) inspector       Slightly different words, but same intent.         d. Measuring and test equipment used where required.       (f) reference to information on action taken in connection with noconformances       Type of observation         Test reports and data sheets shall include an evaluation of the acceptability of inspection and tests results and provide for identifying the individual who performed the evaluation.       6 Data Analysis and Evaluation final acceptance. These procedures shall identify individuals or       Slightly different words, but same intent.	Each report shall identify the item to	BR 10 "Inspection"	These words are not included in NQA-
Instruction followed in performing the task and include the following:       Inspection results shall be documented.         BR 11 "Test Control"       Test results shall be documented.         Supplement 10S-1 "Supplementary Requirements for Inspection"       Records shall, as a minimum, identify (a) through (f) below:         a. Pertinent inspection and test data.       (e) results and acceptability       Slightly different words, but same intent.         b. Significant dates and times.       (b) date of inspection       Slightly different words, but same intent.         c. Signature or stamp of inspector or tester.       (c) inspector       Slightly different words, but same intent.         d. Measuring and test equipment used where required.       (d) type of observation       Type of observation may include identification of equipment as necessary         e. Identification of nonconformances and action taken on other conditions that were not anticipated.       (f) reference to information on action taken in connection with nonconformances       Slightly different words, but same intent.         Test reports and data sheets shall include an evaluation of the acceptability of inspection and tests results and provide for identifying the individual who performed the evaluation.       Procedures shall be established for processing inspection, and final acceptance. These procedures shall identify individuals or or       Slightly different words, but same intent.	which it applies, the procedures or	Inspection results shall be	1
BR 11 "Test Control"         Test results shall be documented.         Supplement 10S-1 "Supplementary Requirements for Inspection"         Records shall, as a minimum, identify (a) through (f) below:         a. Pertinent inspection and test data.         b. Significant dates and times.         (b) date of inspection         Slightly different words, but same intent.         c. Signature or stamp of inspector or tester.         d. Measuring and test equipment used where required.         (c) inspector         (d) type of observation         Type of observation of equipment as neccessary         e. Identification of nonconformances and action taken on other conditions that were not anticipated.         ft Bott Analysis and Evaluation that were not anticipated.         Fest reports and data sheets shall include an evaluation of the acceptability of inspection and tests results and provide for identifying the individual who performed the evaluation.         Procedures shall be established for processing inspection and test data and their analysis, evaluation, and final acceptance. These procedures shall identify individuals or	task and include the following:	documented.	
Test results shall be documented.         Supplement 10S-1 "Supplementary Requirements for Inspection"         Records shall, as a minimum, identify (a) through (f) below:         a. Pertinent inspection and test data.       (e) results and acceptability         b. Significant dates and times.       (b) date of inspection         c. Signature or stamp of inspector or tester.       (c) inspector         d. Measuring and test equipment used where required.       (d) type of observation         view re not atken on other conditions that were not atken on other conditions that were not anticipated.       (f) reference to information on action taken in connection with nonconformances       Slightly different words, but same intent.         Test reports and data sheets shall include an evaluation of inspection and tests results and provide for identifying the individual who performed the evaluation.       6 Data Analysis and Evaluation processing inspection and test data and their analysis, evaluation, and final acceptance. These procedures shall identify undividuals or       Slightly different words, but same intent.		BR 11 "Test Control"	
Supplement 10S-1 "Supplementary Requirements for Inspection"Records shall, as a minimum, identify (a) through (f) below:a. Pertinent inspection and test data.(e) results and acceptabilityb. Significant dates and times.(b) date of inspectionc. Signature or stamp of inspector or tester.(c) inspectord. Measuring and test equipment used where required.(d) type of observatione. Identification of nonconformances and action taken on other conditions that were not anticipated.(f) reference to information on action taken in connection with nonconformancesTest reports and data sheets shall include an evaluation.6 Data Analysis and Evaluation procedures shall be established for processing inspection and test data and their analysis, evaluation, and final acceptance. These procedures shall identify individuals orSlightly different words, but same intent.		Test results shall be documented.	
Records shall, as a minimum, identify         a. Pertinent inspection and test data.         b. Significant dates and times.         (e) results and acceptability         Slightly different words, but same intent.         b. Significant dates and times.         (b) date of inspection         Slightly different words, but same intent.         c. Signature or stamp of inspector or tester.         (c) inspector         (d) type of observation         Where required.         (e) reference to information on action taken on other conditions that were not anticipated.         Test reports and data sheets shall include an evaluation of the acceptability of inspection and tests results and provide for identifying the individual who performed the evaluation.         Procedures shall be established for processing inspection and test data and their analysis, evaluation, and final acceptance. These procedures shall identify individuals or results and provide for identifying the individual who performed the evaluation.		Supplement 10S-1 "Supplementary Requirements for Inspection"	
a. Pertinent inspection and test data.       (e) results and acceptability       Slightly different words, but same intent.         b. Significant dates and times.       (b) date of inspection       Slightly different words, but same intent.         c. Signature or stamp of inspector or tester.       (c) inspector       Slightly different words, but same intent.         d. Measuring and test equipment used where required.       (d) type of observation       Type of observation may include identification of equipment as necessary         e. Identification of nonconformances and action taken on other conditions that were not anticipated.       (f) reference to information on action taken in connection with nonconformances       Slightly different words, but same intent.         Test reports and data sheets shall include an evaluation of the acceptability of inspection and tests results and provide for identifying the individual who performed the evaluation.       Procedures shall be established for processing inspection and test data and their analysis, evaluation, and final acceptance. These procedures shall identify individuals or       Slightly different words, but same intent.		Records shall, as a minimum, identify (a) through (f) below:	
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c. Signature or stamp of inspector or tester.       (c) inspector       Slightly different words, but same intent.         d. Measuring and test equipment used where required.       (d) type of observation       Type of observation may include identification of equipment as necessary         e. Identification of nonconformances and action taken on other conditions that were not anticipated.       (f) reference to information on action taken in connection with nonconformances       Slightly different words, but same intent.         Test reports and data sheets shall include an evaluation of the acceptability of inspection and tests results and provide for identifying the individual who performed the evaluation.       6 Data Analysis and Evaluation and test data and their analysis, evaluation, and final acceptance. These procedures shall identify individuals or       Slightly different words, but same intent.	b. Significant dates and times.	(b) date of inspection	Slightly different words, but same intent.
d. Measuring and test equipment used where required.       (d) type of observation       Type of observation may include identification of equipment as necessary         e. Identification of nonconformances and action taken on other conditions that were not anticipated.       (f) reference to information on action taken in connection with nonconformances       Slightly different words, but same intent.         Test reports and data sheets shall include an evaluation of the acceptability of inspection and tests results and provide for identifying the individual who performed the evaluation.       6 Data Analysis and Evaluation processing inspection and test data and their analysis, evaluation, and final acceptance. These procedures shall identify individuals or       Slightly different words, but same intent.	c. Signature or stamp of inspector or tester.	(c) inspector	Slightly different words, but same intent.
where required.       identification of equipment as necessary         e. Identification of nonconformances and action taken on other conditions that were not anticipated.       (f) reference to information on action taken in connection with nonconformances       Slightly different words, but same intent.         Test reports and data sheets shall include an evaluation of the acceptability of inspection and tests results and provide for identifying the individual who performed the evaluation.       6 Data Analysis and Evaluation       Slightly different words, but same intent.         Procedures shall be established for processing inspection and test data and their analysis, evaluation, and final acceptance. These procedures shall identify individuals or       Slightly different words, but same intent.	d. Measuring and test equipment used	(d) type of observation	Type of observation may include
e. Identification of nonconformances and action taken on other conditions that were not anticipated.       (f) reference to information on action taken in connection with nonconformances       Slightly different words, but same intent.         Test reports and data sheets shall include an evaluation of the acceptability of inspection and tests results and provide for identifying the individual who performed the evaluation.       6 Data Analysis and Evaluation       Slightly different words, but same intent.         Procedures shall be established for processing inspection and test data and their analysis, evaluation, and final acceptance. These procedures shall identify individuals or       Slightly different words, but same intent.	where required.		identification of equipment as
and action taken on other conditions that were not anticipated.taken in connection with nonconformancesintent.Test reports and data sheets shall include an evaluation of the acceptability of inspection and tests results and provide for identifying the individual who performed the evaluation.6 Data Analysis and EvaluationSlightly different words, but same intent.Procedures shall be established for processing inspection and test data and their analysis, evaluation, and final acceptance. These procedures shall identify individuals orSlightly different words, but same intent.	e. Identification of nonconformances	(f) reference to information on action	Slightly different words, but same
that were not anticipated.       nonconformances         Test reports and data sheets shall include an evaluation of the acceptability of inspection and tests results and provide for identifying the individual who performed the evaluation.       6 Data Analysis and Evaluation       Slightly different words, but same intent.         Procedures shall be established for processing inspection and test data and their analysis, evaluation.       Procedures content of the procedures shall be established for processing inspection and test data and their analysis, evaluation, and final acceptance. These procedures shall identify individuals or	and action taken on other conditions	taken in connection with	intent.
rest reports and data sneets shall       b Data Analysis and Evaluation       Slightly different words, but same intent.         include an evaluation of the acceptability of inspection and tests results and provide for identifying the individual who performed the evaluation.       Procedures shall be established for processing inspection and test data and their analysis, evaluation, and final acceptance. These procedures shall identify individuals or       Slightly different words, but same intent.	that were not anticipated.	nonconformances	
acceptability of inspection and tests results and provide for identifying the individual who performed the evaluation.       Procedures shall be established for processing inspection and test data and their analysis, evaluation, and final acceptance. These procedures shall identify individuals or	include an evaluation of the	o Data Analysis and Evaluation	Singhity different words, but same
results and provide for identifying the individual who performed the evaluation.	acceptability of inspection and tests	Procedures shall be established for	
individual who performed the and their analysis, evaluation, and final acceptance. These procedures shall identify individuals or	results and provide for identifying the	processing inspection and test data	
evaluation. tinal acceptance. These procedures shall identify individuals or	individual who performed the	and their analysis, evaluation, and	
	evaluation.	shall identify individuals or	

ANSI N45.2.8 - 1975	NQA-1 (1994) Subpart 2.8	
	(except where noted)	(NOTE: OK signifies identical or
	organizations responsible for the	nearly identical wording)
	acquisitions and reduction of	
	inspection and test data, and evaluation against acceptance	
	criteria, operating limits and	
2.6 Cleaning	performance standards.	NMC commitment to Subpart 2.1 in
		equivalent to this requirement
standard shall be performed in		
accordance with ANSI N45.2.1 and		
Section 4 of this standard.		NMC commitment to Subpart 2.1 is
Handling		equivalent to this requirement
Receiving, storage and handling		
activities required by this standard shall be performed in accordance with		
ANSI N45.2.2.		
2.6 Housekeeping		NMC commitment to Subpart 2.3 is equivalent to this requirement
In areas, facilities, and environments		
where installation, inspection and testing of mechanical items is		
performed in accordance with the		
requirements of this standard, the		
accordance with ANSI N45.2.3.		
2.7 Personnel Qualifications	Introduction	Slightly different words, but same intent.
Those personnel who perform	Section 5 "Qualification of	
required by this standard shall be	Personnei	
qualified in accordance with ANSI	Inspection, test, and nondestructive	
N45.2.6.	examination personnel and laboratory technicians shall be	
	trained and qualified/certified in	
	accordance with the applicable	
	Supplementary Requirements.	
	Professional personnel shall meet the	
	requirements defined by the implementing organization in its	
	position descriptions.	
2.8 Measuring and Test Equipment	Supplement 12S-1 "Supplementary Requirements for Control of	UK
2.8.1 Selection. Measuring and test	Measuring and Test Equipment"	
equipment used to implement the	Paragraph 2	
selected to have range, type and	Γαιαγιαμίι 2	
accuracy sufficient to determine	Selection of measuring and test	
requirements.	assure that such items are of proper	
	type, range, accuracy, and tolerance	
	to accomplish the function of determining conformance to specified	
	requirements.	
2.8.2 Calibration and Control.	Supplement 12S-1 "Supplementary	The words "used to determine
determine compliance with speci-	Measuring and Test Equipment"	in NQA-1

ANSI N45.2.8 - 1975	NQA-1 (1994) Subpart 2.8	
	(except where noted)	(NOTE: OK signifies identical or
fightions, shall be adjusted and		nearly identical wording)
calibrated at predetermined intervals,	Paragraph 3.1	Slightly different wording. Same intent
based on equipment stability and use,		and effect.
against certified equipment having known valid relationships to nationally	Measuring and test equipment shall be calibrated adjusted and	
recognized standards.	maintained at prescribed intervals or,	
	prior to use, against certified	
	tionships to nationally recognized	
	standards.	
for calibration shall be documented.	Requirements for Control of	OK
	Measuring and Test Equipment"	
	Paragraph 3.1	
	If no nationally recognized standards	
	exist, the bases for calibration shall	
Records of calibrations shall be	Supplement 12S-1 "Supplementary	Slightly different words, but same
maintained and equipment suitably	Requirements for Control of	intent.
can be determined.	measuring and rest Equipment	
	Paragraph 5	
	Records shall be maintained and	
	to indicate calibration status.	
Records of calibration shall be		These words not in NQA-1
where applicable.		
Moasuros shall be taken to assure	Supplement 12S 1 "Supplementary	Slightly different words, but same
Measures shall be taken to assure	Supplement 123-1 Supplementary	Silgitity unletent words, but same
proper handling, storage, and care of the measuring and test equipment	Requirements for Control of Measuring and Test Equipment"	intent.
proper handling, storage, and care of the measuring and test equipment after calibration in order to maintain the	Requirements for Control of Measuring and Test Equipment"	intent.
proper handling, storage, and care of the measuring and test equipment after calibration in order to maintain the required accuracy of such equipment.	Requirements for Control of Measuring and Test Equipment" Paragraph 4	intent.
proper handling, storage, and care of the measuring and test equipment after calibration in order to maintain the required accuracy of such equipment.	Requirements for Control of Measuring and Test Equipment" Paragraph 4 Measuring and test equipment shall	intent.
proper handling, storage, and care of the measuring and test equipment after calibration in order to maintain the required accuracy of such equipment.	Requirements for Control of Measuring and Test Equipment" Paragraph 4 Measuring and test equipment shall be properly handled and stored to maintain accuracy	intent.
proper handling, storage, and care of the measuring and test equipment after calibration in order to maintain the required accuracy of such equipment. When measuring and test equipment is	Requirements for Control of Measuring and Test Equipment" Paragraph 4 Measuring and test equipment shall be properly handled and stored to maintain accuracy. Supplement 12S-1 "Supplementary	NQA-1 does not include the word
When measuring and test equipment is found to be out of calibration, an evolution and test equipment is found to be out of calibration, an	Requirements for Control of Measuring and Test Equipment" Paragraph 4 Measuring and test equipment shall be properly handled and stored to maintain accuracy. Supplement 12S-1 "Supplementary Requirements for Control of Measuring and Test Fundaments"	NQA-1 does not include the word "mechanical" and "since the last
When measuring and test equipment is found to be out of calibration, an evaluation shall be made of the validity of previous inspection or test results	Requirements for Control of Measuring and Test Equipment" Paragraph 4 Measuring and test equipment shall be properly handled and stored to maintain accuracy. Supplement 12S-1 "Supplementary Requirements for Control of Measuring and Test Equipment"	NQA-1 does not include the word "mechanical" and "since the last calibration check".
When measuring and test equipment is found to be out of calibration, an evaluation shall be made of the validity of previous inspection or test results and the acceptability of mechanical items inspected or tested since the last	Requirements for Control of Measuring and Test Equipment" Paragraph 4 Measuring and test equipment shall be properly handled and stored to maintain accuracy. Supplement 12S-1 "Supplementary Requirements for Control of Measuring and Test Equipment" Paragraph 3.2	NQA-1 does not include the word "mechanical" and "since the last calibration check". Slightly different wording. Same intent and effect.
When measuring and test equipment is found to be out of calibration, an evaluation shall be made of the validity of previous inspection or test results and the acceptability of mechanical items inspected or tested since the last calibration check.	Requirements for Control of Measuring and Test Equipment" Paragraph 4 Measuring and test equipment shall be properly handled and stored to maintain accuracy. Supplement 12S-1 "Supplementary Requirements for Control of Measuring and Test Equipment" Paragraph 3.2 When measuring and test equipment is found to be out of adjunction on	NQA-1 does not include the word "mechanical" and "since the last calibration check". Slightly different wording. Same intent and effect.
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When measuring and test equipment is found to be out of calibration, an evaluation shall be made of the validity of previous inspection or test results and the acceptability of mechanical items inspected or tested since the last calibration check.	Requirements for Control of Measuring and Test Equipment" Paragraph 4 Measuring and test equipment shall be properly handled and stored to maintain accuracy. Supplement 12S-1 "Supplementary Requirements for Control of Measuring and Test Equipment" Paragraph 3.2 When measuring and test equipment is found to be out of calibration, an evaluation shall be made and documented of the validity of	NQA-1 does not include the word "mechanical" and "since the last calibration check". Slightly different wording. Same intent and effect.
When measuring and test equipment found to be out of calibration, an evaluation shall be made of the validity of previous inspection or test results and the acceptability of mechanical items inspected or tested since the last calibration check.	Requirements for Control of Measuring and Test Equipment" Paragraph 4 Measuring and test equipment shall be properly handled and stored to maintain accuracy. Supplement 12S-1 "Supplementary Requirements for Control of Measuring and Test Equipment" Paragraph 3.2 When measuring and test equipment is found to be out of calibration, an evaluation shall be made and documented of the validity of previous inspection or test results and the acceptability of items	NQA-1 does not include the word "mechanical" and "since the last calibration check". Slightly different wording. Same intent and effect.
When measuring and test equipment is found to be out of calibration, an evaluation shall be made of the validity of previous inspection or test results and the acceptability of mechanical items inspected or tested since the last calibration check.	Requirements for Control of Measuring and Test Equipment" Paragraph 4 Measuring and test equipment shall be properly handled and stored to maintain accuracy. Supplement 12S-1 "Supplementary Requirements for Control of Measuring and Test Equipment" Paragraph 3.2 When measuring and test equipment is found to be out of calibration, an evaluation shall be made and documented of the validity of previous inspection or test results and the acceptability of items previously inspected or tested.	NQA-1 does not include the word "mechanical" and "since the last calibration check". Slightly different wording. Same intent and effect.
When measuring and test equipment is found to be out of calibration, an evaluation shall be made of the validity of previous inspection or test results and the acceptability of mechanical items inspected or tested since the last calibration check.	Requirements for Control of Measuring and Test Equipment"         Paragraph 4         Measuring and test equipment shall be properly handled and stored to maintain accuracy.         Supplement 12S-1 "Supplementary Requirements for Control of Measuring and Test Equipment"         Paragraph 3.2         When measuring and test equipment is found to be out of calibration, an evaluation shall be made and documented of the validity of previous inspection or test results and the acceptability of items previously inspected or tested.         4.1 Planning A plan shall be developed outlining	NQA-1 does not include the word "mechanical" and "since the last calibration check". Slightly different wording. Same intent and effect.
Where necessary to determine the acceptability of items or data, the required original inspections or tests or	Requirements for Control of Measuring and Test Equipment" Paragraph 4 Measuring and test equipment shall be properly handled and stored to maintain accuracy. Supplement 12S-1 "Supplementary Requirements for Control of Measuring and Test Equipment" Paragraph 3.2 When measuring and test equipment is found to be out of calibration, an evaluation shall be made and documented of the validity of previous inspection or test results and the acceptability of items previously inspected or tested. 4.1 Planning A plan shall be developed outlining the work to be performed and the	NQA-1 does not include the word "mechanical" and "since the last calibration check". Slightly different wording. Same intent and effect.
When measuring and test equipment after calibration in order to maintain the required accuracy of such equipment. When measuring and test equipment. When measuring and test equipment. When measuring and test equipment is found to be out of calibration, an evaluation shall be made of the validity of previous inspection or test results and the acceptability of mechanical items inspected or tested since the last calibration check. Where necessary to determine the acceptability of items or data, the required original inspections or tests or applicable portions thereof shall be	Requirements for Control of Measuring and Test Equipment" Paragraph 4 Measuring and test equipment shall be properly handled and stored to maintain accuracy. Supplement 12S-1 "Supplementary Requirements for Control of Measuring and Test Equipment" Paragraph 3.2 When measuring and test equipment is found to be out of calibration, an evaluation shall be made and documented of the validity of previous inspection or test results and the acceptability of items previously inspected or tested. 4.1 Planning A plan shall be developed outlining the work to be performed and the work procedures or instructions required to comply with the	NQA-1 does not include the word "mechanical" and "since the last calibration check". Slightly different wording. Same intent and effect. The effect of the 4.1 requirements is to establish the necessity and methods for such inspections or tests if they are deemed to be required.
Where necessary to determine the acceptability of items or data, the required original inspections or tests or applicable portions thereof shall be repeated using properly calibrated equipment.	Requirements for Control of Measuring and Test Equipment"         Paragraph 4         Measuring and test equipment shall be properly handled and stored to maintain accuracy.         Supplement 12S-1 "Supplementary Requirements for Control of Measuring and Test Equipment"         Paragraph 3.2         When measuring and test equipment is found to be out of calibration, an evaluation shall be made and documented of the validity of previous inspection or test results and the acceptability of items previously inspected or tested.         4.1 Planning A plan shall be developed outlining the work to be performed and the work procedures or instructions required to comply with the requirements of the defined work	NQA-1 does not include the word "mechanical" and "since the last calibration check". Slightly different wording. Same intent and effect. The effect of the 4.1 requirements is to establish the necessity and methods for such inspections or tests if they are deemed to be required.
Where necessary to determine the last calibration check.         Where necessary to determine the acceptability of items or data, the required original inspections or tests or applicable portions thereof shall be repeated using properly calibrated equipment.	Requirements for Control of Measuring and Test Equipment"         Paragraph 4         Measuring and test equipment shall be properly handled and stored to maintain accuracy.         Supplement 12S-1 "Supplementary Requirements for Control of Measuring and Test Equipment"         Paragraph 3.2         When measuring and test equipment is found to be out of calibration, an evaluation shall be made and documented of the validity of previous inspection or test results and the acceptability of items previously inspected or tested.         4.1 Planning A plan shall be developed outlining the work to be performed and the work procedures or instructions required to comply with the requirements of the defined work scope.	NQA-1 does not include the word "mechanical" and "since the last calibration check". Slightly different wording. Same intent and effect.
Where necessary to determine the last calibration check.         Where necessary to determine the acceptability of items or data, the required original inspections or tests or applicable portions thereof shall be repeated using properly calibrated equipment.	Requirements for Control of Measuring and Test Equipment" Paragraph 4 Measuring and test equipment shall be properly handled and stored to maintain accuracy. Supplement 12S-1 "Supplementary Requirements for Control of Measuring and Test Equipment" Paragraph 3.2 When measuring and test equipment is found to be out of calibration, an evaluation shall be made and documented of the validity of previous inspection or test results and the acceptability of items previously inspected or tested. 4.1 Planning A plan shall be developed outlining the work to be performed and the work procedures or instructions required to comply with the requirements of the defined work scope. Planning shall include a review of the structure, system or component	NQA-1 does not include the word "mechanical" and "since the last calibration check". Slightly different wording. Same intent and effect. The effect of the 4.1 requirements is to establish the necessity and methods for such inspections or tests if they are deemed to be required.
Where necessary to determine the acceptability of items or data, the required original inspections or tests or applicable portions thereof shall be originally specified methods, equipment.	Requirements for Control of Measuring and Test Equipment"         Paragraph 4         Measuring and test equipment shall be properly handled and stored to maintain accuracy.         Supplement 12S-1 "Supplementary Requirements for Control of Measuring and Test Equipment"         Paragraph 3.2         When measuring and test equipment is found to be out of calibration, an evaluation shall be made and documented of the validity of previous inspection or test results and the acceptability of items previously inspected or tested.         4.1 Planning A plan shall be developed outlining the work to be performed and the work procedures or instructions required to comply with the requirements of the defined work scope.         Planning shall include a review of the structure, system or component design/procurement specifications,	NQA-1 does not include the word "mechanical" and "since the last calibration check". Slightly different wording. Same intent and effect. The effect of the 4.1 requirements is to establish the necessity and methods for such inspections or tests if they are deemed to be required.
Where necessary to determine the last calibration check.         Where necessary to determine the acceptability of items or data, the required original inspections or tests or applicable portions thereof shall be repeated using properly calibrated equipment.	Requirements for Control of Measuring and Test Equipment"         Paragraph 4         Measuring and test equipment shall be properly handled and stored to maintain accuracy.         Supplement 12S-1 "Supplementary Requirements for Control of Measuring and Test Equipment"         Paragraph 3.2         When measuring and test equipment is found to be out of calibration, an evaluation shall be made and documented of the validity of previous inspection or test results and the acceptability of items previously inspected or tested.         4.1 Planning A plan shall be developed outlining the work to be performed and the work procedures or instructions required to comply with the requirements of the defined work scope.         Planning shall include a review of the structure, system or component design/procurement specifications, materials, lists, drawings, construction work plans and	NQA-1 does not include the word "mechanical" and "since the last calibration check". Slightly different wording. Same intent and effect. The effect of the 4.1 requirements is to establish the necessity and methods for such inspections or tests if they are deemed to be required.

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	(except where noted)	(NOTE: OK signifies identical or
		nearly identical wording)
	installation, modification, inspection,	
	incorporated; that the work can be	
	accomplished as specified; and that	
	time and resources, plus training, are	
	sufficient to accomplish the work in	
	requirements	
	Planning shall define the operations	
	to be performed, the systematic	
	sequential progression of operations,	
	employed to preserve the quality of	
	the work.	
2.9 Prerequisites	2.2 Prerequisites	OK
The following minimum conditions shall	The following minimum conditions	
shall be available as applicable before	thereof shall be available as appli-	
the requirements set forth in this	cable, before the requirements set	
standard are applied:	forth in Subpart 2.8 are applied.	
a. Qualification of individuals,	(a) Qualification of individuals,	ОК
organizations and procedures have	organizations, and procedures have	
requirements of applicable codes and	the requirements of applicable codes	
standards.	and standards.	
b. Systems have been designed and	(b) Systems have been designed	ОК
engineered in accordance with	and engineered in accordance with	
specifications	specifications	
c. Materials have been selected and	(c) Materials have been selected	ОК
equipment has been fabricated and	and equipment has been fabricated	
assembled in accordance with the	and assembled in accordance with	
applicable published codes and	applicable published codes and	
standards, the conformance to which	standards, the conformance to which	
has been demonstrated by the	has been demonstrated by the	
responsible organization.	responsible organization.	01/
d. Engineering limitations, as	(d) Engineering limitations, as	OK
the procedures and instructions. These	the procedures and instructions.	
limitations and requirements shall	These limitations and requirements	
include, as a minimum, installation,	shall include, as a minimum,	
testing, and on-site fabrication	installation, testing, and on-site	
nondestructive examination and	cleaning welding nondestructive	
parameters such as pressure, flow,	examination, and parameters such as	
speed, load limits (static and dynamic),	pressure, flow, speed, load limits	
travel limits, physical clearances,	(static and dynamic), travel limits,	
vironmental and thermal limits which	alarm settings, and environmental	
are included in design specifications,	and thermal limits, which are included	
manufacturer's data sheets, instruction	in design specifications,	
manual and design reports.	manufacturer's data sheets,	
	reports	
e. To substantiate (b) and (c) above,	(e) To substantiate (b) and (c)	N45.2.8 uses the term "construction
the following documents relating to the	above, the following documents	site" whereas NQA-1 uses the term
the item shall be available at the con-	installation activity for the item shall	
struction site:	be available at the work site:	
(1) The latest applicable approved-	(1) the latest applicable	ОК
tor-construction drawings.	approved-for construction drawings	OK
(3) Manufacturer's installation	(2) equipment specifications (3) manufacturer's installation	OK
instructions.	instructions	

(except where noted)         (NOTE: CK signifies identical or nearly identical wording)           (4)         Installation procedures.         (6)           (6)         Evidence of compliance by manufacturer with purchase requirements, including quilty assur- ance requirements.         OK           (6)         Evidence of that engineering or design changes are documented and approved prior to installation         OK           (7)         Records of inspections and tests proved prior to installation         OK           (7)         records of inspections and tests and requirements, including and panding.         OK           (8)         records of inspections and tests installation         OK           (9)         revidence that onyneonformances have been astisfactority resolved or controlled.         OK           3. <b>RE-INSTALLATON</b> <b>VERIFICATION 3 REINSTALLATON</b> <b>VERIFICATION</b> OK           3.1 <b>Cheresi</b> the installation area conform to specified requirements and the necessary resources are available to assure that the quality of the mechanical line with the tem and the installation race conform to specified requirements and the necessary resources are available to assure that the quality of the mechanical line with the maintained as the installation race actions in the installation and te mecessary resources are available to aco	ANSI N45.2.8 - 1975	NQA-1 (1994) Subpart 2.8	
All installation procedures         Constraints           (4) Installation procedures         (4) Installation procedures         OK           (5) Evidence of compliance by manufacturer with purchase requirements.         (6) Evidence that engineering or design changes are documented are carguments.         OK           (6) Evidence that engineering outing on-site receiving. Storage and handing.         OK         OK           (7) Evidence that engineering outing on-site receiving. Storage and handing.         OK         OK           (9) Release of mechanical installation.         OK         OK           (9) Release of mechanical installation.         (7) records of inspections and handing.         OK           (9) Evidence that nonconformances have been satisfactorily resolved or controlled.         OK         OK           3. Renews the statistic in stallation of the installation of mechanical installation area conform to specified requirements and the installation area conform to specified requirements and the installation area conform to specified requirements and the installation shall be completed to verify that the is installation shall be mechanical item will be maintained as the installation shall be recessary during instillation shall be recessary during instillation shall be recessary during instillation shall be received and planned so that the saturation shall be reviewed and planned so that the endes to verify that the identify of received mechanical maintained and is in accordance with the latest approved-for-construction drawings, equipment tists, specifications, and established procedures.         OK		(except where noted)	(NOTE: OK signifies identical or
(c)       Installation productives       (C)         (c)       Evidence of compliance by manufacturer with purchase review concerning of design changes are documented approved prior to installation.       (C)         (c)       Evidence that engineering or design changes are documented and approved prior to installation.       (C)         (c)       Revisor of inspections and tests during on-site receiving, storage and handling.       (C)       revisor of inspections and tests during on-site receiving, storage and handling.       (C)         (d)       Revisor of inspections and tests during on-site receiving, storage and handling.       (C)       revisor of inspections and tests during on-site receiving.       (C)         (e)       Evidence that nonconformances have been satisfactorily resolved or controlled.       (C)       (C)         3.       Recense of mechanical mechanical items, there are certain preliminary inspections, checks, and smilar activities that shall be completed to verify that the flow and smilar activities that shall be completed to verify that the mechanical items, there are certain preliminary inspections, checks, and smilar activities that shall be concerned are available to assure that the quality of the mechanical item will be maintained as the installation proceeds.       (C)         7       Records that are mechanical item will be maintained as the installation proceeds.       (C)         7       Records that are mechanical item will be maintained as the installation of mechanical item will be maintained and apanned so that they are understood by responsible	(4) Installation procedures	(4) installation procedures	nearly identical wording)
manufacturer with purchase of the second ses	(5) Evidence of compliance by	(4) Installation procedures (5) evidence of compliance by	OK
requirements, including quality assur- ance requirements. including quality assur- ance requirements. including quality assur- ance requirements. (6) Evidence that engineering (7) Records of inspections and test during on-site receiving, storage and handing. (8) Release of mechanical items for installation. (9) Evidence that nonconformances have been satisfactorily resolved or controlled. (9) Evidence that nonconformances have been satisfactorily resolved or controlled. (1) Ecoresity resolved or controlled (1) Evidence that engineering or nonconstructure that the item and the installation area conform to esessary resources are available to assure that the quality of the mechanical item will be maintained as the installation proceeds. (1) The quality requirements and quality assurance actions that are necessary issuration and the proceed. (2) Events and the installation proceeds. (3) I dentification (1) Events and eventy that the iterating of nonconstruction drawing, equipment lists, specifications, and established procedures. (2) Events and be not the verify that the iterating proved-for-construction drawing, equipment lists, specifications and established procedures for control of identification	manufacturer with purchase	manufacturer with purchase	
ance requirements         ance requirements         OK           (6)         Evidence that engineering or design changes are documented and paroved prot or installation         OK           (7)         Records of inspections and tests         (7)         records of inspections and tests         OK           (8)         Release of mechanical items for installation         OK         OK           (9)         Evidence that nonconformances have been satisfacton/i resolved or controlled.         OK         OK           (1)         Evidence that nonconformances have been satisfacton/i resolved or controlled.         OK         OK           (2)         Evidence that nonconformances have been satisfacton/i resolved or controlled.         OK         OK           (3)         Recersal         SPREINSTALLATION         VERIFICATION         OK           VERIFICATION         VERIFICATION         VERIFICATION         OK         OK           3.1         General         Sepacified requirements, and the installation of mechanical linew will be maintained as the installation or mechanical linew will be maintained as the installation proceeds.         OK           the installation or macroscopy testication proceeds.         The quality of the assure that the versol ve	requirements, including quality assur-	requirements, including quality assur-	
(b)       Evidence that engineering of design changes are documented and approved prior to installation.       (c)       (c)         (c)       Records of inspections and test during on-site receiving, storage and handling.       (c)       (c)       (c)         (d)       Recircle of inspections and test during on-site receiving.       (c)       (c)       (c)         (d)       Recircle of inspections and test during on-site receiving.       (c)       (c)       (c)         (d)       Recircle of inspections and test during on-site receiving.       (c)       (c)       (c)         (d)       Revidence that nonconformances inspections, the statistication in resolution of mechanical items, there are certain preliminary inspections, checks, and similar activities that shall be completed to verify that the film and the installation of mechanical items, there are certain preliminary inspections, checks, and similar activities that shall be completed to verify that the installation of area corriom to specified requirements, and the installation stread of the actual installation stread or prevents, and the installation stread or prevents and the installation stread or prevents and the installation stread or prevents and the installation stread or prevent activities that shall be completed to verify that the installation shall be revered are corrispects.       (c)         The quality requirements and quality quality requirements and quality quality requirements and quality of the assure that the quality of the assure that the quality of the assure that the quality of the assure that a correspreved for construction material and equipment lists, specification	ance requirements.	ance requirements	OK
approved prior to installation.         and approved prior to installation         OK           (7) Records of inspectors and rests during on-site receiving, and regrege, and handling.         OK           (8) Release of mechanical items for installation.         (8) release of mechanical items for installation.         OK           (9) Evidence that nonconformances have been assistation/resolved or controlled.         (9) evidence that nonconformances have been assistation resolved or controlled.         OK           3. PRE-INSTALLATION VERIFICATION	(6) Evidence that engineering of design changes are documented and	or design changes are documented	0R
(7)       Records of inspections and tests during on-site receiving, storage, and handling       OK         (8)       Release of mechanical items for installation.       (9)       Evidence that nonconformances have been satisfactorily resolved or controlled.       OK         (9)       Evidence that nonconformances have been satisfactorily resolved or controlled.       OK       OK         3.       PRE-INSTALLATION VERIFICATION       SPREINSTALLATION VERIFICATION       OK         3.1       General       3.1       General Prior to the actual installation of mechanical items, there are certain preliminary inspections, checks and similar activities that stimilar certain preliminary inspections, checks and similar activities that stimulate or ecretain preliminary inspections, checks and similar activities that stimulate or specified requirements and the necessary resources are available to assure that the quality of the mechanical item will be maintained as the installation proceeds.       OK         The quality requirements and the receivery might installation proceeds.       St. Identification       OK         3.1       Identification       OK       CK         The quality requirements and the installation proceeds.       CK       CK         The quality requirements and the installation proceeds.       OK       CK         Checks shall be made to verify that the identity of received mechanical items with the maintained and is in accordance with the identity of received mechanical items store asposible individuals.       CK	approved prior to installation.	and approved prior to installation	
during on-site receiving, shanding.       tests during on-site receiving, shanding.       OK         (8)       Release of mechanical installation.       OK         (9)       Evidence that nonconformances have been satisfactorily resolved or controlled.       OK         3.       PRE-INSTALLATION       SPEINSTALLATION VERIFICATION       OK         3.1       General Prior to the actual installation of mechanical items, there are certain preliminary inspections, checks and similar activities that shall be completed to verify that the installation proceeds.       OK         3.1       General Prior to the actual installation of mechanical item will be maintained as the installation area conform to specified requirements and the necessary resources are available to assure that the quality of the mechanical item will be maintained as the installation proceeds.       OK         3.2       Identification       The quality requirements and quality assurance actions that are necessary ourgent installatons and be reviewed and planned so that they are understood by responsible individuals.       OK         3.2       Identification       3.2       Identification       OK         Checks shall be made to verify that the identity of received mechanical materials and equipment has been maintained and is in accordance with the identity of received mechanical maintained and is in accordance with the identity of received mechanical maintained and is in accordance with the identity of received mechanical maintained and is in accordance with the identify of received mechanical items diffication or maintaining identification,	(7) Records of inspections and tests	(7) records of inspections and	ОК
(f)       release of mechanical items for installation       OK         (g)       Evidence that nonconformances installation       OK         (have been satisfactorily resolved or controlled       OK         3.       PRE-INSTALLATION       OK         VERIFICATION       3 PREINSTALLATION VERIFICATION       OK         3.1       General       OK         3.1       General       OK         3.1       General Prior to the actual installation of mechanical items, there are certain preliminary inspections, checks and similar activities that the installation proceeds.       OK         completed to verify that the lem and the installation proceeds.       Description of the installation of mechanical items, there are cartain preliminary resources are available to assure that the quality of the mechanical item will be maintained as the installation proceeds.       OK         The quality requirements and the reviewed and planned so that they are understood by responsible individuals.       OK         3.2       Identification       3.2       Identification       OK         Checks shall be made to verify that the identity of received mechanical items theiden is accordance with the identity of received mechanical metalistic on the actual installation, dividuals.       OK         3.2       Identification       3.2       Identification       OK         Checks shall be made to verify that the identity of received mechanical items	during on-site receiving, storage and handling.	tests during on-site receiving, storage, and handling	
Instantation       (9) Evidence that nonconformances have been satisfactorily resolved or controlled       OK         3. PRE-INSTALLATION       SPREINSTALLATION       OK         VERIFICATION       3 PREINSTALLATION       OK         3.1 General       3.1 General Prior to the actual installation of mechanical items, there are certain preliminary inspections, checks, and similar activities that shall be completed to verify that the item and the installation area conform to specified requirements and the necessary resources are available to assure that the quality of the mechanical item will be maintained as the installation proceeds.       OK         The quality requirements and the necksanical item will be maintained as the installation proceeds.       OK         The quality requirements and the necksanical item will be maintained as the installation proceeds.       OK         The quality requirements and the necksanical item will be maintained as the installation proceeds.       OK         The quality requirements and the nechanical item will be maintained as the installation proceeds.       OK         S.2 Identification       3.2 Identification       OK         3.1 General       The quality requirements and quality assurance actions that are understood by responsible individuals.       OK         3.2 Identification       3.2 Identification       OK         Checks shall be made to verify that the leatest approved-for-construction drawings, equipment lists, specifications, and established procedures.       OK	(8) Release of mechanical items for	(8) release of mechanical	ОК
have been satisfactorily resolved or controlled       Image: Controlled         3: PRE-INSTALLATION VERIFCATION       3 PREINSTALLATION VERIFCATION       OK         3.1 General Prior to the actual installation of mechanical items, there are certain similar activities that shall be completed to verify that the item and the installation area conform to specified requirements, and the necessary resources are available to assure that the quality of the mechanical item will be maintained as the installation proceeds.       OK         The quality requirements and quality assurace actions that are necessary resources are available to assure that the quality of the mechanical item will be maintained as the installation proceeds.       OK         The quality requirements and quality assurace actions that are necessary resources are available to assurace actions that are necessary during installation shall be understood by responsible individuals.       OK         3.2 Identification       3.2 Identification       OK         Checks shall be made to verify that the identity of received mechanical maintained and is in accordance with the latest approved-for-construction drawings, equipment lists, specifications, and established procedures.       OK       OK         If these checks disclose apparent installation.       OK       OK       OK         Checks shall be made to verify that the identity of received mechanical maintained and is in accordance with the latest approved-for-construction drawings, equipment lists, specifications, and established procedures.       OK         If these checks disclose apparent installation.       OK	(9) Evidence that nonconformances	(9) evidence that nonconformances	ОК
controlled.       controlled         3. PRE-INSTALLATION       3 PREINSTALLATION         VERIFICATION       3 PREINSTALLATION         3.1 General       3.1 General         Prior to the actual installation of mechanical items, there are certain preliminary inspections, checks, and similar activities that shale completed to verify that the item and the installation area conform to specified requirements and the necessary resources are available to assure that the quality of the mechanical item will be maintained as the installation proceeds.       OK         The quality requirements and the necessary resources are available to assure that the quality of the mechanical item will be maintained as the installation proceeds.       OK         The quality requirements and quality assurance actions that are necessary during installation shall be created by responsible individuals.       OK         3.2 Identification       3.2 Identification       OK         Checks shall be made to verify that the identity of received mechanical methanical as and equipment has been maintained and is in accordance with the latest approved-for-construction drawing, equipment lists, specifications, and established procedures.       OK         Checks shall be made to verify that a control system for maintained as through installation.       OK         Checks shall be made to verify that a control system for maintaining identification, the identity shall be control system for maintaining identification, the identity shall be readified or metanical.       OK         Checks shall be made to verify that a control system for main	have been satisfactorily resolved or	have been satisfactorily resolved or	
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3.1 General       3.1 General Prior to the actual installation of mechanical items, there are certain preliminary inspections, checks and iscur are certain preliminary inspections, checks, and similar activities that shalb e completed to verify that the item and the installation area conform to specified requirements and the necessary resources are available to assure that the quality of the mechanical item will be maintained as the installation proceeds.       A the completed to verify that the item and the installation area conform to specified requirements, and the mechanical item will be maintained as the installation proceeds.       OK         The quality requirements and the installation shalb be reviewed and planned so that they are understood by responsible individuals.       The quality requirements and quality installation shalb be reviewed and planned so that they are understood by responsible individuals.       OK         3.2 Identification       3.2 Identification       OK         Checks shall be made to verify that the identity of received mechanical metrials and equipment has been maintained and is in accordance with the latest approved-for-construction drawings, equipment lists, specifications, the identity shall be readfirmed prior to release for installation.       OK         Checks shall be made to verify that a control system for maintained and is in accordance with the altest approved-for-construction drawings, equipment lists, specifications, the identity shall be readfirmed prior to release for installation.       OK         Checks shall be made to verify that a control system for maintaining identification of mechanical items if through installation has been established including provisions for control of substitution or exchange of requipment or mat	3. PRE-INSTALLATION VERIFICATION	3 PREINSTALLATION VERIFICATION	OK
Prior to the actual installation of mechanical items, there are certain preliminary inspections, checks and similar activities that shall be completed to verify that the item and the installation area conform to specified requirements, and the necessary resources are available to assure that the quality of the mechanical item will be maintained as the installation proceeds.       OK         The quality requirements and quality assurance actions that are necessary rung installation shall be reviewed and planned so that they are understood by responsible individuals.       OK         3.2 Identification       3.2 Identification       OK         Checks shall be made to verify that the identity of received mechanical item will be reviewed and planned so that they are understood by responsible individuals.       OK         3.2 Identification       3.2 Identification       OK         Checks shall be made to verify that the identity of received mechanical metrification drawings, equipment has been maintained as in accordance with the latest approved-for-construction drawings, equipment lists, specifications, and established procedures.       OK         If these checks disclose apparent loss of identification of mechanical items through installation shall be made to verify that a control system for maintaining identification and to schange of installation and be reading provisions for control of traceability to drawings, specification shall provide a system of maintaining identification shall provide a system of maintaining identification shall provide a system of raceability to drawings, specification shall proved from an item.       OK         Checks shall be made to verify that arou didentification or markings must be destroyed,	3.1 General	3.1 General Prior to the actual	
mechanical items, there are certain preliminary inspections, checks, and similar activities that shall be completed to verify that the item and the installation area conform to specified requirements and the necessary resources are available to assure that the quality of the mechanical item will be maintained as the installation proceeds.       acc certain preliminary inspections, checks, and similar activities that shall be completed to verify that the item and the installation area conform to specified requirements and the usatily requirements and quality requirements and quality requirements and planned so that they are understood by responsible individuals.       OK         3.2 Identification       3.2 Identification       OK         Checks shall be made to verify that the identity of received mechanical materials and equipment has been maintained and is in accordance with the identity of received mechanical materials and equipment has been maintained and is in accordance with the latest aproved-for-construction drawings, equipment lists, specification, and established procedures.       OK         Checks shall be made to verify that the identity for celeves de abblished procedures.       If these checks disclose apparent loss of identification, the identity shall be reaffirmed prior to release for installation.       OK         Checks shall be made to verify that control system for maintaining identification of mechanical items through installation has been established procedures.       OK         order decivers       Checks shall be made to verify that acont of web identification of mechanical items through installation has been established including provisions for control of installation has been established procedures.       OK	Prior to the actual installation of	installation of mechanical items, there	
preliminary inspections, checks and similar activities that shall be completed to verify that the item and the installation area conform to specified requirements, and the necessary resources are available to assure that the quality of the mechanical item will be maintained as the installation proceeds. The quality requirements and quality quality assurance actions that are necessary during installation shall be reviewed and planned so that they are understood by responsible individuals. 3.2 Identification Checks shall be made to verify that the identity of received mechanical materials and equipment has been maintained and is in accordance with the latest approved-for-construction drawings, equipment lists, specifications and established procedures. If these checks disclose apparent loss of identification of mechanical items installation. Checks shall be made to verify that the identity of received mechanical materials and equipment has been maintained and is in accordance with the latest approved-for-construction drawings, equipment lists, specifications and established procedures. If these checks disclose apparent loss of identification of mechanical items through nustallation checks shall be made to verify that at control system for maintaining identification of mechanical tems through nustallation as been established including provisions for control of substitution or exchange of equipment or materials. The procedures for control of identification shall provide a system of traceability to drawings, specifications or other records when identification or markings must be destroyed, hidden or markin	mechanical items, there are certain	are certain preliminary inspections,	
Similar activities installation       Similar be completed to verify that the item and the installation area conform to specified requirements, and the necessary resources are available to assure that the quality of the mechanical item will be maintained as the installation proceeds.       OK         The quality requirements and quality assurance actions that are necessary during installation shall be reviewed and planned so that they are understood by responsible individuals.       The quality requirements and quality assurance actions that are necessary during installation shall be reviewed and planned so that they are understood by responsible individuals.       OK         3.2 Identification       3.2 Identification       OK         Checks shall be made to verify that the latest approved-for-construction drawings, equipment has been maintained and is in accordance with the latest approved-for-construction drawings, equipment lists, specifications and established procedures.       OK         If these checks disclose apparent loss of identification, the identity shall be reaffirmed prior to release for installation and to overify that a control system for maintaining identification of mechanical items through installation has been established including provisions for control of substitution or exchange of equipment or materials.       OK         The procedures.       Checks shall be made to verify that a control system for maintaining identification is control of substitution or exchange of equipment or materials.       OK         The procedures for control of identification shall provide a system of traceability to drawings, equipment or materials.       OK         The procedures for control of identifi	preliminary inspections, checks and	checks, and similar activities that	
the installation area conform to specified requirements, and the specified requirements and the necessary resources are available to assure that the quality of the mechanical item will be maintained as the installation proceeds. The quality requirements and quality quality assurance actions that are necessary resources are available to assure that the quality of the mechanical item will be maintained as the installation proceeds. The quality requirements and quality quality assurance actions that are necessary during installation shall be reviewed and planned so that they are understood by responsible individuals. 3.2 Identification 3.2 Identification Ghecks shall be made to verify that the identity of received mechanical materials and equipment has been maintained and is in accordance with the latest approved-for-construction drawings, equipment lists, specifications and established procedures. If these checks disclose apparent loss of identification, the identity shall be reakers shall be maintaining identification issue for unstallation. Checks shall be made to verify that a control system for maintaining identification of mechanical items throughout installation has been established procedures. If these checks disclose apparent loss of identification of mechanical items throughout installation has been established including provisions for control of substitution or exchange of equipment or materials. Checks shall be made to verify that a control system for maintaining identification of mechanical items through installation or exchange of equipment or materials. The procedures for control of identification shall provide a system of traceability to drawings, specifications, or other records when identification or antikings must be destroyed, hidden or merved from an item. <b>3.3. Dreasess and Brocedures 3.4. Dreasess and Brocedures</b>	completed to verify that the item and	item and the installation area conform	
specified requirements and the necessary resources are available to assure that the quality of the mechanical item will be maintained as the installation proceeds.       Assure that the quality of the mechanical item will be maintained as the installation proceeds.         The quality requirements and quality quality assurance actions that are necessary during installation shall be reviewed and planned so that they are understood by responsible individuals.       OK         32 Identification       32 Identification       OK         Checks shall be made to verify that the latest approved-for-construction drawings, equipment lists, specifications, and established procedures.       OK         If these checks disclose apparent lost of identify of or cleases for installation.       Checks shall be made to verify that a control system for maintaining identification of mechanical items throughout installation as been established procedures.       OK         If these checks disclose apparent lost of identification of mechanical items throughout installation as been established including provisions for control of substitution or exchange of equipment or materials.       OK         Checks shall be made to verify that a control system for maintaining identification of mechanical items throughout installation.       OK         Checks shall be made to verify that a control system for maintaining identification of mechanical items throughout installation as been established, including provisions for control of identification shall provide a system of traceability to drawings, specifications, or ther records when identification or materials.       OK         The procedures or ontrol of inatema	the installation area conform to	to specified requirements, and the	
necessary resources are available to assure that the quality of the mechanical item will be maintained as the installation proceeds.       OK         The quality requirements and quality assurance actions that are necessary during installation shall be reviewed and planned so that they are understood by responsible individuals.       The quality requirements and quality assurance actions that are necessary during installation shall be reviewed and planned so that they are understood by responsible individuals.       OK         3.2 Identification       3.2 Identification       OK         Checks shall be made to verify that the identity of received mechanical materials and equipment has been maintained and is in accordance with the latest approved-for-construction drawings, equipment lists, specifications and established procedures.       OK         If these checks disclose apparent of identification.       If these checks disclose apparent loss of identification, the identity shall be reaffirmed prior to release for installation.       OK         Checks shall be made to verify that through installation has been established including provisions for control system for maintaining identification of mechanical items throughout installation has been established, including provisions for control of substitution or exchange of equipment or materials.       OK         The procedures for control of identification shall provide a system of markings must be destroyed, hidden, or removed from an item.       OK	specified requirements and the	necessary resources are available to	
assurance and are quality or quirements and quality assurance actions that are necessary during installation proceeds.       OK         The quality requirements and quality assurance actions that are necessary during installation shall be reviewed and planned so that they are understood by responsible individuals.       The quality requirements and quality assurance actions that are necessary during installation shall be reviewed and planned so that they are understood by responsible individuals.       OK         3.2 Identification       3.2 Identification       OK         Checks shall be made to verify that the identity of received mechanical materials and equipment has been maintained and is in accordance with the latest approved-for-construction drawings, equipment lists, specifications, and established procedures.       OK         If these checks disclose apparent istallation.       If these checks disclose apparent be reaffirmed prior to release for installation.       OK         Checks shall be made to verify that the identity shall be reaffirmed prior to release for installation.       If these checks disclose apparent be reaffirmed prior to release for installation.       OK         Checks shall be made to verify that a control system for maintaining identification of mechanical items through installation has been established including provisions for control of substitution or exchange of equipment or materials.       OK         The procedures for control of identification shall provide a system or markings must be destroyed, hidden or removed from an item.       The procedures for control of identification or markings must be destroyed, hidden, or removed from an item.       OK<	necessary resources are available to	assure that the quality of the	
the installation proceeds.       The quality requirements and quality accurate actions that are necessary during installation shall be reviewed and planned so that they are understood by responsible individuals.       OK         3.2 Identification       3.2 Identification       OK         Checks shall be made to verify that the latest approved-for-construction drawings, equipment has been maintained and is in accordance with the latest approved-for-construction drawings, equipment lists, specifications and established procedures.       OK         If these checks disclose apparent loss of identification of installation abs been established including provisions for control of substitution or exchange of equipment or materials.       If these checks disclose apparent loss of identification of mechanical items through installation has been established including provisions for control of substitution or exchange of equipment or materials.       OK         The receives when identification or markings must be destroyed, hidden or markings mu	mechanical item will be maintained as	the installation proceeds.	
The quality requirements and quality assurance actions that are necessary during installation shall be reviewed and planned so that they are understood by responsible individuals.       OK         3.2 Identification       3.2 Identification       OK         Checks shall be made to verify that the identity of received mechanical materials and equipment has been maintained and is in accordance with the latest approved-for-construction drawings, equipment lists, specifications and established procedures.       OK         If these checks disclose apparent loss of identification.       If these checks disclose apparent loss of identification, the identity of a collease for installation.       OK         Checks shall be made to verify that the latest approved-for-construction drawings, equipment lists, specifications, and established procedures.       OK         If these checks disclose apparent loss of identification, the identity shall be reaffirmed prior to release for installation.       OK         Checks shall be made to verify that a control system for maintaining identification of mechanical items throughout installation has been established including provisions for control of substitution or exchange of equipment or materials.       OK         The procedures for control of identification shall provide a system of maintaining identification shall provide a system of maintaining or the receability to drawings, specification and the identification or exchange of equipment to materials.       OK         The procedures for control of identification or markings must be destroyed, hidden or markings must be destroyed, hidden or morewed from an item.       OK	the installation proceeds.	· · · · · · · ·	
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equipment or materials.       equipment or materials.         The procedures for control of identification shall provide a system of traceability to drawings, specifications or other records when identification or markings must be destroyed, hidden or removed from an item.       The procedures for control of identification shall provide a system of traceability to drawings, specifications or other records when identification or markings must be destroyed, hidden, or removed from an item.       OK	established including provisions for	established, including provisions for	
The procedures for control of identification shall provide a system of traceability to drawings, specifications or other records when identification or markings must be destroyed, hidden or removed from an item.       The procedures for control of identification shall provide a system of traceability to drawings, specifications, or other records when identification or markings must be destroyed, hidden or removed from an item.       OK	equipment or materials.	equipment or materials.	
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markings must be destroyed, hidden or removed from an item. <b>3.3.</b> Proceeses and Procedures	traceability to drawings, specifications	or traceability to drawings,	
removed from an item. destroyed, hidden, or removed from an item.	markings must be destroyed, hidden or	identification or markings must be	
an item.	removed from an item.	destroyed, hidden, or removed from	
	3.3 Processes and Procedures	an item.	OK
ANSI N45.2.8 - 1975	NQA-1 (1994) Subpart 2.8		
-----------------------------------------------------------------	-------------------------------------------------------------------------	----------------------------------	
	(except where noted)	(NOTE: OK signifies identical or	
		nearly identical wording)	
Consistent with the construction	Consistent with the construction		
activities schedule, inspections or	activities schedule, inspections, or		
checks shall be performed to verify	checks shall be performed to verify		
that processes and procedures are	that processes and procedures are		
ready when needed for use in the	ready when needed for use in the		
These inspections or checks shall	These inspections or checks shall	ОК	
include, but not be limited to the	include, but not be limited to, the		
following verifications:	following verifications.		
a. Approved procedures, drawings,	(a) Approved procedures, drawings,	OK	
provided to the installer at the	are provided to the installer at the		
construction site.	work site.		
b. Special instructions and checklists	(b) Special instructions and	ОК	
as required are available at the	checklists as required are available at		
item	the item		
c. Approved procedures and	(c) Approved procedures and	ОК	
instructions for special processes such	instructions for special processes		
as coating, welding, heat treating and	such as coating, welding, heat		
available at the site	examination are available at the site		
d. Where applicable, personnel,	(d) Where applicable, personnel,	ОК	
procedures and instructions shall have	procedures, and instructions shall		
been qualified through the preparation	have been qualified through the		
or mockups that simulate actual job	standards samples or mockups that		
conditions.	simulate actual job conditions.		
e. Installation preparations have been	(e) Installation preparations have	ОК	
completed, including such tasks as	been completed, including such tasks		
cleaning, and preliminary positioning,	as removal of packaging, condi- tioning, cleaning, and preliminary		
cioaring, and promining positioning.	positioning.		
f. Jigs, fixtures and equipment for	(f) Jigs, fixtures, and equipment for	ОК	
special processes, if required, are	special processes, if required, are		
specified requirements.	specified requirements.		
g. Equipment for handling and	(g) Equipment for handling and	ОК	
placement of mechanical items is	placement of mechanical items is		
available at the site and is adequate to	available at the site and is adequate		
specified requirements.	with specified requirements.		
h. Warnings and safety notices,	(h) Warnings and safety notices	ОК	
appropriate to the activity, are posted.	appropriate to the activity are posted.	0.1	
3.4 Physical Condition	3.4 Physical Condition	OK	
Inspections or checks as appropriate	Inspections or checks, as		
shall be performed to verify that	appropriate, shall be performed to		
mechanical items at the installation are	verify that mechanical items at the		
In accordance with the specified re-	installation are in accordance with the specified requirements and that		
maintained.	guality has been maintained.		
These inspections or checks shall	These inspections or checks shall	ОК	
include, but not be limited to, the	include, but not be limited to, the		
Tollowing verifications:	tollowing verifications.	OK	
integrity during storage have been	integrity during storage have been		
maintained in conformance with	maintained in conformance with		
specified requirements.	specified requirements.		
D. Nonconformances have been satisfactorily dispositioned or	(D) Nonconformances have been satisfactorily dispositioned or	UK	
controlled.	controlled.		
c. Items have been cleaned in	(c) Items have been cleaned in	ОК	
accordance with specified	accordance with specified		

(except where noted)         (NOTE: CK signifies identical or nearly identical wording)           7:8 Site Conditions         3.5 Site Conditions         OK           Inspections or checks as appropriate shall be performed to verify that conditions of the instalation area contions the veben taken to preduction share been taken to preductions the limited to, verification of the following, a. Protection from adjacent construction activities is being provided, including implementation of appropriate exclusion and area decampes regularements and other ambies decampes regularements.         OK           0. Protection from inclement wather and other ambies decampes regularements.         OK         OK           0. Induction of the exclusion and other ambies decampes regularements on provide decampes regularements to the mechanical items being installed are controlled.         OK         OK           0. Installation of the mechanical items will not adversely affect the subsequent installation of materials and equipment and that repair or rework and proceeding set appropriate scubastored or proformed salidatority.         OK         OK           0. Monochroming items can be performed salidation of mechanical items was been dispositioned or rework and proceeding schane dispositoned and conditioned.         OK	ANSI N45.2.8 - 1975	NQA-1 (1994) Subpart 2.8	
requirements.         requirements.         requirements.         requirements.         OK           3.5 Site Conditions         3.5 Site Conditions         OK         Inspections or checks as appropriate shall be performed to verify that conditions of the installation area confrom to specified requirements and precautions have been taken to prevent conditions that will adversely been taken taken to prevent conditions that will adversely been taken taken taken taken that may be deleterious to the mechanical terms been being installed on or materials and equipment and that repair or rework on any nonconforming terms have been dispositioned or controlled.         OK         OK           1. Adequate permanent or approved temporary supports and mountings have been dispositioned or controlled.         OK         OK         OK           2. Addition partial partial partial bin adversely adversely adversely adversely adversely adversely adversely besitioned or controlled.		(except where noted)	(NOTE: OK signifies identical or
requirements.       requirements.       OK         3.5 Site Conditions       OK         Inspections or checks as appropriate shall be performed to verify that continues of the installation area contorm to specified requirements and prevailors have been taken of the unstallation.       Inspections or checks, as appropriate, shall be performed to verify that conditions of the installation.       OK         These inspections or checks shall include. but not be limited to, trouble, but not adverses to appropriate exclusion and area appropriate installation of merchanical item installed, and or mechanical item aspecified to installation and the repair and flanges are properly positioned and conditioned.       OK         6. Neededifferences       (7) Adeguate permanent or appro			nearly identical wording)
3.5 Site Conditions     3.5 Site Conditions     OK       Inspections or checks as appropriate installation areas conform to specified requirements and performed to equirements and requirements and recently of the item during installation.     Inspections or checks as of the installation areas conform to specified requirements and performed to equirements and performed to equirements.     OK       1. These inspections or checks shall     These inspections or checks shall     OK       2. Protection from adjacent construction activities being provided, including implementation of appropriate exclusion and area calcumeter and cher ambient conditions adverse and performed to equirements.     OK       2. The exclusion from inclement weather and cher ambient conditions and area calcumeter and cher ambient conditions adverse and performed easily and performed easing and performed easily	requirements.	requirements.	
Inspections or checks as appropriate shall be performed to verify that conditions of the installation area conform to specified requirements and precautions have pervent conditions that will adversely affect the quality of the item during installation. These inspections or checks shall include, but not be limited to, verification of the following. B. Protection from adjacent construction activities being provided including but not be limited to, verification and a construction activities is being provided. Including but not be limited to, verification of the following. B. Protection from adjacent construction activities being provided including implementation of appropriate exclusion and area cleanness requirements. B. Protection from inclement and other ambient conditions averse to quality is being provided. C. Materials that may be deleterious to the mechanical items being and the ambient onto adverse to quality is being provided. C. Materials that may be deleterious to the mechanical items being and the ambient onto adverse and other ambient conditions. C. Materials that may be deleterious to the mechanical items being installed are confoled. C. Nonconformances for adjacent (d) Installation of the mechanical items and be performed satisfactority. Controlled. M. Acquate permanent or approved and conditioned. C. Acquate permanent or approved target parts such as couplings and flanges are property positioned and conditioned. C. Acquate permanent or approved target in stalled that will properly interface with the mechanical item. S. Protection mechanical item. S. Nonconformanes for adjacent tems have been installed that will properly interface with the mechanical item. S. Astrong parts such as couplings and flanges are properly positioned and conditioned. C. Acquate permanent or approved target to installation has been performed. C. Active that the required quality is being advitues shall be performed during the installation process. Approcedure shall be performed in stallation process. Approcedure s	3.5 Site Conditions	3.5 Site Conditions	OK
shall be performed to verify inai       appropriate. shall be performed to verify inai         conditions of the installation area conform to specified requirements and prevent conditions that will adversely affect the quality of the item during installation.       MCK         These inspections or checks shall include, but not be limited to, the quality of the item during installation of a provided, including implementation of appropriate exclusion and area cleaness requirements.       OK         B. Protection from adjacent construction activities being provided.       (a) Protection from adjacent construction activities being provided.       OK         C. Materials that may be deletrious to the mechanical items being provided.       (c) Materials that may be deletrious to the mechanical items being provided.       OK         C. Materials that may be deletrious to the mechanical items sets ougulity is being provided.       OK       OK         C. Materials that may be deletrious to the mechanical items sets ougulity is being provided.       OK       OK         C. Materials that may be deletrious to the mechanical items sets ougulity is being provided.       OK       OK         C. Materials that may be deletrious to the mechanical item sets out any is being provided.       OK       OK         C. Materials that may be deletrious to the mechanical item sets being provided.       OK       OK         C. Materials that may be deletrious to the mechanical item sets being provided.       OK       OK         Controled.       (f) Inst	Inspections or checks as appropriate	Inspections or checks, as	
<ul> <li>conditions of the installation area conditions of the installation area acroit mot basefield requirements and precautions have been taken to prevent conditions that will adversely affect the quality of the item during installation.</li> <li>These inspections or checks shall include, but not be limited to, but not but himsels is being provided including implementation of appropriate exclusion and area cleanness requirements.</li> <li>Protection from inclement weather and other ambient conditions adverse to quality is being provided.</li> <li>Materials that may be deleterious to the mechanical items being and that may be deleterious to the mechanical items and perain or nework on any nonconforming items can be and satisfactority.</li> <li>Nonconformances for adjacent items have been dispositioned or controlled.</li> <li>Acquete permanent or approved itemporary supports and mountings have been installed that will properly interface with the mechanical item.</li> <li>Mating parts such as couplings and finenges are properly positioned and conditioned.</li> <li>Servicing or maintenance activity related to installation or description, and examination of testing, situation or description in accordance with prescribed procedures.</li> <li>Contract ULNN SINSTALLATION PROCESS</li> <li>Acequate permanent or approved in accordance with prescribed procedures.</li> <li>Contract be performed in a sequine during the installation or description in accordance</li></ul>	shall be performed to verify that	appropriate, shall be performed to	
conform to specified requirements and prevent conditions that will adversely affect the quality of the item during installation.       installation area conform to specified recalutions that will adversely affect the quality of the item during installation.         These inspections or checks shall include, but not be limited to, the diversely affect the quality of the item during installation.       OK         a. Protection from adjacent construction advites being provided, including implementation of appropriate exclusion and area centered services and ther ambient conditions and area centered services.       OK         b. Protection from inclement weather and other ambient conditions that will adversely affect the quality of the item during implementation of appropriate exclusion and area centered adverse to quality is being provided.       OK         c. Materials that may be deleterious the mechanical items being installed, are controlled.       OK       OK         c. Installation of the mechanical item will not adversely affect the subsequent installation of materials and equipment, and regulation or rework and y nonconforming items can be performed satisfactority interface with the mechanical item.       OK         c. Nonconformances for adjacent temporary supports and mountings and flange are property positioned or and conditioned.       OK         d. Adsequate permement cancing items cancing items cance activity interface with the mechanical item.       OK         example adjubilition do materials and equipment, and regulation or adjacent temporary supports and mountings have been installed on or materials and equipment, and regulation or adjacent temporary supports and mountings have been	conditions of the installation area	verify that conditions of the	
prevent conditions have been taken to prevent conditions that multiple enables to prevent the multiple enables to prevent conditions that multiple enables to prevent conditions that multiple enables to prevent conditions that multiple enables to prevent the term that the prevent enables to prevent the term that the term term term term term term term ter	conform to specified requirements and	installation area conform to specified	
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h. Servicing or maintenance activity related to installation has been performed.       (h) Servicing or maintenance activity related to installation has been performed.       OK         4. CONTROL DURING INSTALLATION PROCESS       4 CONTROL DURING INSTALLATION PROCESS       NQA-1 uses "Checking, inspection, and examination of testing" This is considered to be a typographical error.         4.1 General       Checking, inspection, examination or testing activities shall be performed during the installation of mechanical items to assure that the required quality is being obtained in accordance with prescribed procedures.       Checking, inspection, and examination of testing activities shall be performed during the installation of mechanical items to assure that the required quality is being obtained in accordance with prescribed proce- dures.       OK         These activities shall be performed in a systematic manner to assure surveillance throughout the installation process.       These activities shall be performed in a systematic manner to assure surveillance throughout the installation process.       OK         A procedure shall be provided for the coordination and sequencing of these       A procedure shall be provided for the coordination and sequencing of these	and conditioned.	and conditioned.	
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performed.performed.4. CONTROL DURING INSTALLATION PROCESS4 CONTROL DURING INSTALLATION PROCESSNQA-1 uses "Checking, inspection, and examination of testing" This is considered to be a typographical error.4.1 General4.1 GeneralChecking, inspection, examination or testing activities shall be performed during the installation of mechanical items to assure that the required quality is being obtained in accordance with prescribed procedures.Checking, inspection, and examination of testing activities shall be performed during the installation of mechanical items to assure that the required quality is being obtained in accordance with prescribed proce- dures.OKThese activities shall be performed in a systematic manner to assure surveillance thoughout the installation process.These activities shall be provided for the coordination and sequencing of theseA procedure shall be provided for the coordination and sequencing of theseOK	related to installation has been	related to installation has been	
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with prescribed procedures.       in accordance with prescribed procedures.         These activities shall be performed in a systematic manner to assure surveillance thoughout the installation process.       These activities shall be performed in a systematic manner to assure surveillance throughout the installation process.       OK         A procedure shall be provided for the coordination and sequencing of these       A procedure shall be provided for the coordination and sequencing of these       OK	quality is being obtained in accordance	the required quality is being obtained	
These activities shall be performed in a systematic manner to assure surveillance thoughout the installation process.       These activities shall be performed in a systematic manner to assure surveillance throughout the installation process.       OK         A procedure shall be provided for the coordination and sequencing of these       A procedure shall be provided for the coordination and sequencing of these       OK	with prescribed procedures.	in accordance with prescribed proce-	
A procedure shall be provided for the coordination and sequencing of these       A procedure shall be provided for the coordination and sequencing of these       OK	These activities shall be porformed in a	uures. These activities shall be porformed in	OK
surveillance thoughout the installation process.       surveillance throughout the installation process.         A procedure shall be provided for the coordination and sequencing of these       A procedure shall be provided for the coordination and sequencing of these	systematic manner to assure	a systematic manner to assure	
process.       installation process.         A procedure shall be provided for the coordination and sequencing of these       A procedure shall be provided for the coordination and sequencing of these	surveillance thoughout the installation	surveillance throughout the	
A procedure shall be provided for the coordination and sequencing of these	process.	installation process.	
A procedure shall be provided for the coordination and sequencing of these			
coordination and sequencing of these coordination and sequencing of these	A procedure shall be provided for the	A procedure shall be provided for the	ОК
	coordination and sequencing of these	coordination and sequencing of these	

ANSI N45.2.8 - 1975	NQA-1 (1994) Subpart 2.8	
	(except where noted)	(NOTE: OK signifies identical or
		nearly identical wording)
points in successive stages of	points in successive stages of	
installation.	installation.	
A method shall be implemented to	A method shall be implemented to	ОК
assure that engineering and design	assure that engineering and design	
controlled during installation.	documented and controlled.	
4.2 Process and Procedure Control	4.2 Process and Procedures	ОК
Checks shall be made to verify that a	Control Checks shall be made to verify that a	OK
system of controls has been	system of controls has been	
established and is being maintained at	established and is being maintained	
the construction site to assure the	at the construction site to assure the	
a. The applicable revision of approved	(a) The applicable revision of	ОК
procedures, drawings and instructions	approved procedures, drawings, and	
are being followed.	instructions is being followed.	OK.
b. Qualified and approved processes, materials tools and other equipment	(b) Qualified and approved	ŬK
are being used by qualified personnel.	equipment are being used by quali-	
	fied personnel.	01/
C. The status of installation,	(C) The status of installation, inspections, examinations, or tests is	ŬK
clearly indicated or identified in in-	clearly indicated or identified in in-	
spection records.	spection reports.	
d. The installation, inspection and	(d) The installation, inspection, and	ОК
testing sequence is being maintained.	maintained.	
e. Identification, appropriate	(e) Identification, appropriate	N45.2.8 uses term "are being
segregation, and disposition of	segregation, and disposition of	controlled" whereas NQA-1 uses term
controlled	tained	are being maintained .
		Differently worded. Same intent and
		effect.
f. "As-built" information is being processed.	(f) As-built information is being processed.	ОК
g. Inspection and test reports are	(g) Inspection and test reports are	ОК
current, accurate and complete.	current, accurate, and complete.	NAE 2.9 provides exemples of
4.5 Examination	Requirements for Control of	nondestructive examinations
Nondestructive examinations, when	Processes"	
required, shall be performed to	Deve sweet 2	Same intent and effect.
approved applicable procedures. Ex-	Paragraph 3	
liquid penetrant, magnetic particle,	Each special process shall be	
ultrasonic, eddy current and radi-	performed in accordance with	
ograpny.	or reference procedure personnel	
	and equipment qualification	
	requirements.	011
4.4 Inspection	4.3 Inspection	OK
Inspections of the work areas and the	Inspections of the work areas and the	
work in progress shall be performed to	work in progress shall be performed	
located installed assembled or con-	to verify that mechanical items are being located installed assembled	
nected in compliance with the latest	or connected in compliance with the	
approved-for-construction drawings,	latest approved-for-construction	
manufacturers' instructions, codes,	drawings, manufacturer's	
procedures.		
Inspections performed shall include as	Inspections performed shall include	ОК
appropriate, but not be limited to, the	as appropriate, but not be limited to,	

ANSI N45.2.8 - 1975	NQA-1 (1994) Subpart 2.8	Comments
	(except where noted)	(NOTE: OK signifies identical or
		nearly identical wording)
a. Identification.	(a) identification	OK
b. Location and orientation of	(b) location and orientation of	OK
c Leveling and alignment	(c) leveling and alignment	OK
d. Clearances and tolerances.	(d) clearances and tolerances	OK
e. Tightness of connections and	(e) tightness of connections and	ОК
fastenings.	fastenings	01
t. Fluid levels and pressures.	(f) fluid levels and pressures	OK
h Physical integrity	(b) physical integrity	OK
i. Cleanness.	(i) cleanness	OK
j. Welding operations including	(j) welding operations, including	ОК
materials and process controls,	materials and process controls,	
adequate purging, and the removal of	adequate purging, and the removal of	
k Adequacy of protective measures to	(k) adequacy of protective measures	OK
assure that the item will not be	to assure that the item will not be	
damaged during installation.	damaged during installation	
I. Adequacy of housekeeping, barriers	(I) adequacy of housekeeping,	ОК
and protective equipment to assure	barriers, and protective equipment to	
contaminated as a result of adjacent	damaged or contaminated as a result	
construction activities.	of adjacent construction activities	
4.5 Installation Checks	4.4 Installation Checks	ОК
Charles shall be performed to verify	Charles shall be not formed to verify	
that mechanical items have been	that mechanical items have been	
correctly installed and will function	correctly installed and will function	
properly so that the initial starting of	properly so that the initial starting of	
items and preoperational testing can	items and preoperational testing can	
proceed with a minimum amount of	proceed with a minimum amount of	
problems and delays.	problems and delays.	
If construction or associated activity	If construction or associated activity	OK
checks shall be repeated if necessary	the checks shall be repeated if	
to assure that the quality has not been	necessary to assure that the quality	
adversely affected.	has not been adversely affected.	
These activities shall include as	These activities shall include as	ОК
appropriate, but not be limited to, the	appropriate, but not be limited to, the	
a Checkout procedures are prepared	(a) Checkout procedures are	OK
and approved to verify correctness of	prepared and approved to verify	Sit .
installation and ability to function.	correctness of installation and ability	
	to function.	
b. Proper greasing or lubrication has	(b) Proper greasing or	OK
c Lubricating and cooling water	(c)   ubricating and cooling	ОК
systems are in service.	water systems are in service.	
d. Protection strainers are installed	(d) Protection strainers are	ОК
where necessary.	installed where necessary.	
e. Rotation of prime movers is correct.	(e) Rotation of prime movers is	Ŭĸ
f. Electrical circuits. controls and relay	(f) Electrical circuits. controls.	ОК
settings are correct.	and relay settings are correct.	
g. Phasing of electrical busses is	(g) Phasing of electrical buses	ОК
correct.	Is correct.	OK
service as required	calibrated and in service as required	ÖK
i. Item is correctly valved and	( <i>i</i> ) Item is correctly valved and	ОК
isolated.	isolated.	
j. Casings, reservoirs, etc. are primed,	(j) Casings, reservoirs, etc.,	ОК
vented and filled.	are primed, vented, and filled.	OK
established for control	are established for control	
I. Tags are issued, where appropriate.	( <i>l</i> ) Tags are issued, where	ОК

ANSI N45.2.8 - 1975	NQA-1 (1994) Subpart 2.8 (except where noted)	Comments (NOTE: OK signifies identical or nearly identical wording)
for isolation and control.	appropriate, for isolation and control.	
m. Piping system alignment is correct.	(m) Piping system alignment is correct.	ОК
<ul> <li>n. Pipe hanger placement is correct and hangers will function properly.</li> </ul>	(n) Pipe hanger placement is correct and hangers will function properly.	ОК
o. Seismic anchors and restraints are properly installed.	(o) Seismic anchors and restraints are properly installed.	ОК
<ul> <li>p. Valve glands and packing are installed.</li> </ul>	(p) Valve glands and packing are installed.	ОК
q. Pneumatic lines have been blown.	(q) Pneumatic lines have been blown.	ОК
r. Valve stroking, actuation and settings are proper.	(r) Valve stroking, actuation, and settings are proper.	ОК
s. Pump seals and packing are properly installed.	(s) Pump seals and packing are properly installed.	ОК
t. Limit switches, interlocks and stops are properly adjusted and set.	(t) Limit switches, interlocks, and stops are properly adjusted and set.	ОК
<b>4.5.1 Cleaning.</b> Installed systems and components shall be cleaned, flushed and conditioned according to the requirements of ANSI N45.2.1. Special attention shall be given to the following	<b>4.4.1 Cleaning.</b> Installed systems and components shall be cleaned, flushed, and conditioned according to applicable requirements. Special attention shall be given to the	N45.2.8 states according to the requirements of ANSI N45.2.1 whereas NQA-1 states according to applicable requirements.
requirements:	following requirements.	See 2.4 above.
a. Chemical Conditioning. Procedures shall be prepared including the scope, acceptance criteria, se- quence, temperatures, soak periods and neutralizing solutions to be used.	(a) Chemical Conditioning. Procedures shall be prepared including the scope, acceptance criteria, sequence, temperatures, soak periods, and neutralizing	ОК
Checks shall be made to verify that the proper chemicals at the designated strength and temperature are being used in the conditioning operations	Checks shall be used. Checks shall be made to verify that the proper chemicals at the designated strength and temperature are being used in the conditioning operations	ОК
Other operations shall be performed as specified in Paragraph 4.5.1.c.	Other operations shall be performed as specified in (c) below.	ОК
<b>b.</b> <i>Flushing.</i> Procedures shall be prepared including routes, boundaries, velocities and acceptance criteria, restoration, and layup for high integrity systems where appropriate.	(b) Flushing. Procedures shall be prepared including routes, boundaries, velocities and acceptance criteria, restoration, and layup for high integrity systems, where appropriate.	ОК
Checks shall be made to verify that mechanical items are being flushed in accordance with specified requirements so that contaminants or flow velocities will not adversely affect subsequent operations.	Checks shall be made to verify that mechanical items are being flushed in accordance with specified requirements so that contaminants or flow velocities will not adversely affect subsequent operations.	ОК
Other operations shall be performed as specified in Paragraph 4.5.1 .c.	Other operations shall be performed as specified in (c) below.	OK
c. Process Controls. Checks shall be performed to verify that controls are functioning for the following:	(c) Process Controls. Checks shall be performed to verify that controls are functioning for the following:	ОК
(1) Removal and installation of parts or components such as metering devices, orifice plates and valve internals that are removed from the system to facilitate flushing.	<ol> <li>(1) removal and installation of parts or components such as metering devices, orifice plates, and valve internals that are removed from the system to facilitate flushing;</li> </ol>	ОК
(2) Installation and removal of temporary strainers, blind flanges, and piping.	(2) installation and removal of temporary strainers, blind flanges, and piping;	ОК
(3) Isolation of sensitive	(3) isolation of sensitive	OK

ANSI N45.2.8 - 1975	NQA-1 (1994) Subpart 2.8	Comments
	(except where noted)	(NOTE: OK signifies identical or
		nearly identical wording)
instrumentation.	instrumentation;	
(4) Water and chemical quality.	(4) water and chemical quality;	OK OK
(5) Acceptance data, specimens, or	(5) acceptance data, specimens, or	UK .
Where appropriate for disassembly	Where appropriate for disassembly	ОК
and reassembly of components,	and reassembly of components,	
procedures or instructions shall be	procedures or instructions shall be	
prepared or manufacturer's technical	prepared or manufacturer's technical	
manuals shall be used to assure	manuals shall be used to assure	
adherence to match marks, protection	adherence to match marks,	
preclude damage to the component	reassembly and to preclude damage	
	to the component.	
4.5.2 Pressure Testing. Checks	4.4.2 Pressure Testing. Checks	ОК
shall be made to verify that mechanical	shall be made to verify that	
items are being pressure tested in	mechanical items are being pressure	
accordance with specified	tested in accordance with specified	
strength and integrity of the installed	strength and integrity of the installed	
systems or portions thereof conform to	systems or portions thereof conform	
specified requirements.	to specified requirements.	
The purpose of the test, scope, test	The purpose of the test, scope, test	ОК
boundary, duration for inspection,	boundary, duration for inspection,	
acceptance criteria, restoration, and	acceptance criteria, restoration, and	
documented	documented	
Checks shall include, but not be limited	Checks shall include, but not be	ОК
to, the following:	limited to, the following.	
a. Appropriate pressures,	(a) Appropriate pressures,	OK
temperatures, water chemistry, and	temperatures, water chemistry, and	
b Sufficient time at test pressure is	(b) Sufficient time at test pressure is	OK
specified to determine acceptance	specified to determine acceptance.	SK .
c. Provisions are available to protect	(c) Provisions are available to protect	ОК
and isolate instrumentation during	and isolate instrumentation during	
hydrostatic testing.	hydrostatic testing.	01
<ol> <li>Items external to test boundary are protected to prevent inadvertent</li> </ol>	(d) Items external to test boundary	ÜK
overpressurization	overpressurization	
e. Relief devices are controlled to	(e) Relief devices are controlled to	ОК
prevent system overpressurization.	prevent system overpressurization.	
f. Gagging and ungagging of relief	(f) Gagging and ungagging of relief	ОК
g Piping and equipment supports have	(a) Piping and equipment supports	ОК
hydrostatic pins installed where	have hydrostatic pins installed where	
applicable for testing and removed	applicable for testing and are to be	
upon completion of testing.	removed upon completion of testing.	
	(h) Evidence of calibration of test	These words are not included in
4.6 Care of Items	4 5 Care of Items	N45.2.0
Items on which inspection and testing	Items on which inspection and testing	
activities are being performed shall be	activities are being performed shall	
protected from personnel traffic,	be protected from personnel traffic,	
activities such as sandblasting acid	activities such as sandblasting acid	
cleaning, welding, iack hammering	cleaning, welding, iack hammering	
chipping, burning and stress relieving	chipping, burning, and stress	
that would adversely affect the quality	relieving, which would adversely	
of the item or test results.	affect the quality of the item or test	
Such protection shall be provided	results.	OK
through good cleanliness and	through good cleanliness and	
housekeeping practices, temporary	housekeeping practices, temporary	
packaging, erection of barriers,	packaging, erection of barriers,	

ANSI N45.2.8 - 1975	NQA-1 (1994) Subpart 2.8 (except where noted)	Comments (NOTE: OK signifies identical or nearly identical wording)
protective covers, and walkways as required in accordance with Subsection 2.6.	protective covers, and walkways, as required.	
Temporary use of equipment or facilities to which this standard applies that are to become part of the completed project may be desirable.	Temporary use of equipment or facilities to which this Part applies that are to become part of the com- pleted project may be desirable.	ОК
Authorization for such usage shall be as provided for in the contract or by written approval from the responsible organization.	Authorization for such usage shall be as provided for in the contract or by written approval from the responsible organization.	ОК
Such temporary use shall not subject the equipment or systems to conditions for which they were not designed.	Such temporary use shall not subject the equipment or systems to conditions for which they were not designed.	ОК
The temporary use authorization shall include:	The temporary use authorization shall include:	OK
(1)conditions of use or operation;	(a) conditions of use or operation;	OK
<ul> <li>(2) maintenance requirements; and</li> <li>(3) inspections and tests as required to maintain operability and quality during period of temporary use of the item.</li> </ul>	<ul> <li>(b) maintenance requirements; and</li> <li>(c) inspections and tests as required to maintain operability and quality during the period of temporary use of item.</li> </ul>	OK
When temporary use is completed, conditions of temporary use shall be evaluated to verify that the permanent plant equipment continues to satisfy the specified requirements.	When temporary use is completed, conditions of temporary use shall be evaluated to verify that the permanent plant equipment continues to satisfy the most specified requirements.	NQA-1 adds the word "most".
5. INSTALLED SYSTEMS INSPECTION AND TESTS	5 INSTALLED SYSTEMS INSPECTION AND TESTS	ОК
5.2 General	5.1 General	
Following the installation of mechanical items, the checking, inspection, and testing activities shall be performed to verify that the completed systems are in conformance with specified requirements.	Following the installation of mechanical items, the checking inspection and testing activities shall be performed to verify that the completed systems are in conformance with specified requirements.	
This is a final verification that the requirements defined by licensing commitments, drawings, specifications and other contract documents are reflected in the completed installation.	This is a final verification that the requirements defined by licensing commitments, drawings, specifications, and other contract documents are reflected in the completed installation.	ОК
It is also a time to verify that field modifications and other changes made and controlled during installation activities have been incorporated in the "as-built" documents.	It is also a time to verify that field modifications and other changes made and controlled during installation activities have been incorporated in the as-built documents.	ОК
Controls shall be provided for the identification, documentation, and resolution of nonconformances disclosed by inspections or tests.	Controls shall be provided for the identification, documentation, and resolution of nonconformances disclosed by inspections or tests.	ОК
Tests shall be conducted on completed plant systems.	Tests shall be conducted on completed plant systems.	ОК
Test procedures shall identify prerequisites for system testing including required completed construc-	Test procedures shall identify prerequisites for system testing, including required completed con-	ОК

ANSI N45.2.8 - 1975	NQA-1 (1994) Subpart 2.8 (except where noted)	Comments (NOTE: OK signifies identical or
	(	nearly identical wording)
tion activities.	struction activities.	OK
describe any temporary or simulated	describe any temporary or simulated	
condition or equipment.	condition or equipment.	OK
documented notice shall be prepared	documented notice shall be prepared	ŬŔ.
and issued with approval of the	and issued with approval of the	
responsible organization stating the	responsible organization stating the	
Written verification shall also be	Written verification shall also be	ОК
provided that temporary installations	provided that temporary installations	
the permanent installations	nave been satisfactorily replaced by permanent installations	
Checks and inspections shall be	Checks and inspections shall be	ОК
performed to verify the operational	performed to verify the operational	
ponents and systems. These systems	ponents and systems. These	
or partial systems shall be identified,	systems or partial systems shall be	
tagged and released for operational	identified, tagged, and released for	
These checks and inspections shall be	These checks and inspections shall	ОК
performed to verify the following as a	be performed to verify the following,	
minimum:	as a minimum.	OK
sustained external physical damage.	not sustained external physical	
	damage.	
b. The installation has been made in accordance with specified	( <i>b)</i> The installation has been made in accordance with specified	Ŭĸ
requirements.	requirements.	
c. All nonconforming items have	(c) All nonconforming items have	ОК
d. Internal and external restrictions	(d) Internal and external restrictions	ОК
and obstructions to flow and full travel	and obstructions to flow and full	
have been removed.	travel have been removed.	OK
properly installed.	properly installed.	
f. Interfacing connections with	(f) Interfacing connections with	ОК
g. Original materials and component	(a) Original materials and	ОК
identification has been preserved with	component identification have been	
provisions for traceability throughout	preserved with provisions for trace-	
the installed systems.	systems.	
h. Safety features such as interlocks,	(h) Safety features such as	ОК
cable separation, guards, warning devices, and lockouts have been	interlocks, cable separations, guards, warning devices, and lockouts have	
installed, are being used and comply	been installed, are being used, and	
with applicable codes and regulations.	comply with applicable codes and	
i. Temporary connections such as	(i) Temporary connections, such as	ОК
jumpers and bypass lines and	jumpers and bypass lines, and	
temporary trip points of control equip-	temporary trip points of control	
that their final condition can be verified.	documented so that their final	
i. Ouestane unetan altaneiateu ia	condition can be verified.	
appropriate for operational testing.	appropriate for operational testing.	
k. External surface chemistry	(k) External surface chemistry	ОК
I. Permits and authorizations have	(I) Permits and authorizations have	ок
been obtained.	been obtained.	-
5.3 Preoperational Testing	5.2 Preoperational Testing	ОК
This testing involves the operation of	This testing involves the operation of	
all items in a system, partial systems	all items in a system(s) or partial	

ANSI N45.2.8 - 1975	NQA-1 (1994) Subpart 2.8	Comments
	(except where noted)	(NOTE: OK signifies identical or
		nearly identical wording)
or systems to assure that operation is	system(s) to assure that operation is in accordance with the design criteria	
and functional requirements. The	and functional requirements. The	
testing shall include, but not be limited	testing shall include, but not be	
to, the following:	limited to, the following:	
a. Systems integrity.	(a) systems integrity;	OK
D. In-line instrument installation is consistent with specified flow	( <i>b)</i> In-line instrument installation is consistent with specified flow	OK
directions.	directions;	
c. Sensing lines are phased	(c) sensing lines are phased	ОК
correctly to in-line elements and	correctly to in-line elements and	
sensors.	sensors; (d) service requirements for initial	OK
operation such as flow alignment.	operation such as flow alignments.	SK SK
limiting flow orificing and relief	limiting flow orificing, and relief	
devices have been performed.	devices have been performed;	
e. Operation of controls, valves,	(e) operation of controls, valves,	OK
limiting devices	devices:	
f. Rotating equipment (motors,	(f) rotating equipment (motors,	ОК
pumps, blowers)— rotation,	pumps, blowers), rotation, speed,	
speed, vibration, noise, and no-	vibration, noise, and no-load opera-	
a Handling equipment—load tests	$(\alpha)$ handling equipment (load tests of	OK
of cranes, hoists, conveyors,	cranes, hoists, conveyors, hooks,	
hooks, and handling adaptors,	handling adapters, and accessories);	
and accessories.		
h. Containment systems.	(h) containment systems;	OK
i. Fuel storage and handling	(i) fuel storage and handling	OK
systems.	systems;	
k. Reactor components handling	(k) reactor component handling	ОК
systems.	systems;	OK.
I. Instrument air systems.     m Eluid service systems	( <i>i</i> ) Instrument air systems; ( <i>m</i> ) fluid service systems:	OK OK
n. Waste effluent systems.	( <i>n</i> ) waste effluent systems;	OK
o. Auxiliary building systems.	(0) auxiliary building systems.	ОК
Where mechanical equipment and	Where mechanical equipment and	ОК
systems interface with, and their	systems interface with, and their	
mechanical equipment or systems the	mechanical equipment or systems	
test performed shall include verifying	the test performed shall include	
the compatibility of interfacing	verifying the compatibility of	
equipment and functions.	interfacing equipment and functions.	Outdate and Warding date and
inspections tests and procedures see		establish requirements
Section 6 of ANSI N18.7.		catabilari requirementa.
5.4 Cold Functional Tests	5.3 Cold Functional Tests	ОК
	These tests follow second statistics	
testing of individual systems including	testing of individual systems	
reactor coolant systems.	including reactor coolant systems.	
This testing shall be performed to	This testing shall be performed to	ОК
obtain operational data of equipment	obtain operational data of equipment	
with maximum allowable simultaneous	and maximum allowable	
equipment and final verification of	systems and equipment. the final	
functional performance of these	verification of functional performance	
systems.	of these systems.	21
5.3.1 Reactor Coolant System	5.3.1 Reactor Coolant System	UK
the reactor system type hydrostatic	reactor system type hydrostatic tests	
tests to verify conformance to specified	to verify conformance to specified	
requirements when performed on the	requirements, when performed on the	
reactor coolant system, shall include	reactor coolant system, shall include	

ANSI N45.2.8 - 1975	NQA-1 (1994) Subpart 2.8	Comments
	(except where noted)	(NOTE: OK signifies identical or
		nearly identical wording)
all or parts of connected systems	all or parts of connected systems	
pressure.	test pressure.	
The applicable test requirements are	The applicable test requirements are	ОК
contained in Section III of the Code.	contained in Section III of the ASME	
500 Free stienest and Flags Tasting	Boiler and Pressure Vessel Code.	014
5.3.2 Functional and Flow Testing.	5.3.2 Functional and Flow	ŬK
be tested to demonstrate cold	systems shall be tested to	
functional operability of individual	demonstrate cold	
components, subsystems and	functional operability of individual	
systems, and to demonstrate	components, subsystems, and	
compatibility with other systems.	systems, and to demonstrate	
These tests where appropriate shall	These tests where appropriate shall	ОК
demonstrate the following:	demonstrate the following:	
a. System pressure drop.	(a) system pressure drop	ОК
b. Flow rate.	(b) flow rate	OK
c Controls and throttling device	(c) controls and throttling device	OK
settings.	settings	
d. Function of interlocks, alarms and	(d) function of interlocks, alarms, and	ОК
automatic features.	automatic features	
e. Instrument calibration.	(e) instrument calibration	OK
f. Setting of meter blases.	(f) setting of meter blases	UR OK
g. Systems stability.	(g) system stability (b) adequacy of pipe and equipment	OK
support settings.	support settings	SK .
i. Heat runs on rotating equipment.	(i) heat runs on rotating equipment	ОК
j. Adequacy of ventilation, lubrication	(j) adequacy of ventilation,	OK
and cooling systems under sustained	lubrication, and cooling systems	
operating conditions.	under sustained operating conditions	014
k. Ability to meet water chemistry	(k) ability to meet water chemistry	ŬK
5.5 Hot Functional Tests	5.4 Hot Functional Tests	ОК
These tests are not applicable to BWR	I hese tests are not applicable to	
these plants use nuclear heat to	BWR and HTGR nuclear plants because these plants use nuclear	
produce the system temperatures.	heat to produce the system	
	temperatures.	
Hot functional tests for PWR plants	Hot functional tests for PWR plants	OK
follow cold functional tests and	follow cold function tests and	
simulate plant operating conditions at	simulate plant operating conditions at	
elevated temperatures and pressures.	pressures.	
All auxiliary and support systems	All auxiliary and support systems	ОК
exclusive of those required for pre-	exclusive of those required for	
criticality resting must be available for	precriticality testing must be available	
If any of these systems are not	If any of these systems is not	OK
available, the responsible organization	available, the responsible	
shall specifically authorize exclusion of	organization shall specifically	
these systems or subsystems from	authorize exclusion of these systems	
testing and document those	trom testing and document those	
These systems shall include the	These systems shall include the	ОК
following as a minimum:	following as a minimum:	
a. System pressure drop.	(a) system pressure drop	ОК
b. Flow rate.	(b) flow rate	ОК
c. Controls and throttling device	(c) controls and throttling device	ОК
d Function of interlocks alarms and	(d) function of interlocks alarms	ОК
automatic features.	and automatic features	
e. Instrument calibration.	(e) instrument calibration	ОК

ANSI N45.2.8 - 1975	NQA-1 (1994) Subpart 2.8	Comments
	(except where noted)	(NOTE: OK signifies identical or nearly identical wording)
f. Setting of meter biases.	(f) setting of meter biases	ОК
g. Systems stability.	(g) system stability	ОК
h. Adequacy of pipe and equipment support settings.	(h) adequacy of pipe and equipment support settings	ОК
i. Heat runs on rotating equipment.	(i) heat runs on rotating equipment	ОК
j. Verification of heat exchanger	(j) verification of heat exchanger	ОК
k Verification of boron control	(k) verification of boron control	OK
system performance.	system performance	SK .
I. Thermal insulation effectiveness.	(I) thermal insulation effectiveness	ОК
m. Set points of temperature,	(m) set points of temperature,	ОК
n System heatup tests	(n) system heatup tests	ОК
o. System cooldown tests.	(0) system cooldown tests	OK
p. Hot flow tests.	(p) hot flow tests	ОК
q. Setting protective devices.	(q) setting protective devices	ОК
r. Hot clearances.	(r) hot clearances	OK
s. Vibration measurement of major equipment and piping, as applicable.	<ul> <li>(s) vibration measurements of major equipment and piping, as applicable</li> </ul>	OK
6. DATA ANALYSIS AND EVALUATION	6 DATA ANALYSIS AND EVALUATION	ОК
Procedures shall be established for processing inspection and test data and their analysis, evaluation, and final acceptance	Procedures shall be established for processing inspection and test data and their analysis, evaluation, and final acceptance	
These procedures shall identify	These procedures shall identify	ОК
individuals or organizations	individuals or organizations	
responsible for the acquisition and	responsible for the acquisitions and	
and evaluation against acceptance	and evaluation against acceptance	
criteria, operating limits, and	criteria, operating limits, and	
performance standards.	performance standards.	
The data processing procedure should	The data processing procedure shall	OK
determine the validity of the inspection	determine the validity of the	
and test results, and the	inspection and test results and the	
appropriateness of continuing the	appropriateness of continuing the in-	
inspection or test.	spection or test.	
The data shall be analyzed and	The data shall be analyzed and eval-	OK
results achievement of inspection and	results achievement of inspection	
test objectives, and operational	and test objectives, and operational	
proficiency of equipment and systems;	proficiency of equipment and	
to identify additional inspection or test	systems; to identify additional	
requirements or both; and to identify	Inspection or test requirements or both: and to identify necessary	
inspection or test procedures.	changes to the installation inspection	
	or test procedures.	
Inspection and test results supported	Inspection and test results supported	ОК
by the inspection and test data,	by the inspection and test data,	
and evaluation, shall be provides as	and evaluation, shall be provided as	
specified in Section 7.	specified in Section 7.	
7. RECORDS	7 RECORDS	NQA-1 deleted the word "completed"
Record copies of completed	Record copies of procedures.	beiore procedures.
procedures; reports; required	reports, required qualification	No effect – a record is defined as
qualification records; test equipment	records, test equipment calibration	being properly completed and
calibration records; test deviation or	records, test deviation or exception	authenticated.
examination and check records shall	and check records shall be prepared	
be prepared.		

ANSIN	N45.2.8 - 1975	NQA-1 (1994) Subpart 2.8 (except where noted)	Comments (NOTE: OK signifies identical or nearly identical wording)
These shall be project records standard, speci procedures.	placed with other as required by code, fication or project	These records shall be retained with other project records as required by code, standard, specification, or project procedures.	N45.2.8 uses word "placed" whereas NQA-1 uses word "retained". Same intent and effect.
Collection, stora quality assuran accordance wit N459.	age and maintenance of ce records shall be in h ANSI		Guidance only. Wording does not establish requirements. BR 17 "Quality Assurance Records"
8. REVISION NATIONA REFERRE DOCUME	N OF AMERICAN IL STANDARDS ED TO IN THIS NT		QATR A.7.3
When the follow to in this docum a revision approved National Standa sion is not man incorporated as	ving standards referred nent are superseded by oved by the American ards Institute, the revi- datory until it has been a part of this standard.		
Revisions of the and revisions to after the date o invoking this sta mutual consent the supplier.	e referenced standards, o this standard issued f a specific contract andard may be used by t of the purchaser and		
N18.7-1972	Administrative Controls for Nuclear Power Plants		
<i>N45</i> .2-1971	Quality Assurance Program Require- ments for Nuclear Power Plants		
N45.2.1 -1973	Cleaning of Fluid Systems and Asso- ciated Components During the Con- struction Phase of Nuclear Power Plants		
N45.2.2-1972	Packaging, Shipping, Receiving, Storage and Handling of Items for Nuclear Power Plants (During the Construction Phase)		
N45.2.3-1973	Housekeeping During the Construction Phase of Nuclear Power Plants		
N45.2-6-1973	Qualifications of Inspection, Exami- nation and Testing Personnel for the Construction Phase of Nuclear Power Plants		

ANSI N45.2.8 - 1975		NQA-1 (1994) Subpart 2.8 (except where noted)	Comments (NOTE: OK signifies identical or nearly identical wording)
N45.2.9-1974	Requirements for Collection, Storage and Maintenance of Quality Assurance Records for Nuclear Power Plants		
N45.2.10-1973	Quality Assurance Terms and Definitions		