

ENCLOSURE 4

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

**TABLE COMPARING ANSI N18.7-1976
TO
ASME NQA-1-1994 AND THE NMC QATR**

77 Pages Follow

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<p>1. Scope</p> <p>This Standard provides requirements and recommendations for an administrative controls and quality assurance program necessary to provide assurance that operational phase activities at nuclear power plants are carried out without undue risk to the health and safety of the public. The requirements of this Standard apply to all activities affecting the safety-related functions of nuclear power plant structures, systems, and components.</p>		<p>Policy Statement "Nuclear Management Company, LLC (NMC) shall maintain and operate nuclear plants in a manner that will ensure the health and safety of the public and workers. Facilities shall be operated in compliance with the requirements of the Code of Federal Regulations, the applicable Nuclear Regulatory Commission (NRC) Facility Operating Licenses, and applicable laws and regulations of the state and local governments.</p> <p>The NMC Quality Assurance Program (QAP) described herein and associated implementing documents provide for the control of NMC activities that affect the quality of safety related nuclear plant structures, systems, and components. The QAP is also applied to certain equipment and activities that are not safety-related, but support safe plant operations, or where other non-CFR NRC guidance establishes program requirements."</p>	
<p>It is not intended to apply to test, mobile and experimental reactors nor reactors not subject to US Nuclear Regulatory Commission licensing. However, applicable sections of this Standard should be used as they apply to related activities. Activities included are: design changes, purchasing, fabricating, handling, shipping, storing, cleaning, erecting, installing, inspecting, testing, operating, maintaining, repairing, refueling and modifying.</p>		<p>A.1 Methodology "The QAP applies to activities affecting the performance of safety-related structures, systems and components, including, but not limited to: design, procurement, fabrication, installation, modification, maintenance, repair, refueling, operation, training, inspection, and tests."</p>	
<p>It is recommended that the administrative controls and quality assurance provisions of this Standard be applied to other important plant equipment at a level commensurate with the importance of the</p>		<p>A.1 Methodology "It is NMC's policy to assure a high degree of availability and reliability of its nuclear plants while ensuring the health and safety of the public and workers. To this</p>	

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equipment to reliable and efficient plant operation. However, it is emphasized that this Standard is directed primarily toward administrative controls and quality assurance associated with safety-related activities, equipment and procedures.		end, selected elements of the Quality Assurance Program are also applied to certain equipment and activities that are not safety related, but support safe and reliable plant operations, or where other non-CFR NRC guidance establishes program requirements."	
This Standard incorporates criteria that permit a degree of flexibility, since administrative practices vary among organizations operating nuclear power plants.			This is a comment on the format of the standard. It establishes no requirements.
The Nuclear Regulatory Commission (NRC) promulgates regulations applicable to many aspects of the design, construction and operation of nuclear power reactors. This Standard contains criteria for administrative controls and quality assurance for nuclear power plants during the operational phase of plant life. This phase is generally considered to commence with initial fuel loading, except for certain preoperational activities. Certain operating activities may commence prior to fuel loading and certain initial construction activities may extend past fuel loading. Owner organizations should identify clearly those activities that fall in these overlapping time periods and should specify whether the activities are to be considered as operational or as construction activities.			This is a comment on the format of the standard and the necessity to differentiate between construction and operation. It establishes no requirement.
This Standard is intended to be consistent with applicable criteria for quality assurance, including those given in Title 10 Code of Federal Regulations, Part 50, "Licensing of Production and Utilization Facilities," Appendix B. [1]' This Standard fully and completely describes, the general requirements and guidelines of American National Standard Quality Assurance Program Utilization Facilities," Appendix B. [1]' guidelines of American National Standard Quality Assurance Program Requirements for	NQA-1 was developed based on ANSI N45.2.	Introduction "The NMC Quality Assurance Topical Report describes the methods and establishes quality assurance program and administrative requirements that meet 10CFR50, Appendix B and apply during the operational phase of plant life."	

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Nuclear Power Plants, N45.2-1971, [2] as those requirements and guidelines apply during the operational phase of plant life.			
2. Definitions			
2.1 Limitations The definitions given below are applicable specifically to this Standard. Other terms and their definitions are contained in American National Standard, Quality Assurance Terms and Definitions, N45.2.10 [3].	Introduction Section 4 "Terms and Definitions" states "the following definitions are provided to assure a uniform understanding of select terms as they are used in this Part." N45.2.10 has been rescinded and replaced by NQA-1.		
2.2 Glossary of Terms The following terms are defined: *administrative controls *audit. A formal, independent examination with intent to verify conformance with established requirements *emergency procedures *experiments *independent review *inspection. Examination, observation, or measurement to determine the conformance of materials, supplies, components, parts, appurtenances, systems, personnel performance, procedures, processes or structures to predetermined requirements. *maintenance and modification procedures *nuclear power plant	Introduction Section 4 "Terms and Definitions" (no definition provided) *audit. A planned and documented activity performed to determine by investigation, examination, or evaluation of objective evidence the adequacy of and compliance with established procedures, instructions, drawings, and other applicable documents, and the effectiveness of implementation. An audit should not be confused with surveillance or inspection activities performed for the sole purpose of process control or product acceptance. (no definition provided) (no definition provided) (no definition provided) inspection – examination or measurement to verify whether an item or activity conforms to specified requirements. (no definition provided) (no definition provided)	QATR, Appendix C contains definitions found in N18.7 but not found in NQA-1. With NQA-1 and the QATR, all important terms found in N18.7 are addressed	

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*off-normal condition procedures	(no definition provided)		
*on-site operating organization	(no definition provided)		
*operating activities	(no definition provided)		
*operating procedures	(no definition provided)		
*operational phase	(no definition provided)		
*owner organization. The organization, including the onsite operation organization, which has overall legal, financial and technical responsibility for the operation of one or more nuclear power plants.	*owner – the person, group, company, agency, or corporation, who has or will have title to the nuclear power plant.		
*quality assurance. All those planned and systematic actions necessary to provide assurance that a structure, system, or component will perform satisfactorily in service. It applies to all activities associated with doing a job correctly as well as verifying and documenting the satisfactory completion of the work.	*quality assurance – all those planned and systematic actions necessary to provide adequate confidence that a structure, system, or component will perform satisfactorily in service.		
*review	(no definition provided)		
*shall, should, and may. The word "shall" is used to denote a requirement; the word "should" to denote a recommendation; and the word "may," to denote permission, neither a requirement nor a recommendation.	shall, should – the word should denotes a guideline (a suggested practice that is not mandatory in programs intended to comply with a standard). The word shall denotes a requirement.		
*supervision	(no definition provided)		
*surveillance testing. Periodic testing to verify that safety-related structures, systems, and components continue to function or are in a state of readiness to perform their functions.	*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.		
*system	(no definition provided)		
*testing. Performance of those steps necessary to determine that systems or components function in accordance with	testing – an element of verification for the determination of the capability of an item to meet specified requirements by		

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predetermined specifications.	subjecting the item to a set of physical, chemical, environmental, or operating conditions.		
3. Owner Organization			
3.1 General The owner organization shall establish an administrative controls and quality assurance program which complies with this Standard. The program shall be in effect at all times during the operational phase to assure that operational phase activities are carried out without undue risk to the health and safety of the public. The program shall require that decisions affecting safety are made at the proper level of responsibility and with the necessary technical advice and review. The owner organization may delegate to other organizations the work of-establishing and executing the administrative controls and quality assurance program or any parts thereof, in accordance with this Standard, but shall retain responsibility therefore.		Policy Statement "Nuclear Management Company, LLC (NMC) shall maintain and operate nuclear plants in a manner that will ensure the health and safety of the public and workers. Facilities shall be operated in compliance with the requirements of the Code of Federal Regulations, the applicable Nuclear Regulatory Commission (NRC) Facility Operating Licenses, and applicable laws and regulations of the state and local governments. A.3 Responsibility "NMC retains and exercises the responsibility for the scope and implementation of an effective QAP. Positions identified in A.2 may delegate all or part of the activities of planning, establishing, and implementing the program for which they are responsible to others, but retain the responsibility for the program's effectiveness. Decisions affecting safety are made at the level appropriate for its nature and effect, and with any necessary technical advice or review."	
3.2 Assignment of Authority and Responsibility [It is essential that all members of the organization involved in operation of nuclear power plants, including those at the highest management levels, recognize the necessity that the plants be operated under a well formulated and detailed administrative controls and quality assurance program to assure safety and efficiency.] Lines of authority, responsibility and	Basic Requirement 1 "Organization" states "The organizational structure, functional responsibilities, levels of authority, and lines of communication for activities affecting quality shall be documented."	A.2 Organization "This section describes the NMC organizational structure, functional responsibilities, levels of authority and interfaces for establishing, executing, and verifying QAP implementation. The organizational structure includes corporate functions and onsite functions at each plant. ...Implementing documents assign more specific responsibilities and duties, and define the organizational interfaces involved in conducting activities and duties within the scope of this QATR."	N18.7 wording in brackets are included in this table for completeness; they do not establish requirements that either NQA-1 or the NMC QATR would need to address.

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communication shall be established from the highest management level through intermediate levels and including the onsite operating organization (including those offsite organizational units assigned responsibility for procurement, design and construction, quality assurance, and technical support activities). These relationships shall be documented and updated, as appropriate, in the form of organizational charts, functional descriptions of departmental responsibilities and relationships and job descriptions for key personnel positions or in equivalent forms of documentation.			
The owner organization shall specify in writing the authority and responsibility assigned to individuals and organizations involved in establishing, executing and measuring the overall, effectiveness of the administrative controls and quality assurance program required by this Standard.		A.2 Organization "This section describes the NMC organizational structure, functional responsibilities, levels of authority and interfaces for establishing, executing, and verifying QAP implementation. The organizational structure includes corporate functions and onsite functions at each plant. ...Implementing documents assign more specific responsibilities and duties, and define the organizational interfaces involved in conducting activities and duties within the scope of this QATR."	
Persons or organizations performing functions of assuring that the administrative controls and quality assurance program is established and implemented or of assuring that an activity has been correctly performed shall have sufficient authority and organizational freedom to: identify quality problems; initiate, recommend or provide solutions, through designated channels; and verify implementation of solutions.	Basic Requirement 1 "The organization structure, functional responsibilities, levels of authority, and lines of communication for activities affecting quality shall be documented. Persons or organizations responsible for assuring that an appropriate quality assurance program have been established and verifying that activities affecting quality have been correctly performed shall have sufficient authority, access to work areas, and organizational freedom to: (a) identify quality problems; (b) initiate, recommend, or provide solutions to quality problems		

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	through designated channels; (c) verify implementation of solutions;"		
<p>The organizational structure and the functional responsibility assignments shall be such that:</p> <p>(1) Attainment of program objectives is accomplished by those who have been assigned responsibility for performing work. [This may include interim examinations, checks, and inspections of the work by the individual performing the work.]</p> <p>(2) Verification of conformance to established program requirements is accomplished by a qualified person who does not have responsibility for performing or directly supervising the work. The method and extent of such verification shall be commensurate with the importance of the activity to plant safety and reliability.</p>		<p>B.1 Methodology "Personnel who work directly or indirectly for NMC are responsible for the achievement of acceptable quality in the work covered by this QATR."</p> <p>A.2 Organization "Personnel executing performance activities and those performing verification activities are functionally independent to the degree commensurate with the activity's relative importance to safety. The method and extent of verification is commensurate with importance of the activity to plant safety and reliability."</p> <p>A.5 Personnel Training and Qualification "Personnel assigned to implement elements of the QAP must be capable of performing their assigned tasks. To this end, NMC establishes and maintains formal indoctrination and training programs for personnel performing, verifying or managing activities within the scope of the QAP to assure that suitable proficiency is achieved and maintained."</p>	
<p>[In structuring the organization and assigning responsibility, quality assurance should be recognized as an interdisciplinary function involving many organizational components and, therefore, should not be regarded as the sole domain of a single quality assurance group. For example, it may be more appropriate for nuclear engineers to perform reviews of plant nuclear engineering activities rather than quality assurance engineers because of the special competence required to perform these reviews. Quality assurance encompasses many functions and activities and</p>			<p>N18.7 wording in brackets are included for completeness; they do not establish requirements that either NQA-1 or the NMC QATR would need to address.</p>

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extends to various levels in all participating organizations, from the top executive to all workers whose activities may influence quality.]			
3.3 Indoctrination and Training. Provisions shall be made for indoctrination and training of those personnel in the owner organization performing activities affecting quality to assure that suitable proficiency is achieved and maintained.		A.5 "Personnel Training and Qualification" states "Personnel assigned to implement elements of the QAP must be capable of performing their assigned tasks. To this end NMC establishes and maintains formal indoctrination and training programs for personnel performing, verifying or managing activities within the scope of the QAP to assure that suitable proficiency is achieved and maintained."	
Such personnel also shall be provided training concerning the administrative controls and quality assurance program which, as a minimum, shall include the following areas: overall company policies, procedures, or instruction which establish the program; procedures or instructions which implement the program related to the specific job-related activity.	NQA-1 Supplement 2S-4 Section 3 states "Personnel shall be indoctrinated in the following subjects as they relate to a particular function: (a) general criteria, including applicable codes, standards, and company procedures; (b) applicable quality assurance elements; and (c) job responsibilities and authority."	A.5 "Personnel Training and Qualification" states "Indoctrination includes the administrative and technical objectives, requirements of the applicable codes and standards, and the QAP elements to be employed.	
3.4 Onsite Operating Organization 3.4.1 General [A number of factors influence management in its decision regarding the establishment of an onsite operating organization. These include the owner organization's established staffing policies, the physical size and complexity of the nuclear power plant, the number of units, the extent of assistance provided by offsite technical support organizations, the extent of reliance on consultants and the availability of qualified personnel from other sources to assist in activities, such as initial start-up, refueling, maintenance or modification work. A nuclear power plant onsite operating			N18.7 wording in brackets are included in this table for completeness; they do not establish requirements that either NQA-1 or the NMC QATR would need to address.

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organization may change with time. For example, the number and qualifications of personnel making up the onsite technical support-staff can generally be reduced as a plant progresses through initial operation to operational maturity.] Management shall give careful consideration to the timing and extent of such changes.		A.2 "Management gives careful consideration to the timing, extent and effects of organizational structure changes."	
3.4.2 Requirements for the Onsite Operating Organization The onsite Operating organization shall include one or more individuals knowledgeable in the following fields: nuclear power plant operation; nuclear power plant, mechanical, electrical and electronic systems; nuclear engineering; chemistry and radiochemistry; radiation protection; and quality assurance.		A2.2 "The on-site operating organization includes one or more individuals knowledgeable in the following fields: nuclear power plant operation; nuclear power plant mechanical, electrical and electronic systems; nuclear engineering; chemistry and radiochemistry; radiation protection; and quality assurance."	
Initial incumbents or replacements for members of the onsite operating organization and offsite technical support organizations shall have appropriate experience, training and retraining to assure that necessary competence is maintained in accordance with the provisions of American National Standard for Selection and Training of Nuclear Power Plant Personnel, N18.1-1971.		A.5 "Personnel assigned to implement elements of the QAP must be capable of performing their assigned tasks. To this end NMC establishes and maintains formal indoctrination and training programs...When required by code, regulation, or standard, specific qualification and selection of personnel is conducted in accordance with those requirements..." (see also A.7.3)	
Personnel whose qualifications do not meet those specified in N18.1 and who are performing inspection, examination, and testing activities during the operations phase of the plant, including preoperational and start-up testing shall be qualified to American National Standard Qualifications of Inspection, Examination, and Testing Personnel for the Construction Phase of Nuclear Power Plants, N45.2.6-1973 [5], except that the QA experience cited for Levels I, II, and III' should be	N45.2.6 = NQA-1, BR 2, Supplements 2S1, 2S-2 and NmA 2A-1	A.5 commits to NQA-1, Supplements 2S-1, and 2S-2 for qualification of inspection, examination or test personnel (with exceptions).	

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interpreted to mean actual experience in carrying out the types of inspection, examination, or testing activity being performed.			
The owner organization shall designate those positions in the onsite operating organization which shall be filled by personnel holding NRC reactor operator and senior reactor operator licenses. Requirements for the minimum number of personnel holding such licenses who shall be present at the plant under various operating conditions and situations shall also be specified.		NA	Designation of the cited positions in site procedures complies with 10CFR50 and plant Technical Specification requirements that establish license-holder requirements and minimum staffing. Since these requirements are explicit and supersede N18.7 statements, they are not included in the QATR.
The Plant Manager shall have overall responsibility for the execution of the administrative controls and quality assurance program at the plant to assure safety. An individual or organizational unit knowledgeable and experienced in nuclear power plant operational phase activities and quality assurance practices shall be designated and assigned the responsibility to verify that the program is being effectively implemented.		<p>A.2.2 "Site Organization" states (Site Vice President) "This position...is responsible for overall plant nuclear safety and the implementation of the QAP."</p> <p>C.3 "NMC has established a program of planned and periodic performance-based independent assessments to monitor overall performance and confirm that activities affecting quality comply with the QAP and that the QAP is effectively implemented. The organization performing independent assessment (Nuclear Oversight) is technically and performance oriented..."</p>	The QATR states that the Site Vice President has overall responsibility. This reflects the differences in responsibility that have developed since N18.7 was developed.
[Depending on the organizational structure, the individual or organizational unit may report functionally to onsite plant management or an offsite organization (see also 3.2). Reporting to onsite plant management is preferable since such an arrangement usually results in improved communications in identifying problems and initiating corrective action.]			N18.7 wording in brackets are included in this table for completeness; they do not establish requirements that either NQA-1 or the NMC QATR would need to address.
[The individual or organizational unit in this case may receive technical guidance from offsite support groups.] This individual's or organizational unit's duties and responsibilities shall be		<p>A.2 "Management positions are established both offsite and onsite for carrying out the independent assessment functions. Individuals filling these positions :</p> <ul style="list-style-type: none"> ▪ Have no 	

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such that the required attention can be devoted, as required, to verifying that the program is being effectively executed.		unrelated duties or responsibilities that would preclude full attention to assigned responsibilities."	
The individual or organizational unit shall report on the effectiveness of the program to the Plant Manager and to other cognizant management as may be designated. Their activities shall be periodically audited by designated offsite personnel.		C.3 "Independent assessment results are documented and reviewed by Nuclear Oversight management and by management having responsibility for the area assessed. In addition, Nuclear Oversight activities are periodically assessed for effectiveness..."	
4. Reviews and Audits			
4.1 General Programs for reviews and for audits of activities affecting plant safety during the operational phase shall be established by the owner organization to: (1) Verify that these activities are performed in conformance with this Standard and with company policy and rules, approved operating procedures and license provisions (2) Review significant proposed plant changes, tests and procedures (3) Verify that reportable events, which require reporting to NRC in writing within 24 hours, are promptly investigated and corrected in a manner (4) Detect trends which may not be apparent to a day-to-day observer.		C.1 "Assessment" states "NMC establishes programs for reviews and assessments to verify that activities covered by this QATR are performed in conformance with the requirements established, review significant proposed plant changes, tests and procedures, verify that reportable events are promptly investigated and corrected, and detect trends which may not be apparent to the day-to-day observer."	At the time N18.7 was written, NRC reporting requirements included reporting in writing within 24 hours the occurrence of certain events. These requirements have been changed several times (10CFR50.72 and 50.73) such that reference to "reportable events" is sufficient to establish the necessary requirement.
These programs for reviews and audits shall, themselves, be periodically reviewed for effectiveness by management of the owner organization. [The programs provided for reviews and for audits may take different forms. For example, the owner organization may assign these functions to separate established organizational units independent of the onsite operating organization or may appoint a standing committee-comprised of individuals from within or outside the owner organization to		C.1 "These programs are, themselves, reviewed for effectiveness as part of the overall assessment process, as described herein."	N18.7 wording in brackets are included in this table for completeness; they do not establish requirements that either NQA-1 or the NMC QATR would need to address.

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perform reviews and to exercise overview of audits.]			
[Historically, a committee approach was used to provide both review and audit capability for early commercial nuclear power plants. This approach was employed to make the most efficient use of personnel with pertinent experience and qualifications. In the ensuing period, the availability of competent personnel has significantly increased as the nuclear power industry has expanded and the sources of trained manpower have responded to the resulting demand. This growing pool of talent in the aggregate, is sufficient to encourage alternative approaches to the review and audit committees commonly-used in the past.]			N18.7 wording in brackets are included in this table for completeness; they do not establish requirements that either NQA-1 or the NMC QATR would need to address.
[In general the time required of individuals serving as members of independent review groups is a function of the number of nuclear power plants an owner organization has in operation.]			N18.7 wording in brackets are included in this table for completeness; they do not establish requirements that either NQA-1 or the NMC QATR would need to address.
[For this reason, owner organizations contemplating rapid growth and an expanding commitment to nuclear power should regard the use of committees to meet the independent review functions as an interim approach for effective utilization of available technical expertise. In addition, such owner organizations should include in their expansion planning provisions for early establishment of organizational units to provide independent review, for recruitment of staff, and for an orderly transition to such an organizational structure in the event a committee approach has been used previously to meet the independent review function.]			N18.7 wording in brackets are included in this table for completeness; they do not establish requirements that either NQA-1 or the NMC QATR would need to address.
An independent offsite organizational unit may be assigned review responsibilities including		NMC does not use an independent offsite organization. Reviews are as specified in the QATR.	The submittal letter for the QATR provides the basis for NMC's position regarding

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responsibility for reviewing audit reports provided by onsite staff members, or both functions may be assigned to an organizational unit that is independent of line responsibility for operating activities.			offsite/independent review.
[This Standard does not specify an organizational structure for meeting the review and audit functions, but in lieu thereof delineates essential elements of satisfactorily comprehensive programs for review and for audit in the manner best suited to the owner organization involved.]			N18.7 wording in brackets are included in this table for completeness; they do not establish requirements that either NQA-1 or the NMC QATR would need to address.
4.2 Program Description Written programs for both audits and independent reviews shall be prepared that contain: (1) Subjects to be audited and independently reviewed.		C.3 "Independent Assessment" states "Planning for independent assessments identifies the characteristics and activities to be assessed and the relevant performance and/or acceptance criteria." NMC does not use an independent review function. Reviews are as specified in the QATR.	The submittal letter for the QATR provides the basis for NMC's position regarding offsite/independent review.
(2) Responsibility and authority of those supervising audits and conducting independent review. These responsibilities shall include the identification of problems and the verification of corrective action. [Additional responsibilities may include recommendations to appropriate management of solutions to problems and the approval or disapproval of contemplated actions.]	Basic Requirement 1 "Organization" states "Persons or organizations responsible for assuring that an appropriate quality assurance program has been established and verifying that activities affecting quality have been correctly performed shall have sufficient authority, access to work areas, and organizational freedom to: (a) identify quality problems; (b) initiate, recommend, or provide solutions to quality problems through designated channels; (c) verify implementation of solutions..."	NMC does not use an independent review function. Reviews are as specified in the QATR.	N18.7 wording in brackets are included in this table for completeness; they do not establish requirements that either NQA-1 or the NMC QATR would need to address. The submittal letter for the QATR provides the basis for NMC's position regarding offsite/independent review.
(3) Mechanisms for initiating audit and independent review activities.		C.3 establishes when independent assessments should be done.	
(4) Provisions for the use of specialists or subgroups.	Supplement 2S-3 "Supplementary Requirements for the Qualification of Quality Assurance Program Audit	C.3 "NMC assessment resources may be supplemented with technical specialists as needed."	

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	Personnel" Section 2.1 states "The responsible auditing organization shall establish the audit personnel qualifications and the requirements for the use of technical specialists to accomplish the auditing..."		
(5) Authority to obtain access to the nuclear power plant operating records and operating personnel to perform audits and independent reviews.		A.2 "Individuals filling these positions: ▪ Have sufficient authority..., including authority to obtain access to records and personnel as needed to perform assessments."	
(6) Requirements for distribution of reports and other records to appropriate staff members and managers in the owner organization.		C.3 "Independent Assessment" states "Results of independent assessments are reported in an understandable form and in a timely fashion to a level of management having the authority to effect corrective action."	
(7) Identification of the management position (or positions, if auditors and reviewers have different reporting chains) to which auditors and independent reviewers report.		A.2.1.2.b "Vice President Nuclear Assessment Programs" states "This position...is responsible for...managing independent assessment..."	
(8) Provisions for assuring that personnel responsible for audit and independent review are kept informed on a timely basis of matters within their scope of responsibility.		C.1 "Methodology" states "Persons responsible for carrying out these assessments are cognizant of day-to-day activities such that they can act in a management advisory function with respect to the scope of the assessment."	
(9) Provisions for follow-up action, including re-audit of deficient areas where indicated.		C.3 "Independent Assessment" states "Nuclear Oversight conducts timely follow-up action, including re-assessment of deficient areas, as necessary to establish adequacy of corrective actions."	
(10) Other provisions required for effective audits and independent reviews.		Section C provides the necessary provisions for effective assessments.	
4.3 Independent Review Program. Activities occurring during the operational phase shall be independently reviewed on a periodic basis. [The		NMC does not use an independent review function. Reviews are as specified in the QATR.	The submittal letter for the QATR provides the basis for NMC's position regarding offsite/ independent review. The bracketed wording is

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<p>independent review program shall be functional prior to initial core loading.]</p> <p>4.3.1 Personnel. Personnel assigned responsibility for independent reviews shall be specified in both number and technical disciplines, and shall collectively have the experience and competence required to review problems in the following areas:</p> <ul style="list-style-type: none"> (1) Nuclear power plant operations (2) Nuclear engineering (3) Chemistry and radiochemistry (4) Metallurgy (5) Nondestructive testing (6) Instrumentation and control (7) Radiological safety (8) Mechanical and electrical engineering, (9) Administrative controls and quality assurance practices (10) Other appropriate fields associated with the unique characteristics of the nuclear power plant involved 			not applicable for plants already in operation.
<p>[An individual may possess competence in more than one specialty area.] If sufficient expertise is not available from within the owner organization, independent reviews shall be supplemented through outside consultants or organizations. Provisions shall assure that appropriate expertise is brought to bear in reviews of operational phase activities.</p>		NMC does not use an independent review function. Reviews are as specified in the QATR.	<p>The submittal letter for the QATR provides the basis for NMC's position regarding offsite/ independent review.</p> <p>N18.7 wording in brackets are included in this table for completeness; they do not establish requirements that either NQA-1 or the NMC QATR would need to address.</p>
<p>4.3.2 Standing Committees Functioning as Independent Review Bodies</p> <p>4.3.2.1 Committee Composition</p> <p>When a standing committee is responsible for the independent review program, it shall be composed of no less than five persons, of whom no more than a minority are</p>		NMC does not use an independent offsite committee. Reviews are as specified in the QATR.	<p>The submittal letter for the QATR provides the basis for NMC's position regarding offsite/ independent review.</p>

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members of the onsite operating organization. Competent alternates are permitted if designated in advance. The use of alternates shall be restricted to legitimate absences of principals.			
4.3.2.2 Meeting Frequency Formal meetings of personnel assigned to a standing committee functioning, as an independent review group shall be scheduled as needed. During the period of initial operation such meetings should be held no less frequently than once per calendar quarter. Subsequently, the meeting frequency shall not be less than twice a year.		NMC does not use an independent offsite committee. Reviews are as specified in the QATR.	The submittal letter for the QATR provides the basis for NMC's position regarding offsite/ independent review.
4.3.2.3 Quorum A quorum for formal meetings of the committee held under the provisions of 4.3.2.2 shall consist of not less than a majority of the principals, or duly appointed alternates, and shall be subject to the following constraints: the chairman (or his duly appointed alternate) shall be present for all formal meetings; and no more than a minority of the quorum shall have line responsibility for operation of the plant.		NMC does not use an independent offsite committee. Reviews are as specified in the QATR.	The submittal letter for the QATR provides the basis for NMC's position regarding offsite/ independent review.
4.3.2.4 Meeting Records Minutes of all meetings of the committee shall be prepared and retained. All documentary material reviewed should be identified. Decisions and recommendations made by the committee shall be documented. Meeting minutes shall be disseminated promptly to appropriate members of management having responsibility in the area reviewed. (See also Section 6.2A2)		NMC does not use an independent offsite committee. Reviews are as specified in the QATR.	The submittal letter for the QATR provides the basis for NMC's position regarding offsite/ independent review.
4.3.3 Organizational Units Functioning as Independent Review Bodies. An organizational unit		NMC does not use an organizational unit for reviews. Reviews are as specified in the QATR.	The submittal letter for the QATR provides the basis for NMC's position regarding offsite/ independent review.

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assigned primary responsibility for review of operational phase activities shall report to a designated management representative who is assigned authority and responsibility for effective functioning of the unit and who is not immediately responsible for the performance of the activities to be reviewed. The supervisor of such an organizational unit should schedule periodic formal meetings of his staff, or of appropriate subparts thereof, for the purpose of fostering interaction in reviews of specific operational phase activities.			
4.3.3.1 Documentation of Reviews. Written records of reviews shall be prepared and retained. All documentary material reviewed should be identified. Results of reviews conducted by the unit including recommendations and proposed actions shall be subject to approval of the supervisor of the unit, and shall be disseminated promptly to appropriate members of management having responsibility in the area reviewed. (See also Section 5.2.12.)		NMC does not use an independent review function. Reviews are as specified in the QATR.	The submittal letter for the QATR provides the basis for NMC's position regarding offsite/ independent review.
4.3.4 Subjects Requiring Independent Review. The following subjects shall be reviewed by the independent review body: (1) Written safety evaluations of changes in the facility as described in the Safety Analysis Report, changes in procedures as described in the Safety Analysis Report and tests or experiments not described in the Safety Analysis Report which are completed without prior NRC approval under the provisions of 10 CFR 50.59(a)(1). [1] This review is to verify that such changes, tests or experiments did not involve a change in the technical specifications or an unreviewed safety question		NMC does not use an independent review function. Reviews are as specified in the QATR.	The submittal letter for the QATR provides the basis for NMC's position regarding offsite/ independent review.

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<p>as defined in 10 CFR 50.59(a)(2). (1)</p> <p>(2) Proposed changes in procedures, proposed changes in the facility, or proposed tests or experiments, any of which involves a change in the technical specifications or an unreviewed safety question as defined in 10 CFR 50.59(c) [1] Matters of this kind shall be referred to the independent review body by the onsite operating organization (see 4.4) following its review, or by other functional organizational units within the owner organization, prior to implementation.</p> <p>(3) Changes in the technical specifications or license amendments relating to nuclear safety prior to implementation, except in those cases where the change is identical to a previously reviewed proposed change.</p> <p>NOTE: Regulatory Guide 1.33 states "It should be noted that proposed changes to technical specifications or license amendments should be reviewed by the independent review body prior to their submittal to the Commission for approval."</p> <p>(4) Violations, deviations and reportable events, which require reporting to the NRC in writing within 24 hours, such as:</p> <p>(a) Violations of applicable codes, regulations, orders, technical specifications, license requirements or internal procedures or instructions having safety significance</p> <p>(b) Significant operating abnormalities or deviations from normal or expected performance of plant safety-related structures systems, or components</p> <p>(c) Reportable events, which require reporting to the NRC in writing within 24hours,</p> <p>Review of events covered under this subsection shall include the results of any</p>			

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<p>investigations made and the recommendations resulting from such investigations to prevent or reduce the probability of recurrence of the event.</p> <p>(5) Any other matter involving safe operation of the nuclear power plant which an independent reviewer deems appropriate for consideration, or which is referred to the independent reviewers by the onsite operating organization or by other functional organizational units within the owner organization.</p>			
<p>4.4 Review Activities of the Onsite Operating Organization.</p> <p>The onsite operating organization shall provide, as part of the normal duties of plant supervisory personnel, timely and continuing monitoring of operating activities to assist the Plant Manager in keeping abreast of general plant conditions and to verify that the day-to-day operating activities are conducted safely and in accordance with applicable administrative controls. [These continuing monitoring activities are considered to be an integral part of the routine supervisory function and are important to the safety of plant operation.] The onsite operating organization shall perform reviews periodically and as situations demand, to evaluate plant operations and to plan future activities. The important elements of the reviews should be documented. Such reviews serve a useful purpose but shall not take the place of the reviews and audits described in Sections 4.3 and 4.5, respectively. The onsite operating organization should screen subjects of potential concern to independent reviewers and perform preliminary investigations</p>		<p>A.3 "Managers and supervisors are responsible for timely and continuing monitoring of performance to verify that day-to-day activities are conducted safely and in accordance with applicable requirements."</p> <p>Appendix A, Plant Operating Review Committee, provides for periodic reviews by the plant operating organization with requirements for subjects to be reviewed, for appropriate documentation, and for discretionary reviews as requested by plant management.</p>	<p>The Plant Operating Review Committee is not responsible for planning future activities of the plant as a whole, but may review future plans for impact on plant operations and safety, such as review of refueling outage schedules.</p>

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<p>(see 4.3.4). The Plant Manager, in carrying out his responsibility for overall safety of plant operations, shall be responsible for timely referral of appropriate matters to management and independent reviewers.</p> <p>NOTE: Regulatory Guide 1.33 replaces a number of "should" statements with "shall". These are in Section 4.4, 5.2.3, 5.2.4, 5.2.7.1, 5.2.13.4, 5.2.19(2), 5.2.19.1, 5.3.2, 5.3.9, 5.3.9.1. These have been replaced in the first column text and have been indicated in bold.</p>			
<p>4.5 Audit Program. A comprehensive system of planned and documented audits shall be carried out to verify compliance with all aspects of the administrative controls and quality assurance program. Audits of selected aspects of operational phase activities shall be performed with a frequency commensurate with their safety significance and in such a manner as to assure that an audit of 'all safety-related functions is completed within a period of two years.</p> <p>NOTE: Regulatory Guide 1.33 amplifies the above requirement "the following program elements should be audited at the indicated frequencies:</p> <ol style="list-style-type: none"> The results of actions taken to correct deficiencies that affect nuclear safety and occur in facility equipment, structures, systems, or method of operation – at least once per 6 months. The conformance of facility operation to provisions contained within the technical specifications and applicable license conditions – at least once per 12 months. The performance, training, and qualifications of the 		<p>C.3 " NMC has established a program of planned and periodic performance-based independent assessments to monitor overall performance and confirm that activities affecting quality comply with the QAP and that the QAP is effectively implemented. The organization performing independent assessment (Nuclear Oversight) is technically and performance oriented, with its focus on the quality of the end product and the effective implementation of procedures and processes. Persons performing independent assessments do not have direct responsibility for any area being assessed, and do not report to a management position with immediate responsibility for the activity being assessed. NMC assessment resources may be supplemented with technical specialists as needed. The independent assessment program provides comprehensive independent evaluations of activities and procedures. Planning for independent assessments identifies the characteristics and activities to be assessed and the relevant performance and/or acceptance criteria. Independent assessments are then conducted using these predetermined criteria. Scheduling and resource allocation for</p>	<p>The amplifications of Regulatory Guide 1.33 are not specifically addressed in NQA-1 or the QATR. The QATR uses a performance based approach to selecting topics for assessments, based on the status, performance and safety importance of the activity or process being assessed. Dynamic scheduling provides for rapid focus shifts of assessment resources depending on the actual performance of the plant and plant staff. The scheduling approach at NMC considers the RG 1.33 elements in its overall structure, but does not subject any single area (except for those where a CFR periodicity requirement is imposed) to a defined periodicity. As has been shown by performance at some plants, meeting a defined assessment periodicity was not an effective defense against significant program failures. NMC's approach provides for response to both internal and external cues to determine what and when to assess performance.</p>

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<p>facility staff – at least once per 12 months.”</p> <p>Audits shall include as a minimum verification of compliance and effectiveness of implementation of internal rules, procedures (for example, operating, design, procurement, maintenance, modification, refueling, surveillance, test security and radiation control procedures and the emergency plan regulations and license, provisions; programs for training, retraining & qualification and performance of operating staff; corrective actions taken following abnormal occurrences; and observation of performance of operating, refueling, maintenance and modification activities, including associated record keeping.</p>		<p>independent assessments are based on the status, performance, and effect on safety of the activity or process being assessed. Scheduling is dynamic to provide for response to developing performance issues and resources are supplemented as necessary when QAP effectiveness is in question. Activities having immediate effect on safety, such as Operations or Maintenance, are independently assessed on a continuing basis. Other topics, as identified in Table 1, where performance metrics, corrective action history and effectiveness, process/personnel stability, self-assessments, and response to operating experience provide sufficient evidence of satisfactory performance, may receive less frequent independent assessment attention, while topics with recent process/personnel changes or unsatisfactory or declining performance trends receive more frequent assessments. A Nuclear Oversight expert panel documents the bases for its decisions regarding which topics (from Table 1) receive independent assessments at what frequency, such that the topics identified in Table 1 are reviewed annually as candidates for independent assessment. Certain activities, as identified in Table 2, receive independent assessments at frequencies established by related NRC rules. ...”</p>	
<p>Written reports of such audits shall be reviewed by the independent review body and by appropriate members of management including those having responsibility in the area audited.</p>		<p>C.3 “Independent Assessment” states “Independent assessment results are documented and reviewed by Nuclear Oversight management and by management having responsibility for the area assessed...”</p>	
<p>Those performing the audits may be members of the audited organization: however, they shall not</p>		<p>C.3 “Independent Assessment” states “Persons performing independent assessments</p>	

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audit activities for which they have immediate responsibility. While performing the audit, they shall not report to a management representative who has immediate responsibility for the activity being audited.		do not have direct responsibility for any area being assessed, and do not report to a management position with immediate responsibility for the activity being assessed."	
Appropriate and timely follow-up action, including re-audit of deficient areas, shall be taken.		C.3 "Independent Assessment" states "Nuclear Oversight conducts timely follow-up action, including re-assessment of deficient areas, as necessary..."	
Periodic review of the audit program shall be performed by the independent review body or by a management representative at least semiannually to assure that audits are being accomplished in accordance with requirements of technical specifications and of this Standard.		NMC does not use an independent review function. Reviews are as described in the QATR.	The submittal letter for the QATR provides the basis for NMC's position regarding offsite/ independent review.
Further guidance on requirements for auditing of quality assurance programs for nuclear power plants exists in draft form.			Descriptive in nature. No action required.
5. Program, Policies, and Procedures 5.1 Program Description. The total program for providing administrative controls and quality-assurance during the operational phase may be described in many diverse documents. For example, operating procedures may be compiled in one manual, maintenance procedures in a second manual and Quality Assurance procedures in a third. It is not intended that all source documents be compiled in one master document.			Descriptive in nature. No action required.
However, a summary document shall be compiled by each owner organization to identify the sources, to index such source documents to the requirements of this Standard and to provide consolidated base for description of the program.		B.14 "Document Control" states "Each site maintains documentation that describes how implementing documents are maintained to assure that QAP requirements are met and are not inadvertently removed in later revisions."	
The owner organization shall identify in the program description those structures, systems and components to be covered		A.1 "Methodology" states "A list, or other means of identification, of safety related Systems, Structures, and	

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by the program and the major organizational units and their responsibilities.		<p>Components (SSC) under the control of the QAP is established and maintained for each operating plant."</p> <p>A.2 "Organization" states "This section describes the NMC organizational structure, functional responsibilities, levels of authority and interfaces for establishing, executing, and verifying QAP implementation. The organizational structure includes corporate functions and onsite functions at each plant."</p>	
The program shall provide control over activities affecting the quality of the structures, systems and components to an extent consistent with their importance to safety. The program shall take into account the need for special controls, processes, tests, equipment, tools, and skills to attain the required quality and the need for verification of quality by inspections, evaluation or test.	BR2 "Quality Assurance Program" states "The program shall provide control over activities affecting quality to an extent consistent with their importance...The program shall provide for any special controls, processes, test equipment, tools, and skills to attain the required quality and for verification of quality."		
<p>5.2 Rules of Practice.</p> <p>The owner organization shall establish rules and instructions pertaining to personnel conduct and control, including consideration of job-related factors which influence the effectiveness of operating and maintenance personnel, including such factors as number of hours at duty station, availability on call of professional and supervisory personnel, method of conducting operations, and preparing and retaining plant documents. These rules and instructions should provide a clear understanding of operating philosophy and management policies.</p>		A.1 "In addition, to provide a clear understanding of NMC operating philosophy, NMC establishes rules of practice pertaining to personnel conduct and control, including consideration of job related factors which can influence the effectiveness of operating and maintenance personnel, including such factors as number of hours at duty station, availability on-call of professional and supervisory personnel, method of conducting operations, and preparing and retaining plant documents."	
<p>5.2.1 Responsibilities and Authorities of Operating Personnel.</p> <p>The responsibilities and authorities of the plant operating personnel shall be delineated. These shall include, as a minimum:</p>		<p>A.3 "Responsibility" states "In addition, operating personnel responsibilities include:</p> <ul style="list-style-type: none"> • The reactor operator's authority and responsibility for shutting down the reactor when it 	

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<p>(1) The reactor operator's authority and responsibility for shutting the reactor down when he determines that the safety of the reactor is in jeopardy or when operating parameters exceed any of the reactor protection system set-points and automatic shutdown does not occur.</p> <p>(2) The responsibility to determine the circumstances, analyze the cause, and determine that operations can proceed safely before the reactor is returned to power after a trip or an unscheduled or unexplained power reduction.</p> <p>(3) The senior reactor operators responsibility to be present at the plant and to provide attention for returning the reactor to power following a swing, a trip or an unscheduled or unexplained power reduction.</p> <p>(4) The responsibility to believe and respond conservatively to instrument indications unless they are proved to be incorrect</p> <p>(5) The responsibility to adhere to the Plant's Technical Specifications.</p> <p>(6) The responsibility to review routine operating data to assure safe operation.</p>		<p>is determined that the safety of the reactor is in jeopardy or when operating parameters exceed any of the reactor protection system set-points and automatic shutdown does not occur.</p> <ul style="list-style-type: none"> • The responsibility to determine the circumstances, analyze the cause, and determine that operations can proceed safely before the reactor is returned to power after a trip or an unexplained or unscheduled power reduction. • The senior reactor operator's responsibility to be present at the plant and to provide direction for returning the reactor to power following a trip or an unscheduled or unexplained power reduction. • The responsibility to believe and respond conservatively to instrument indications unless they are proved to be incorrect. • The responsibility to adhere to the plant's Technical Specifications. • The responsibility to review routine operating data to assure safe operation. 	
<p>5.2.2 Procedure Adherence</p> <p>Procedures shall be followed, and the requirements for use of procedures shall be prescribed in writing.</p>		<p>A.3 "Responsibility" states "Documents that implement the quality program are approved by responsible management; distributed; and revised in accordance with procedures. Work within the scope of the QAP is accomplished in accordance with these documents."</p>	
<p>Rules shall be established which provide methods by which temporary changes to approved procedures can be made, including the designation of a person or persons authorized to approve such changes.</p>		<p>B.14 "Document Control" states "Temporary changes to approved procedures that do not change the intent are approved by two members of the plant staff knowledgeable in the areas affected by the procedure. Temporary changes to procedures identified in Appendix B are approved by two members of the plant staff knowledgeable in</p>	

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		the areas affected by the procedure, at least one of whom is a person holding an active senior reactor operator's license."	
Temporary changes which clearly do not change the intent of the approved procedure, shall as a minimum be approved by two members of the plant staff knowledgeable in the areas affected by the procedures. At least one of these individuals shall be the supervisor in charge of the shift and hold a senior operators license on the unit affected. Such changes shall be documented and, if appropriate, incorporated in the next revision of the affected procedure. In the event of an emergency not covered by an approved procedure, operations personnel shall be instructed to take action so as to minimize personnel injury and damage to the facility and to protect health and safety.		<p>B.14 "Document Control" states "Temporary changes to approved procedures that do not change the intent are approved by two members of the plant staff knowledgeable in the areas affected by the procedure. Temporary changes to procedures identified in Appendix B are approved by two members of the plant staff knowledgeable in the areas affected by the procedure, at least one of whom is a person holding an active senior reactor operator's license.."</p> <p>A.3 "In addition, operating personnel responsibilities include: - the responsibility to take action to minimize personnel injury or damage to the facility and to protect the health and safety of the public in the event of an emergency not covered by approved procedures."</p>	
Guidance should be provided to identify the manner in which procedures are to be implemented. Examples of such guidance include identification of those tasks that require: (1) The written procedure to be present and followed step by step while the task is being performed (2) The operator to have committed the procedural steps to memory (3) Verification of completion of significant steps, by initials or signatures of checkoff lists		<p>B14 Document Control "...Provisions include establishing levels of use, such as requiring the document to be present at the work location. ..."</p> <p>Appendix B "Guidance is established to identify the manner in which procedures are to be implemented, including identification of those tasks that require (1) the written procedure to present and followed step by step while the task is being performed, (2) the user to have committed the procedure steps to memory, (3) verification of completion of significant steps, as by initials or signatures or use of check-off lists."</p>	
The types of procedures that shall be present and referred to directly are those developed for extensive or complex jobs where reliance on memory cannot be trusted, e.g., reactor start-up, tasks which are infrequently		Appendix B "... Procedures that are required to be present and referred to directly are those developed for extensive or complex jobs where reliance on memory cannot be trusted, tasks that are infrequently	N18.7 wording in brackets are included in this table for completeness; they do not establish requirements that either NQA-1 or the NMC QATR would need to address.

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<p>performed, and tasks in which operations must be performed in a specified sequence. [Procedural steps for which actions should be committed to memory include, for example, immediate actions in emergency procedures. Routine procedural actions that are repeated may not require the procedure to be present.] Copies of all procedures shall be available to appropriate members of the plant staff. If documentation of an action is required, the necessary data shall be recorded as the task is performed. [Examples of procedures requiring verification are furnished in 5.3.4.1 and 5.3.4.2.]</p>		<p>performed, and tasks where steps must be performed in a specified sequence. ..."</p> <p>B14 Document Control "... These provisions assure that specified documents are ... used at the location where the prescribed activity takes place. ..."</p> <p>Appendix B "... When documentation of an action is specified, the necessary data is recorded as the task is performed."</p>	
<p>5.2.3 Operating Orders.</p> <p>A mechanism shall be provided for dissemination to the plant staff of instructions of general and continuing applicability to the conduct of business. Such instructions, sometimes also referred to as standing orders or standard operating procedures, should deal with job turnover and relief designation of confines of control room, definition of duties of operators and others, transmittal of operating data to management, filing of charts, limitations on access to certain areas and equipment, shipping and receiving instructions, or other such matters. Provisions shall be made for periodic review and updating of standing orders.</p>		<p>A.1 "In addition, means are provided for dissemination to plant staff of instructions of both general and continuing applicability (e.g., dealing with job turnover and relief, designation of the confines of the control room, limitations on access to certain areas), as well as those of short-term applicability (e.g., dealing with short-term operating conditions, publications, personnel actions). Provisions are included for review, updating and cancellation of such instructions."</p>	
<p>5.2.4 Special Orders.</p> <p>A mechanism shall be provided for issuing management instructions which have short-term applicability and which require dissemination. Such instructions sometimes referred to as a special orders, should encompass special operations, housekeeping, data taking, publications and their distribution, plotting process</p>		<p>A.1 "In addition, means are provided for dissemination to plant staff of instructions of both general and continuing applicability (e.g., dealing with job turnover and relief, designation of the confines of the control room, limitations on access to certain areas), as well as those of short-term applicability (e.g., dealing with short-term operating conditions, publications,</p>	

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parameters, personnel actions, or other similar matters. Provisions shall be made for periodic review, updating and cancellation of special orders.		personnel actions). Provisions are included for review, updating and cancellation of such instructions."	
5.2.5 Temporary Procedures. Temporary procedures may be issued during the operational phase: to direct operations during testing, refueling, maintenance and modifications; to provide guidance in unusual situations not within the scope of the normal procedures; and to insure orderly and uniform operations for: short periods when the plant, a system, or a component of a system is performing in a manner not covered by existing detailed procedure or has been modified or extended in such a manner that portions of existing procedures do not apply. Temporary procedures shall include designation of the period of time during which they may be used and shall be subject to the review process prescribed in 4.3 and 5.2.15 as applicable.		Appendix B "While not specifically a procedure type, Temporary Procedures may be used to direct operations during testing, refueling, maintenance and modifications; to provide guidance in unusual situations not within the scope of normal procedures; and to insure orderly and uniform operations for short periods when the plant, a system, or a component of a system is performing in a manner not covered by existing detailed procedures, or has been modified or affected in such manner that portions of existing procedures do not apply. Temporary Procedures include designation of the period of time during which they may be used."	
Temporary procedures shall be approved by the management representative assigned approval authority.		B.14 "...specified documents are reviewed for adequacy, approved prior to use by authorized persons,..."	
5.2.6 Equipment Control. Permission to release equipment or systems for maintenance shall be granted by designated operating personnel. Prior to granting permission, such operating personnel shall verify that the equipment or system can be released, and determine how long it may be out of service. Granting of such permission shall be documented. Attention shall be given to the potentially degraded degree of protection when one subsystem of a redundant safety system has been removed for maintenance.	NQA-1, Subpart 2.18, paragraph 2.5 "(a) Procedures shall be established for the authorization of maintenance work. ... (b) The work authorization shall contain (4) approval by authorized personnel. (c) Interface concerns such as plant operations, ...shall be considered for applicability by authorized individuals prior to approval of the work authorizing document."	B.16 "Maintenance activities (both corrective and preventive) are scheduled and planned so as not to unnecessarily compromise the safety of the plant. Permission to release equipment or systems for maintenance is granted by designated operating personnel who are responsible to verify that the equipment can be released and determine how long it may be out of service. This includes attention to the potentially degraded degree of protection when one subsystem of a redundant safety system has been removed for maintenance. Release is documented."	

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After permission has been granted to remove the equipment from service, it shall be made safe to work on. Measures shall provide for protection of equipment and workers. Equipment and systems in a controlled status shall be clearly identified. Strict control measures for such equipment shall be enforced.		B.10 "NMC establishes and implements measures to identify the inspection, test and operating status of items and components subject to provisions of this QATR in order to maintain personnel and reactor safety and avoid unauthorized operation of equipment. Equipment control provisions for workmen's protection comply with applicable federal and state OSHA regulations."	
[Conditions to be considered in preparing equipment for maintenance include, for example: shutdown margin; method of emergency core cooling; establishment of a path for decay heat removal; temperature and pressure of the system; valves between work and hazardous material; venting, draining and flushing; entry into closed vessels; hazardous atmospheres; handling hazardous materials; and electrical hazards.] When entry into a closed system is required, control measures shall be established to prevent entry of extraneous material and to assure that foreign material is removed before the system is reclosed.	NQA-1 Subpart 2.18, paragraph 2.3 "(a) Controls to minimize the introduction of foreign materials and to maintain cleanness during maintenance shall be in accordance with Subpart 2.1...Verification methods shall be established to ensure these requirements are met. (b) Immediately prior to closure of equipment, the absence of foreign materials shall be verified. The results of the verification shall be documented."	B.7 "...NMC establishes appropriate cleanliness controls for work on safety related equipment to minimize introduction of foreign material and maintain system/component cleanliness throughout maintenance or modification activities, including documented verification of absence of foreign materials prior to closure."	N18.7 wording in brackets are included in this table for completeness; they do not establish requirements that either NQA-1 or the NMC QATR would need to address.
Procedures shall be provided for control of equipment as necessary, to maintain personnel and reactor safety and to avoid unauthorized operation of equipment. These procedures shall require control measures such as locking or tagging to secure and identify equipment in a controlled status. The procedures shall require independent verifications, where appropriate, to ensure that necessary measures, such as tagging equipment have been implemented correctly.	NQA-1 BR 14 "Status indicator shall also provide for indicating operating status of systems and components of the nuclear facility, such as by tagging valves and switches, to prevent inadvertent operation."	B.10 "NMC establishes and implements measures to identify the inspection, test and operating status of items and components subject to provisions of this QATR in order to maintain personnel and reactor safety and avoid unauthorized operation of equipment. ... Where necessary to preclude inadvertent bypassing of inspections or tests, or to preclude inadvertent operation, these measures require the inspection, test or operating status be verified before release, fabrication, receipt, installation, test or use. Equipment control provisions for workmen's protection comply with applicable federal and state OSHA requirements."	

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Temporary modifications, such as temporary bypass lines, electrical jumpers, lifted electrical leads, and temporary trip point settings, shall be controlled by approved procedures which shall include a requirement for independent verification. A log shall be maintained of the current status of such temporary modifications.	NQA-1 Subpart 2.18 Section 2.1(h) states "the development of provisions for installation and removal of temporary conditions (e.g., jumpers, transferring of control switch position, etc.) and returning equipment and systems to service."	B.2 "In addition, temporary design changes (temporary modifications), such as temporary bypass lines, electrical jumpers and lifted leads, and temporary trip-point settings, are controlled by procedures that include requirements for appropriate installation and removal verifications and status tracking."	
The procedures shall also require that the status of inspections and tests performed upon individual items on the nuclear power plant be indicated by use of markings such as stamps, tags, labels, routing cards, or other suitable means. [Suitable means include identification numbers which are traceable to records of the status of inspections and tests.]	NQA-1 BR 14 "The status of inspection and test activities shall be identified either on items or in documents traceable to the items where it is necessary to assure that required inspections and tests are performed and to assure that items which have not passed the required inspections and tests are not inadvertently installed, used, or operated. Status shall be maintained through indicators, such as physical location and tags, markings, shop travelers, stamps, inspection records, or other suitable means. "		N18.7 wording in brackets are included in this table for completeness; they do not establish requirements that either NQA-1 or the NMC QATR would need to address.
Procedures shall also provide for the identification of items which have satisfactorily passed required inspections and tests, where necessary to preclude inadvertent bypassing of such inspections and tests. In cases where required documentary evidence is not available, the associated equipment or materials must be considered nonconforming in accordance with Section 5.2.14. Until suitable documentary evidence is available to show the equipment or material is in conformance, affected systems shall be considered to be inoperable and reliance shall not be placed on such systems to fulfill their intended safety functions.	NQA-1 BR 8 "Controls shall be established to assure that only correct and accepted items are used or installed. ..." NQA-1 BR 14 "The status of inspection and test activities shall be identified either on the items or in documents traceable to the items where it is necessary to assure that required inspections and tests are performed and to assure that items which have not passed the required inspections and tests are not inadvertently installed, used, or operated.	B.10 "Where necessary to preclude inadvertent bypassing of inspections or tests, or to preclude inadvertent operation, these measures require the inspection, test or operating status be verified before release, fabrication, receipt, installation, test or use." B.6 "NMC establishes and implements provisions for the identification and control of items to prevent the use of incorrect or defective items. ... The identification of items is maintained throughout ..." B.4 "Documentary evidence that an item conforms to these requirements [related to procurement] is available at the site before relying on the item to perform its intended safety function."	The sum of the requirements from NQA-1 and the QATR accomplish the N18.7 intent.
When equipment is ready to be returned to service, operating personnel shall place the equipment in operation and verify and document its functional acceptability. Attention shall be given to restoration of		B.16 "When equipment is ready to be returned to service, operating personnel place the equipment in operation and verify and document its functional acceptability. In completing maintenance	

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normal conditions, such as removal of jumpers or signals used in maintenance or testing or such as returning valves, breakers or switches to proper start-up or operating positions from "test or "manual" positions. When placed into service, the equipment should receive additional surveillance during the run-in period.		and restoring equipment, attention is given to restoration of normal conditions, such as removal of jumpers or signals used in maintenance or testing, or such as returning valves, breakers or switches to proper operating positions."	
<p>5.2.7 Maintenance and Modifications</p> <p>Maintenance or modifications which may affect functioning of safety-related structures; systems, or components shall be performed in a manner to ensure quality at least equivalent to that specified in original design bases and requirements, materials specifications and inspection requirements. A suitable level of confidence in structures, systems or components on which maintenance or modifications have been performed shall be attained by appropriate inspection and performance testing (see also 5.2.17 and 5.3.5).</p>		<p>B.16 "Plant Maintenance" states "NMC establishes controls for the maintenance or modification of items and equipment subject to this QATR to ensure quality at least equivalent to that specified in original design bases and requirements, such that safety-related structures, systems and components are maintained in a manner that assures their ability to perform their intended safety function(s). Maintenance activities (both corrective and preventive) are scheduled and planned so as not to unnecessarily compromise the safety of the plant. ... Inspections (verifications) of maintenance and modification activities are established, conducted and documented as required by Section B.12 to establish a suitable level of confidence in affected structures, systems and components."</p> <p>B.8 "...These programs include criteria for determining when testing is required, such as proof tests before installation, per-operational tests, post-maintenance tests, post-modification tests, inservice tests, and operational tests ...to demonstrate that performance of plant systems is in accordance with design intent."</p>	
Maintenance or modification of equipment shall be preplanned and performed in accordance with written procedures, documented instructions or drawings appropriate to the circumstances which conform to the applicable	NQA-1 Subpart 2.18 "Quality Assurance Requirements for Maintenance of Nuclear Facilities" states in Section 2.2(a) "Procedures and/or written instructions shall be established for performance of maintenance activities..."	B.16 "NMC establishes controls for the maintenance or modification of items and equipment ... Maintenance activities (both corrective and preventive) are scheduled and planned so as not to unnecessarily	N18.7 wording in brackets are included in this table for completeness; they do not establish requirements that either NQA-1 or the NMC QATR would need to address.

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codes, standards, specifications, and criteria. [Skills normally possessed by qualified maintenance personnel may not require detailed step-by-step delineations in a written procedure.]		compromise the safety of the plant.	
Means for assuring quality of maintenance and modification activities (for example, inspections, measurements, tests, welding, heat treatment, cleaning, nondestructive examination and worker qualifications in accordance with applicable codes and standards) and measures to document the performance thereof shall be established. This documentation shall be retained as specified in Section 5.2.12. Measures shall be established and documented to identify the inspection and test status of items to be used in maintenance and modification activities. Normally, the point of control for such items should be the plant storage area.	NQA-1 Subpart 2.18 "Quality Assurance Requirements for Maintenance of Nuclear Facilities" states in Section 2.1 "Responsibilities shall be assigned...the conduct of the program of maintenance activities and other inspections and tests as necessary to verify satisfactory performance..." and Section 2.2d states "Provisions shall be made for documenting data to assist in ensuring satisfactory completion of the work. Such data shall include, as applicable..."	<p>B16 Plant Maintenance "NMC establishes control for the maintenance or modification of items and equipment subject to this QATR to ensure quality at least equivalent to that specified in original design bases and requirements, such that safety-related structures, systems and components are maintained in a manner that assures their ability to perform their intended safety function(s)"</p> <p>B.12 Inspection "NMC establishes and implements provisions for inspections to assure that items, services and activities affecting safety meet established requirements and conform to applicable documented instructions, procedures and drawings. ... Inspections are carried out by properly qualified persons independent of those who performed or directly supervised the work."</p> <p>B15 Records "NMC establishes and implements provisions to ensure that sufficient records of items and activities affecting quality are generated and maintained to reflect completed work. ..."</p> <p>B.10 "NMC establishes and implements measures to identify the inspection, test and operating status of items and components subject to provisions of this QATR in order to maintain personnel and reactor safety and avoid unauthorized operation of equipment."</p>	
The following standards contain useful guidance concerning design and construction-related activities associated with	NQA-1 was developed based on ANSI/ASME N45.2-1977; ANSI N46.2; and Seven daughter standards of ANSI/ASME	See A.7.3 "Regulatory Commitments".	QATR A.7.3 provides a listing of other documents, such as NRC Regulatory Guides that endorsed the older ANSI Standards, and

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modifications and shall be applied to those activities occurring during the operational phase that are comparable in nature and extent to related activities occurring during initial plant design and construction: American National Standard Installation, Inspection and Testing of Instrumentation and Electric Equipment During the Construction of Nuclear Power Generation Station. N45.2.4-1972 (IEEE 336-1972) [6]; American National Standard Supplementary Quality Assurance Requirements for Installation, Inspection and Testing of Structural Concrete and Structural Steel During the Construction Phase of Nuclear Power Plants, N45.2.5-1974 [7]; American National Standard Qualifications of Inspection, Examination and Testing Personnel for the Construction Phase of Nuclear Power Plants N45.2.6-1973 [5]; American National Standard Supplementary Quality Assurance Requirements for Installation, Inspection and Testing of Mechanical Equipment and Systems for Construction Phase of Nuclear Power Plants, N45.2.8-1975 [8] American National Standard Quality Assurance Requirements for the Design of Nuclear Power Plants, N45.2.11-1974 [9]; and American National Standard Quality Assurance for Protective Coating Applied to Nuclear Facilities N101.4-1972 [10].	N45.2. In addition, other daughters were made into subparts, these included: N45.2.1= Subpart 2.1 N45.2.2 = Subpart 2.2 N45.2.3 = Subpart 2.3 N45.2.4 = Subpart 2.4 N45.2.5 = Subpart 2.5 N45.2.8 = Subpart 2.8		establishes the nature and level of NMC commitment thereto.
[Considerable care is required in assessing which operational phase activities are comparable in nature and extent to activities normally associated with design and construction.]			N18.7 wording in brackets are included in this table for completeness; they do not establish requirements that either NQA-1 or the NMC QATR would need to address.
5.2.7.1 Maintenance Programs. A maintenance program shall be developed to maintain safety-related structures, systems and components at the quality required for them to perform their intended functions.		B.16 "Plant Maintenance" states "NMC establishes controls for the maintenance or modification of items and equipment subject to this QATR to ensure quality at least equivalent to that	

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Maintenance shall be scheduled and planned so as not to compromise the safety of the plant.		specified in original design bases and requirements, such that safety-related structures, systems and components are maintained in a manner that assures their ability to perform their intended safety function(s). Maintenance activities (both corrective and preventive) are scheduled and planned so as not to unnecessarily compromise the safety of the plant."	
Planning shall consider the possible safety consequences of concurrent or sequential maintenance, testing or operating activities. Equipment required to be operable for the prevailing mode shall be available, and maintenance shall be performed in a manner such that license limits are not violated. Planning for maintenance shall include evaluation of the use of special processes, equipment, and materials in performance of the task, including assessment of potential hazards to personnel and equipment.	NQA-1, Subpart 2.18, paragraph 2.5 "(a) Procedures shall be established for the authorization of maintenance work. ... (b) The work authorization shall contain (4) approval by authorized personnel. (c) Interface concerns such as plant operations, ...shall be considered for applicability by authorized individuals prior to approval of the work authorizing document."	B.16 "Maintenance activities (both corrective and preventive) are scheduled and planned so as not to be unnecessarily compromise the safety of the plant. Permission to release equipment or systems for maintenance is granted by designated operating personnel who are responsible to verify that the equipment can be released and determine how long it may be out of service. This includes attention to the potentially degraded degree of protection when one subsystem of a redundant safety system has been removed for maintenance."	
[General rules for the development of procedures under a maintenance program which is consistent with the provisions of 5.2.7 shall be written before start-up.] These general rules shall form the basis for developing the repair or replacement procedures at the time of failure. [Procedures required for maintenance of equipment expected to require recurring maintenance should be written prior to plant operation. As experience is gained in operation of the plant, routine maintenance should be altered to improve equipment performance, and procedures for repair of equipment shall be improved as appropriate.] Approved procedures shall be available for repair of safety-related equipment prior to the performance of such repairs (see also Sections 5.2.2 and 5.2.7).	NQA-1 Subpart 2.18 "Quality Assurance Requirements for Maintenance of Nuclear Facilities" Section 2.2a states "Procedures and/or written instructions shall be established for performance of maintenance activities. Requirements for procedure format and content shall be established..."	A.1 "Activities affecting quality are prescribed by and performed according to documents (such as instructions, procedures or drawings) of a type appropriate to the circumstances ..." B.14 "These provisions assure that specified documents are reviewed for adequacy, approved prior to use by authorized persons, and distributed according to current distribution lists and used at the location where the prescribed activity takes place."	N18.7 wording in brackets are included in this table for completeness; they do not establish requirements that either NQA-1 or the NMC QATR would need to address.
A preventive maintenance	NQA-1 Subpart 2.18		

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program including procedures as appropriate for safety-related structures, systems and components shall be established and maintained which prescribes the frequency and type of maintenance to be performed.	"Quality Assurance Requirements for Maintenance of Nuclear Facilities" Section 3 states "Plans and procedures shall be developed to identify the equipment which requires preventive maintenance, to establish the frequency and kind of preventive maintenance to be performed on the equipment, and to document those actions."		
[A preliminary program based on service conditions and experience with comparable equipment should be developed prior to fuel loading. The program should be revised and updated as experience is gained with the equipment.]			N18.7 wording in brackets are included in this table for completeness; they do not establish requirements that either NQA-1 or the NMC QATR would need to address.
The causes of malfunctions shall be promptly determined, evaluated and recorded (see also Sections 4.3 and 4.4). Experience with the malfunctioning equipment and similar components shall be reviewed and evaluated to determine whether a replacement component of the same type can be expected to perform its function reliably. If evidence indicates that common components in safety-related systems have performed unsatisfactorily, corrective measures shall be planned prior to replacement or repair of all such components. Replacement components shall have received adequate testing or should be of a design for which experience indicates a high probability of satisfactory performance. Consideration shall be given to phased replacement to permit inservice performance of the new component to be evaluated and thereby minimize the possibility of a hidden deficiency producing a systematic failure.	NQA-1 Subpart 2.18 "Quality Assurance Requirements for Maintenance of Nuclear Facilities" Sections 4.2 and 4.3 state "Procedures shall be established for promptly identifying the failed item and controlling it to preclude its inadvertent use; documenting and reporting of failures, in accordance with pre-established criteria...An assessment of failure cause and required maintenance shall be made consistent with the type of item failure and the importance of the item. The assessment shall also include, as appropriate, the possibility of similar failure in other items."	B.13 "If evidence indicates that common components in safety related systems have performed unsatisfactorily, compensatory or corrective measures are planned prior to replacement or repair of such components. Replacement components receive adequate testing or are of a design for which experience indicates a high probability of satisfactory performance. Consideration is given to phased replacement to permit inservice performance to be evaluated and minimize the possibility of systemic failure."	
[An augmented testing and inspection program should be implemented following a large scale component replacement (or repair) until such time as a suitable level of performance has			N18.7 wording in brackets are included in this table for completeness; they do not establish requirements that either NQA-1 or the NMC QATR would need to address.

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been demonstrated.]			
<p>5.2.7.2 Modifications. Design activities associated with modifications of safety-related structures, systems and components shall be accomplished in accordance with N45.2.11-1974. [9]</p>	N45.2.11 was incorporated into NQA-1.		
<p>5.2.8 Surveillance Testing and Inspections Schedule.</p> <p>A surveillance testing and inspection program shall be prescribed to insure that safety-related structures, systems, and components will continue to operate, keeping parameters within normal bounds, or will act to put the plant in a safe condition if they exceed normal bounds.</p>		<p>Section B.8 "Test Control" states "NMC establishes and implements testing programs to demonstrate that items subject to the provisions of this QATR will perform satisfactorily in service, ..."</p> <p>Section B.12 "Inspection" states "NMC establishes and implements provisions for inspections to assure that items, services and activities affecting safety meet established requirements."</p> <p>Appendix C "Surveillance testing: periodic testing to verify that safety related structures, systems and components continue to function or are in a state of readiness to perform their functions, and to provide assurance that failures or substandard performance do not remain undetected and that the required reliability of safety related systems is maintained. Such functions include keeping parameters within normal bounds or acting to put the plant in a safe condition if they exceed normal bounds."</p>	
Provisions shall be made for performing required surveillance testing and inspections including inservice inspections. Such provisions shall include the establishment of a master surveillance schedule reflecting the status of all planned in plant surveillance tests and inspections.		<p>Section B.8 "Test Control" states "NMC establishes and implements testing programs to demonstrate that items subject to the provisions of this QATR will perform satisfactorily in service. ... These programs include criteria for determining when testing is required, such as ... inservice tests, and operational tests (such as surveillance tests)... Programs also include provisions for establishing and adjusting test schedules and maintaining status for periodic or recurring tests."</p>	

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		Section B.12 "Inspection" states "NMC establishes and implements provisions for inspections to assure that items, services and activities affecting safety meet established requirements and conform to applicable documented instructions, procedures and drawings. ... Types of inspections may include...in-service... "	
Frequency of surveillance tests and inspections may be related to the results of reliability analyses, the frequency and type of service, or age of the item or system, as appropriate. Additional control procedures shall be instituted, as necessary, to assure timely conduct of surveillance tests and inspections and appropriate documentation, reporting, and evaluation of the results.		B.8 "Programs also include provisions for establishing and adjusting test schedules and maintaining status for periodic or recurring tests. ... Test results are documented and evaluated by the organization performing the test and reviewed by the appropriate authority having responsibility for the item being tested."	
5.2.9 Plant Security and Visitor Control. Procedures shall be developed to supplement features and physical barriers designed to control access to the plant and, as appropriate, to vital areas within the plant. Information concerning specific design features and administrative provisions of the plant security program shall be confidential and thus accorded limited distribution. The security and visitor control procedures should consider, for example, physical provisions, such as: fences and lighting; lock controls for doors, gates and compartments containing sensitive equipment; and provisions for traffic and access control. Also to be considered are administrative provisions, such as: visitor sign-in and sign-out procedures; escorts and badges for visitors; emphasis on inspection, observation and challenging of strangers by operating crews; and a program of pre-employment screening for potential employees. See American National			Security and visitor control provisions at NMC plants comply with 10CFR73 and other NRC orders, and with the approved Security and Safeguards Contingency Plans. N18.7 requirements are considered superseded by these documents, although they generally provide for compliance with the N18.7 intent.

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Standard Industrial Security (or Nuclear Power Plants, N13.17-1973, for guidance and provisions for security measures adequate to protect nuclear power plants. [11]			
5.2.10 Housekeeping and Cleanliness Control. Housekeeping practices shall be utilized recognizing requirements for the control of radiation zones and the control of work activities, conditions and environments that can affect the quality of important parts of the nuclear plant. Housekeeping encompasses all activities related to the control of cleanliness of facilities materials, equipment fire prevention and protection including disposal of combustible material and debris and control of access to areas, protection of equipment, radioactive contamination control and storage of solid radioactive waste.		B.7 "Housekeeping practices during normal operations and maintenance activities, including refueling, are established to account for the control of radiation zones and other conditions or environs that could affect the quality of important parts of the plant. This includes control of cleanliness of facilities and materials, fire prevention and protection, disposal of combustible material and debris, control of access to work areas, protection of equipment, radioactive contamination control and storage of solid radioactive waste."	
Housekeeping practices shall assure that only proper materials, equipment, processes and procedures are utilized and that the quality of items is not degraded as a result of housekeeping practices or techniques. Where necessary procedures and work instructions needed to assure compliance with specific requirements shall be available: e.g., inspection and cleaning of electrical bus and control centers, cleaning of control consoles, radioactive decontamination.		B.7 "Housekeeping practices assure that only proper materials, equipment, processes and procedures are used and that the quality of items is not degraded as a result. Necessary procedures or work instructions, such as for electrical bus and control center cleaning, cleaning of control consoles, and radioactive decontamination are developed and used."	
Particular attention should be given to housekeeping in work and storage areas where important items are handled and stored to preclude damage or contamination.		B.7 "This includes control of cleanliness of facilities and materials, fire prevention and protection, disposal of combustible material and debris, control of access to work areas, protection of equipment, radioactive contamination control and storage of solid radioactive waste."	
American National Standard Housekeeping During the Construction	ANSI N45.2.3 = NQA-1 Subpart 2.3	B.7 "Handling, Storage, and Shipping" states "In addition, NMC commits	

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Phase of Nuclear Power Plants. N-45.2.3.1973 [12] shall be applied to those activities occurring during the operational phase that are comparable in nature and extent to related activities occurring during construction.		to...; and Subpart 2.3, to establish appropriate provisions for housekeeping; ..."	
During maintenance or modification activities, certain portions of safety-related systems may be subject to potential contamination with foreign materials. To prevent such contamination, control measures, including measures for access control, shall be established. Immediately prior to closure an inspection shall be conducted to assure cleanliness and the result of such inspection shall be documented.	NQA-1 Subpart 2.18 Section 2.3 states "(a) controls to minimize the introduction of foreign materials and to maintain cleanliness during maintenance shall be in accordance with Subpart 2.1 of this Part. (Part II). Verification methods shall be established to ensure these requirements are met. (b) Immediately prior to closure of equipment, the absence of foreign materials shall be verified. The results of the verification shall be documented."		
American National Standard Cleaning of Fluid Systems and Associated Components during Construction Phase of Nuclear Power Plant. N45.2.1-1973 [13] shall be applied to activities occurring during the operational phase that are comparable in nature and extent to related activities occurring during construction.	ANSI N45.2.1 = NQA-1 Subpart 2.1	B.7 "Handling, Storage, and Shipping" states "In addition NMC commits to compliance with the requirements of NQA-1, 1994, Subpart 2.1, to establish appropriate provisions for the cleaning of fluid systems and associated components;..."	
[Measures for minimizing the introduction of foreign materials during maintenance or modification, or cleaning following maintenance or modification of radioactively contaminated systems or of equipment of high radiation fields require special consideration.]			N18.7 wording in brackets are included in this table for completeness; they do not establish requirements that either NQA-1 or the NMC QATR would need to address.
5.2.11 Corrective Actions. The program shall provide measures to ensure that conditions adverse to plant safety, such as failure, malfunctions, deficiencies, deviations, defective material and equipment, abnormal occurrences, and nonconformances are promptly identified and corrected. In the case of significant conditions adverse to safety, the measures shall assure that	BR 16 "Corrective Action" states "Conditions adverse to quality shall be identified promptly and corrected as soon as practical. In the case of a significant condition adverse to quality, the cause of the condition shall be determined and corrective action taken to preclude recurrence. The identification, cause, and corrective action for significant conditions adverse to quality shall be	A.6 Corrective Action states "...This includes failures, malfunctions, deficiencies deviations, defective material and equipment, abnormal occurrences, nonconformances, and out of control processes... Significant conditions adverse to quality and significant adverse trends are reported to responsible management. ... In establishing requirements for corrective action, NMC	

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the cause of the condition is determined and corrective action taken shall be documented and reported to appropriate levels of management and for independent review in accordance with Section 4.3.	documented and reported to appropriate levels of management; follow-up action shall be taken to verify implementation of this corrective action."	commits to compliance with NQA-1, Basic Requirements 15 and 16..."	
5.2.12 Plants Records Management. Provisions shall be made for preparation and retention of plant records as appropriate.		B.15 "Records" states "NMC establishes and implements provisions to ensure that sufficient records of items and activities affecting quality are generated and maintained to reflect completed work."	
The responsibility for maintaining records and storing them at a specified location or locations shall be assigned.		B.15 "Records" states "The provisions establish requirements for records administration, including generation, receipt, preservation, storage, safekeeping, retrieval, and final disposition."	
Retention periods of sufficient duration to assure the ability to reconstruct significant events and satisfy any statutory requirements which apply shall be specified.		B.15 "Records" states "NMC uses the list of records in Non-mandatory Appendix 17A-1, supplemented by the recommended retention times established in Regulatory Guide 1.28, position C.2 (Table 1), to establish the types of records that will be created and retained in support of plant operation."	
American National Standard Requirements for Collection, Storage and Maintenance of Quality Assurance Records for Nuclear Power Plants, N45.2.9-1974 shall be used for management of plant records during the operational phase. [14]	NQA-1 was developed based on ANSI N45.2.9. See BR 17 and 17S-1.		
5.2.13 Procurement and Materials Control. Measures shall be provided for procurement, documentation and control of those materials and components including spare and replacement parts necessary for plant operation, refueling, maintenance and modification.	NQA-1 BR 4 "Procurement Document Control" states "Applicable design bases and other requirements necessary to assure adequate quality shall be included or referenced in documents for procurement of items and services." NQA-1 Supplement 4S-1 Section 2.7 states "The procurement documents shall require the identification of appropriate spare and replacement parts or assemblies..."	B.4 "Procurement Control" states "NMC establishes and implements controls to assure that purchased items (components, spares, and replacement parts necessary for plant operation, refueling, maintenance and modifications) and services are subject to quality and technical requirements..."	
These measures shall utilize American National	NQA-1 was developed based on ANSI N45.2.13.		

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Standard Quality Assurance Requirements for the Control of Procurement of Items and Services for Nuclear Power Plants, N45.2.13-1976. The Appendix to N45.2.13 is particularly useful in determining the quality assurance requirements depending on the complexity or safety of the item. [15].	See BR 4 and 4S-1, and BR 7 and 7S-1.		
Procedures shall be established and implemented to ensure that purchased materials and components associated with safety-related structures or systems are: (1) Purchased to specifications and codes equivalent to those specified for the original equipment or those specified by a properly reviewed and approved revision.		B.4 "NMC establishes and implements controls to assure that purchased items (components, spares and replacement parts necessary for plant operation, refueling, maintenance and modifications) and services are subject to quality and technical requirements at least equivalent to those specified for original equipment or specified by properly reviewed and approved revisions..."	
In those cases where the original item or part is found to be commercially "off the shelf," or without specifically identified quality assurance requirements, spare and replacement parts may be similarly procured but care shall be exercised to assure at least equivalent performance.		B.4 "Where original technical or quality assurance requirements cannot be determined, an engineering evaluation is conducted and documented by qualified staff to establish appropriate requirements and controls to assure that interfaces, interchangeability, safety, fit and function, as applicable, are not adversely affected or contrary to applicable regulatory requirements. ... Controls are imposed for the selection, determination of suitability for intended use (critical characteristics), evaluation, receipt and acceptance of commercial-grade or "off-the-shelf" items to assure they will perform satisfactorily in service in safety-related applications."	
(In those cases where the QA requirements of the original item cannot be determined, an engineering evaluation shall be conducted by qualified individuals to establish the requirements and controls. This evaluation shall assure that interfaces, interchangeability, safety, fit and function are not adversely affected or		B.4 "Where original technical or quality assurance requirements cannot be determined, an engineering evaluation is conducted and documented by qualified staff to establish appropriate requirements and controls to assure that interfaces, interchangeability, safety, fit and function, as applicable, are not adversely affected	

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contrary to applicable regulatory or code requirements. The results of this evaluation shall be documented)		or contrary to applicable regulatory requirements."	
(2) Produced or fabricated under requirements at least equivalent to that of the original equipment, or those specified by a properly reviewed and approved revision;		B.4 "NMC establishes and implements controls to assure that purchased items (components, spares and replacement parts necessary for plant operation, refueling, maintenance and modifications) and services are subject to quality and technical requirements at least equivalent to those specified for original equipment or specified by properly reviewed and approved revisions..."	
(3) Packaged and transported in a manner that will ensure that the quality is not degraded during transit;	NQA-1 BR 13 "Handling, storage, cleaning, packaging, shipping and preservation of items shall be controlled to prevent damage or loss and to minimize deterioration."	B.7 " Items are appropriately marked and labeled during packaging, shipping, handling and storage to identify, maintain and preserve the item's integrity..."	
(4) Properly documented to show compliance with applicable specifications, codes and standards;	NQA-1 Supplement 4S-1 states "...these requirements shall be specified by reference to specific drawings, specifications, codes, standards, regulations, procedures, or instructions..."		
(5) Properly inspected, identified and stored to protect against damage, deterioration or misuse;	NQA-1 BR 13 "Handling, storage, cleaning, packaging, shipping and preservation of items shall be controlled to prevent damage or loss and to minimize deterioration."		
(6) Properly controlled to ensure the identification, segregation and disposition of nonconforming material. Special nuclear material and sources shall be shipped and stored as specified in the U.S. Nuclear Regulatory Commission (NRC) fuel license and other applicable regulatory documents.	NQA-1 BR 15 "Items that do not conform to specified requirements shall be controlled to prevent inadvertent installation or use. Controls shall provide for identification, documentation, evaluation, segregation when practical, and disposition of non-conforming items..."		Control, use and shipment of special nuclear material is subject to NRC regulations and applicable license conditions which are not repeated in the QATR.
5.2.13.1 Procurement Document Control. Measures shall be provided to assure that applicable regulatory documents, design bases and other requirements which are necessary to assure quality are included or referenced in the procedures for procurement of items and services. To the extent	NQA-1 BR4 "Procurement Document Control" states "Applicable design bases and other requirements necessary to assure quality shall be included or referenced in documents for procurement of items and services. To the extent necessary, procurement documents shall require Suppliers to have a quality		

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necessary, procurement documents shall require suppliers to provide a quality assurance program consistent with the pertinent requirements of American National Standard Quality Assurance Program Requirements for Nuclear Power Plants, N45.2-1971.	assurance program consistent with the applicable requirements of this part.		
[2] Where changes are made to procurement documents, they shall be subject to the same degree of control as was used in the preparation of the original documents.	NQA-1 Supplement 4S-1 Section 4 states "Procurement document changes shall be subject to the same degree of control as utilized in the preparation of the original documents."		
Procurement documents shall include provisions for the following, as applicable: (1) Supplier Quality Assurance Program. Identification of quality assurance requirements applicable to the items or services procured.	NQA-1 Supplement 4S-1 Section 2 states "Procurement documents issued at all tiers of procurement shall include provisions for the following, as deemed necessary by the Purchaser... 2.3 Quality Assurance Program Requirements Procurement documents shall require that the Supplier have a documented quality assurance program..."	B.4 "Procurement Control" states "Applicable technical, regulatory, administrative, quality and reporting requirements (such as specifications, codes, standards, tests, inspections, special processes, and 10CFR21) are invoked for procurement of items and services."	
(2) Basic Technical Requirements. Where specific technical requirements apply, such as drawings, specifications, and industrial codes and standards, they shall be identified by titles and dates of issue in such a way as to clearly set forth the applicable documents. Where procedural requirements apply, in such areas as test and inspection needs, fabrication, cleaning, erecting, packaging, handling, shipping and storage, they too, shall be identified clearly and in such a way as to avoid uncertainty as to source and need.	NQA-1 Supplement 4S-1 Section 2 states "Procurement documents issued at all tiers of procurement shall include provisions for the following, as deemed necessary by the Purchaser... 2.2 Technical Requirements Technical requirements shall be specified in the procurement documents. Where necessary, these requirements shall be specified by reference to specific drawings, specifications, codes, standards, regulations, procedures, or instructions..."		
(3) Source Inspection and Audit. Provisions for access to the supplier's facilities and records for source inspection and audit when the need for such inspection or audit has	NQA-1 Supplement 4S-1 Section 2 states "Procurement documents issued at all tiers of procurement shall include provisions for the following, as deemed necessary by		

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been determined.	<p>the Purchaser...</p> <p>2.4 Right of Access</p> <p>At each tier of a procurement, the procurement documents shall provide for access to the Supplier's plant facilities and records for inspection or audit..."</p>		
(4) Documentation Requirements. Records to be prepared, maintained, submitted or made available for review, such as drawings, specifications, procedures, procurement documents, inspection and test records, personnel and procedure qualifications, and material, chemical, and physical test results. Instruction on record retention and disposition shall be provided.	<p>NQA-1 Supplement 4S-1 Section 2 states "Procurement documents issued at all tiers of procurement shall include provisions for the following, as deemed necessary by the Purchaser..."</p> <p>2.5 Documentation Requirements</p> <p>The procurement documents at all tiers shall identify the documentation required to be submitted for information, review, or approval by the Purchaser. The time of submittal shall also be established. When the Purchaser requires the Supplier to maintain specific quality assurance records, the retention times and disposition requirements shall be prescribed."</p>		
(5) Lower Tier Procurement. Provisions for extending applicable requirements to lower tier subcontractors and suppliers, including purchaser's access to facilities and records.	<p>NQA-1 Supplement 4S-1 Section 2 states "Procurement documents issued at all tiers of procurement shall include provisions for the following, as deemed necessary by the Purchaser..."</p> <p>2.3 Quality Assurance Program Requirements</p> <p>"...The procurement documents shall require the Supplier to incorporate appropriate quality assurance program requirements in subtier procurement documents."</p> <p>2.4 Right of Access</p> <p>"At each tier of a procurement, the procurement documents shall provide for access to the Supplier's plant facilities and records..."</p>		
5.2.13.2 Control of Purchased Material, Equipment and Services.		B.5 " NMC establishes and implements measures to verify the quality of	

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Measures shall be provided to assure that purchased items and services, whether purchased directly or through contractors, conform to the procurement documents.		purchased items and services, whether purchased directly or through contractors, at intervals and to a depth consistent with the item's or service's importance to safety, complexity, quantity and the frequency of procurement. Verification actions include testing, as appropriate, during design, fabrication and construction activities associated with plant maintenance or modifications. Verifications occur at the appropriate phases of the procurement process, including, as necessary, verification of activities of suppliers below the first tier."	
These measures shall include provisions, as appropriate, for source evaluation and selection, objective evidence of quality furnished by the contractor, inspection and audit at the source and examination of items upon delivery.	Supplement 7S-1 "Supplementary Requirements for Control of Purchased Items and Services" states "Such control shall provide for the following as appropriate: source evaluation and selection, evaluation of objective evidence of quality furnished by the Supplier, source inspection, audit, and examination of items or services upon delivery or completion."		
Measures for evaluation and selection of procurement sources include the use of historical quality performance data, source surveys or audits, or source qualification programs.	Supplement 7S-1 Section 3 states "Measures for evaluation and selection of procurement sources...shall include one or more of (a) through (c) below: (a) evaluation of the Supplier's history of providing an identical or similar product which performs satisfactorily in use... (b) Supplier's current quality records supported by documented qualitative and quantitative information which can be objectively evaluated; (c) Supplier's technical and quality capability as determined by a direct evaluation of his facilities and personnel and the implementation of his quality assurance program."		

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Source inspection or audit shall be performed as necessary to assure the required quality of an item. Source inspection or audit may not be necessary when the quality of the item can be verified by review of test reports, inspection upon receipt, or other means.	Supplement 7S-1 Section 8.2.2 states "When source verification is used, it shall be performed at intervals consistent with the importance and complexity..."		
Where required by code, regulation, or contract requirements documentary evidence that items conform to procurement requirements shall be available at the nuclear power plant site prior to installation or use of such items.	NQA-1, 7S-1, paragraph 8.1 "Where required by code, regulation, or contract requirement, documentary evidence that items conform to procurement documents shall be available at the nuclear power facility site prior to installation or use."	B.4 "Procurement Control" states "For Supplement 7S-1, section 8.1, documentary evidence that items conform to procurement requirements need not be available at the site prior to item installation, but will be available at the site prior to placing reliance on the item for its intended safety function."	Exception to NQA-1 taken.
This documentary evidence shall be retrievable and shall be sufficient to identify the specific requirements such as codes, standards and specifications met by the purchased item.		B.4 "Procurement Control" states "Applicable technical, regulatory, administrative, quality and reporting requirements (such as specifications, codes, standards, tests, inspections...) are invoked for procurement of items and services. Documentary evidence that an item conforms to these requirements is available at the site before relying on the item ... These documents are considered records according to section B.15."	
Where not precluded by other requirements, such documentary evidence may take the form of written certifications of conformance which identify the requirements met by the items, provided means are available to verify the validity of such certifications.	Supplement 7S-1 Section 8.2 states "When a Certificate of Conformance is used, the minimum criteria of (a) through (f) shall be met. (f) means shall be provided to verify the validity of Supplier certificates and the effectiveness of the certification system..."		
The effectiveness of the control of quality shall be assessed by the purchaser at intervals consistent with the importance, complexity and quality of the item or service.	Supplement 7S-1 Section 5 states "The Purchase of items and services shall establish measures to interface with the Supplier and to verify Supplier's performance as deemed necessary by the Purchaser. The measures shall include (a) through (f) below: ... 5.1 The extent of verification activities...shall be a function of relative importance, complexity, and		

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	quantity of the item or services procured and the Supplier's quality performance."		
5.2.13.3 Identification and Control of Materials, Parts and Components. Measures shall be provided for the identification and control of materials, parts and components including partially fabricated subassemblies.	NQA-1, 8S-1, paragraph 2.1 "Items of production (batch, lot, component, part) shall be identified from the initial receipt and fabrication of the items up to and including installation and use."	B.6 "Identification and Control of Items" states "NMC establishes and implements provisions for the identification and control of items..."	
These procedures shall be implemented to provide insurance that only correct and accepted items are used and installed, and relating an item of production (batch, lot, component, part) at any stage, from initial receipt through fabrication, installation, repair or modification, to an applicable drawing, specification, or other pertinent technical document.	BR8 "Identification and Control of Items" states "Controls shall be established to assure that only correct and accepted items are used or installed." Supplement 8S-1 "Identification and Control of Items" Section 2.1 states "Items of production (batch, lot, component, part) shall be identified from the initial receipt and fabrication of the items up to and including installation and use. The identification shall relate an item to an applicable design or other pertinent specifying document."		
Physical identification shall be used to the maximum extent possible. Where physical identification is either impractical or insufficient, physical separation, procedural control or other appropriate means shall be employed.	Supplement 8S-1 Section 2.2 states "Physical identification shall be used to the maximum extent possible. Where physical identification on the item is either impractical or insufficient, physical separation, procedural control or other appropriate means shall be employed."		
Identification may be either on the item or on records traceable to the item, as appropriate.	BR8 "Identification and Control of Items" states "Identification shall be maintained on the items or in documents traceable to the item..."		
Where identification marking is employed, the marking shall be clear, unambiguous and indelible, and shall be applied in such a manner as not to affect the function of the item.	Supplement 8S-1 Section 2.3 states "Identification markings, when used, shall be applied using materials and methods which provide a clear and legible identification and do not detrimentally affect the function or service life of the item."		The NQA-1 requirements are better stated.
Markings shall be transferred to each part of an item when subdivided and shall not be obliterated or hidden by surface treatment or coatings unless other means of	Supplement 8S-1 Section 2.3 states "Markings shall be transferred to each part of an identified item when subdivided and shall not be obliterated or hidden by surface treatment or		

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identification are substituted.	coatings unless other means of identification are substituted."		
When standards or specifications require traceability of materials, parts or components to specific inspection or test records, the program shall be designed to provide such traceability.	Supplement 8S-1 Section 3.1 states "When specified by codes, standards or specifications that include specific identification or traceability requirements (such as identification or traceability of the item to applicable specification and grade of material; heat, batch, lot, part, or serial number; or specified inspection, test, or other records), the program shall be designed to provide such identification and traceability control."		
5.2.13.4 Handling, Storage and Shipping. Measures shall be provided to control handling, storage and shipping, including cleaning, packaging and preservation of material and equipment in accordance with established instructions, procedures or drawings, to prevent damage, deterioration and loss.	BR13 "Handling, Storage, and Shipping" states "Handling, storage, cleaning, packaging, shipping, and preservation of items shall be controlled to prevent damage or loss and to minimize deterioration."		
When necessary for particular items, special coverings, special equipment and special protective environments, such as inert gas atmosphere, specific moisture content levels and temperature levels shall be specified, provided, and their existence verified.	Supplement 13S-1 "Supplementary Requirements for Handling, Storage, and Shipping" Section 3.1 states " When required for particular items, special equipment (such as containers, shock absorbers, and accelerometers) and special protective environments (such as inert gas atmosphere, specific moisture content levels, and temperature levels) shall be specified, provided, and their existence verified."	B.7 "Handling, Storage and Shipping" states " Special controls (such as containers, shock absorbers, accelerometers, inert gas atmospheres, specific moisture content levels and temperature levels) are provided when required to maintain acceptable quality."	
For critical, sensitive, perishable or high-value articles, specific written procedures for handling, storage, packaging, shipping and preservation should be used.	Supplement 8S-1 Section 3.2 states "When required for critical, sensitive, perishable or high-value articles, specific procedures for handling, storage, packaging, shipping and preservation shall be used."		
Special handling tools and equipment shall be provided and controlled as necessary to ensure safe and adequate handling.	Supplement 8S-1 Section 3.3 states "Special handling tools and equipment shall be utilized and controlled as necessary to ensure safe and adequate handling."		
Special handling tools and equipment shall be inspected and tested in accordance with written	Supplement 8S-1 Section 3.3 states "Special handling tools and equipment shall be inspected and tested in		

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procedures and at specified times, to verify that the tools and equipment are adequately maintained.	accordance with procedures and at specified time intervals to verify that the tools and equipment are adequately maintained."		
Attention shall be given to providing adequate instructions for marking and labeling of items for packaging, shipment and storage. Marking shall be adequate to identify, maintain and preserve the shipment, including indication of the presence of special environments or the need for special control.	Supplement 8S-1 Section 4 states "Instructions for marking and labeling for packaging, shipment, handling, and storage of items shall be established as necessary to adequately identify, maintain and preserve the item, including indication of the presence of special environments or the need for special controls."		
American National Standard for Packaging, Shipping, Receiving, Storage and Handling of Items for Nuclear Power Plants (During the Construction Phase), N45.2.2-1972, shall be applied to those activities occurring during the operational phase that are comparable in nature and extent to related activities occurring during construction. [16]	ANSI N45.2.2 = NQA-1 Subpart 2.2	B.7 "In establishing provisions for handling, storage and shipping, NMC commits to compliance with the requirements of NQA-1, 1994, Basic Requirement 13 and Supplement 13S-1. NMC also commits to compliance with the requirements of Subpart 2.2, with the following exceptions: ..."	
5.2.14 Nonconforming Items. Measures shall be provided to control items, services or activities which do not conform to requirements (see also Section 5.2.6).	BR15 "Control of Nonconforming Items" states "Items that do not conform to specified requirements shall be controlled to prevent inadvertent installation or use."		
These procedures shall include as appropriate, instructions for identification, documentation, segregation, disposition and notification to affected organizations.	BR15 "Control of Nonconforming Items" states "Controls shall provide for instructions for identification, documentation, evaluation, segregation when practical, and disposition of nonconforming items, and for notification to affected organizations."		
Nonconforming items shall be reviewed and accepted, rejected, repaired or reworked in accordance with documented procedures.	Supplement 15S-1 Section 4.1 states "Nonconforming characteristics shall be reviewed and recommended dispositions of nonconforming items shall be proposed and approved in accordance with documented procedures."		
The responsibility and authority for the disposition of nonconforming items shall be defined.	Supplement 15S-1 Section 4.2 states "The responsibility and authority for the evaluation and disposition of nonconforming items shall		

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	be defined."		
Repaired and reworked items shall be reinspected in accordance with applicable procedures.	Supplement 15S-1 Section 4.5 states "Repaired or reworked items shall be reexamined in accordance with applicable procedures..."		NQA-1 uses a more encompassing word, "reexamined," in lieu of "reinspected"
Measures which control further processing, delivery, or installation of a nonconforming or defective item pending a decision on its disposition shall be established and maintained.	Supplement 15S-1 Section 4.1 states "Further processing, delivery, installation or use of a nonconforming item shall be controlled pending an evaluation and an approved disposition..."		
Nonconforming items may be disposed of by acceptance "as is," by scrapping or repairing the defective item, or by rework to complete or correct to a drawing or specification. Such measures shall provide assurance that the item is identified as nonconforming and controlled. The measures shall require documentation verifying the acceptability of nonconforming items which have the disposition of "repair" or "use as is."	Supplement 15S-1 Section 4.4 states "The disposition, such as use-as-is, reject, repair, or rework, of nonconforming items shall be identified and documented. Technical justification for the acceptability of a nonconforming item, dispositioned repair or use as is shall be documented."	A.6 "Prior to installation, nonconforming items, services or activities are reviewed and accepted, rejected, repaired or reworked, and are identified and controlled to prevent their inadvertent test, installation or use."	
A description of the change, waiver or deviation that has been accepted shall be documented to record the change and denote the as-built condition.	Supplement 15S-1 Section 4.4 states "The as-built records, if such records are required, shall reflect the accepted deviation."		
As a guideline, control of nonconforming items by tagging, marking or other means of identification is acceptable where physical segregation is not practical, although physical segregation and marking are preferred.	Supplement 15S-1 Section 2 states "Identification of nonconforming items shall be by marking, tagging, or other methods..." Supplement 15S-1 Section 3 states "Nonconforming items shall be segregated, when practical..."		
5.2.15 Review, Approval and Control of Procedures The administrative controls and quality assurance program shall provide measures to control and coordinate the approval and issuance of documents including changes thereto, which prescribe all activities affecting quality.	BR6 "Document Control" states "The preparation, issue, and change of documents that specify quality requirements or prescribe activities affecting quality shall be controlled to assure that correct documents are being employed. Such documents, including changes thereto, shall be reviewed for adequacy and approved for release by authorized personnel."		
Such documents include those which describe organizational interfaces, or which prescribe activities affecting safety-related		A.1 "Activities affecting quality are prescribed by and performed according to documents (such as instructions, procedures or	

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structures, systems, or components. These documents also include operating and special orders, operating procedures, test procedures, equipment control procedures, maintenance or modification procedures, refueling, and material control procedures.		drawings) of a type appropriate to the circumstances and which, where applicable, include quantitative or qualitative acceptance criteria. Such documents are prepared and controlled according to section B.14. In addition, means are provided for dissemination to plant staff of instructions of both general and continuing applicability (e.g., dealing with job turnover and relief, designation of confines of the control room, limitations on access to certain areas), as well as those of short-term applicability (e.g., dealing with short-term operating conditions, publications, personnel actions). Provisions are included for review, updating, and cancellation of such instructions. In addition, as stated in position C.1 of Regulatory Guide 1.33, Revision 2, NMC commits to use Appendix A of Regulatory Guide 1.33 as guidance for establishing the types of procedures that are necessary to control and support plant operation. Requirements specific to procedures are also provided in Appendix C."	
These measures shall assure that documents, including revisions or changes, are reviewed for adequacy by appropriately qualified personnel and approved for release by authorized personnel; and are distributed in accordance with current distribution lists and used by the personnel performing the prescribed activity, and that procedures are provided to avoid the misuse of outdated or inappropriate documents.		B.14 "Document Control" states "These provisions assure that specified documents are reviewed for adequacy, approved prior to use by authorized persons, and distributed according to current distribution lists and used at the location where the prescribed activity takes place... New or revised controlled documents are made available in a timely fashion to support ongoing work and preclude use of incorrect information. Superseded documents are identified or removed from availability. ..."	
[Procedures for operational phase activities of a nuclear power plant reflect the conditions that exist at the time the procedures are written. Procedures for operational phase activities of a nuclear power plant		B.14 "NMC also establishes programmatic procedure preparation, review and usage controls that ensure procedures are technically and administratively correct. These controls ensure that procedures are reviewed	N18.7 wording in brackets are included in this table for completeness; they do not establish requirements that either NQA-1 or the NMC QATR would need to address.

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reflect the conditions that exist at the time the procedures are written. These conditions include the technical information available, industry experience, and in the case of the initial procedures for a new plant assumptions made regarding the detailed behavior of the plant that may not be fully known prior to operation.] In order to ensure that the procedures in current use provide the best possible instructions for performance of the work involved, systematic review and feedback of information based on use is required.		when pertinent source material is revised (such as when Technical Specifications are revised), when unusual incidents occur, when plant modifications are made, and when significant deficiencies are identified. Procedures may also be reviewed because industry experience reviews, use during job execution or training, self-assessments, or independent assessments identify deficiencies or opportunities for improvement. Revisions are made as necessary."	
Each procedure shall be reviewed and approved prior to initial use.		B.14 "Document Control" states "These provisions assure that specified documents are reviewed for adequacy, approved prior to use by authorized persons, and distributed according to current distribution lists and used at the location where the prescribed activity takes place..."	
The frequency of subsequent reviews shall be specified and may vary depending on the type and complexity of the activity involved, and may vary with time as a given plant reaches operational maturity.		B.14 "These controls ensure that procedures are reviewed when pertinent source material is revised (such as when Technical Specifications are revised), when unusual incidents occur, when plant modifications are made, and when significant deficiencies are identified. Procedures may also be reviewed because industry experience reviews, use during job execution or training, self-assessments, or independent assessments identify deficiencies or opportunities for improvement. Revisions are made as necessary. "	
Applicable procedures shall be reviewed following an unusual incident, such as an accident, an unexpected transient, significant operator error, or equipment malfunction. Applicable procedures shall be reviewed following any modification to a system. Plant procedures shall be reviewed by an individual knowledgeable in the area affected by the procedure no less frequently than every two years to		B.14 "NMC also establishes programmatic procedure preparation, review and usage controls that ensure procedures are technically and administratively correct. These controls ensure that procedures are reviewed ...when unusual incidents occur, when plant modifications are made, and when significant deficiencies are identified. Procedures may also be reviewed because industry experience reviews, use	The NMC program provides an acceptable alternative to two-year reviews that has been previously accepted by the NRC in several Licensee QA Programs, including for Palisades in a letter dated October 19, 1995.

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determine if changes are necessary or desirable. A revision of a procedure constitutes a procedure review.		during job execution or training, self-assessments, or independent assessments identify deficiencies or opportunities for improvement. Revisions are made as necessary."	
Procedures shall be approved as designated by the owner organization before initial use. Rules shall be established which clearly delineate the review of procedures by knowledgeable personnel other than the originator and the approval of procedures and procedure changes by authorized individuals.		B.14 "These provisions assure that specified documents are reviewed for adequacy, approved prior to use by authorized persons, and distributed according to current distribution lists and used at the location where the prescribed activity takes place. Procedures are reviewed by qualified persons, independent of the preparer ... Revisions to controlled documents are reviewed for adequacy and approved for release by the same organization(s) as originally did so..."	
Changes to documents shall be reviewed and approved by the same organizations that perform the original review and approval unless the owner organization designates another qualified organization.		B.14. "Revisions to controlled documents are reviewed for adequacy and approved for release by the same organization(s) as originally did so, or by other designated organizations that are qualified and sufficiently knowledgeable ..."	
The reviewing organizations shall have access to pertinent background information upon which to base its approval and shall have adequate understanding of requirements and intent of the original document.	Supplement 6S-1, section 3.1 states "The reviewing organization shall have access to pertinent background data or information upon which to base their review."		
Those participating in any activity shall be made aware of and use, proper and current instructions, procedures, drawings and engineering requirements for performing the activity. Participating organizations shall have procedures for control of the documents and changes thereto to preclude the possibility or use of outdated or inappropriate documents.		B.14 Document Control "Controlled copies of instructions and procedures are made available to and used by the persons performing the activity covered. New or revised controlled documents are made available in a timely fashion to support ongoing work and preclude use of incorrect information. ..."	
Document control measures shall provide for: (1) Identification of individuals or organizations responsible for preparing, reviewing, approving, and issuing documents and	Supplement 6S-1 Section 2 states "The control system shall be documented and shall provide for (a) through (c) below: (a) identification of	B.1 "Provisions are established to designate or identify the proper documents to be used in an activity, and to ascertain that such documents are being used.."	

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<p>revisions thereto</p> <p>(2) Identifying the proper documents to be used in performing the activity</p> <p>(3) Coordination and control of interface documents</p> <p>(4) Ascertaining that proper documents are being used</p> <p>(5) Establishing current and updated distribution lists</p>	<p>documents to be controlled and their specified distribution;</p> <p>(b) identification of assignment of responsibility for preparing, reviewing, approving, and issuing documents</p> <p>(c) review of documents for adequacy, completeness, and correctness prior to approval and issuance."</p>	<p>B.14 "These provisions assure that specified documents are reviewed for adequacy, approved prior to use by authorized persons...</p> <p>Revisions to controlled documents are reviewed for adequacy and approved for release by the same organization(s) as originally did so..."</p>	
<p>5.2.16 Measuring and Test Equipment.</p> <p>The method and interval of calibration for each installed instrument and control device shall be defined and shall be based on the type of equipment, stability and reliability characteristics, required accuracies and other conditions affecting calibration.</p>	<p>Supplement 12S-1 "Supplementary Requirements for Control of Measuring and Test Equipment" Section 3.2 states "The method and interval of calibration for each item shall be defined, based on the type of equipment, stability characteristics, required accuracy, intended use, and other conditions affecting measurement control."</p>		
<p>Tools, instruments, testing equipment and measuring devices used for measurements, tests and calibration shall be of the proper range and type and shall be controlled, calibrated and adjusted and maintained at specified intervals or prior to use to assure the necessary accuracy of calibrated devices.</p>	<p>BR12 "Control of Measuring and Test Equipment" states "Tools, gages, instruments, and other measuring and test equipment used for activities affecting quality shall be controlled and at specified periods calibrated and adjusted to maintain accuracy within necessary limits."</p> <p>Supplement 12S-1 Section 2 states "Selection of measuring and test equipment shall be controlled to assure that such items are of proper type, range, accuracy, and tolerance..."</p>		
<p>When calibration, testing, or other measuring devices are found to be out of calibration, an evaluation shall be made and documented concerning the validity of previous tests and the acceptability of devices previously tested from the time of the previous calibration. If any calibration, testing or measuring device is consistently found to be out of calibration, it shall be repaired or replaced.</p>	<p>Supplement 12S-1 Section 3.2 states "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... If any measuring or test equipment is consistently found to be out of calibration, it shall be repaired or replaced."</p>	<p>B.9 "Measuring and test equipment found out of calibration is tagged or segregated and not used until it is successfully re-calibrated. An evaluation is performed to determine the acceptability of any items measured, inspected or tested with an out-of-calibration device from the time of the previous calibration."</p>	
<p>It is not the intent of this Standard to imply a need</p>	<p>Supplement 12S-1 Section 3.3 states "Calibration and</p>		

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for special calibration and control measures on rulers, tape measures, levels and other such devices if normal commercial practices provide adequate accuracy.	control measures may not be required for rulers, tape measures, levels and other such devices, if normal commercial equipment provides adequate accuracy."		
Special calibration shall be performed when the accuracy of either installed or calibrating equipment is questionable.	Supplement 12S-1 Section 3.2 states "A calibration shall be performed when the accuracy of the equipment is suspect."		
Records shall be made and equipment suitably marked to indicate calibration status.	Supplement 12S-1 Section 5 states "Records shall be maintained and equipment shall be suitably marked to indicate calibration status."		
American National Standard N45.2.4-1972 shall be applied to those activities occurring during the operational phase that are comparable in nature and extent to related activities occurring during construction [6].	ANSI N45.2.4 = NQA-1 Subpart 2.4	B.12 Inspection "In establishing inspection requirements, NMC commits to compliance with NQA-1, 1994, Basic Requirement 10 and Supplement 10S-1 and Subpart 2.4."	
5.2.17 Inspections. A program for inspection of activities affecting safety shall be established and executed by or for the organization performing the activity to verify conformance with applicable documented instructions, procedures, and drawings.		B.12 "NMC establishes and implements provisions for inspections to assure that items, services and activities affecting safety meet established requirements and conform to applicable documented instructions, procedures and drawings.	
Inspections, examinations, measurements, or tests of material, products, or activities shall be performed for each work operation where necessary to assure quality.	NQA-1, 10S-1, paragraph 6.1 "Inspection of items in-process or under construction shall be performed for work activities where necessary to verify quality."		
Such inspections shall be performed by qualified individuals other than those who performed or directly supervised the activity being inspected.	BR10 "Inspection" states "Inspection for acceptance shall be performed by persons other than those who performed or directly supervised the work being inspected."	B.12 "Inspections are carried out by properly qualified persons independent of those who performed or directly supervised the work."	
Inspection of operating activities (work functions associated with normal operation of the plant, routine maintenance, and certain technical services routinely assigned to the onsite operating organization) may be conducted by second-line supervisory personnel or by other qualified personnel not assigned first-line supervisory responsibility for conduct of the work.	BR10 "Inspection" states "Inspection for acceptance shall be performed by persons other than those who performed or directly supervised the work being inspected."	B.12 "Inspections are carried out by properly qualified persons independent of those who performed or directly supervised the work."	The NMC QATR does not include the allowance provided in N18.7.
These independent inspections i.e., those	BR10 "Inspection" states "Inspection for acceptance	B.1 Methodology "Personnel who work	

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performed by individuals not assigned first-line supervisory responsibility for the conduct of the work, are not intended to dilute or replace the clear responsibility of first-line supervisors for the quality of work performed under their supervision.	shall be performed by persons other than those who performed or directly supervised the work being inspected."	directly or indirectly for NMC are responsible for the achievement of acceptable quality in the work covered by this QATR. ... A.3 Responsibility "... Managers and supervisors are responsible for timely and continuing monitoring of performance to verify that day-to-day activities are conducted safely and in accordance with applicable requirements."	
For modifications and non-routine maintenance, inspections shall be conducted in a manner similar (frequency, type, and personnel performing such inspections) to that associated with construction phase activities (see also Section 5.2.7).		B.12 "In establishing inspection requirements, NMC commits to compliance with NQA-1, 1994, Basic Requirement 10, Supplement 10S-1 and Subpart 2.4. In addition, for situations comparable to original construction, NMC commits to compliance with the requirements of Subparts 2.5 and 2.8 for establishing appropriate inspection requirements."	
Inspections of safety-related activities shall be performed in accordance with appropriate written, procedures, which set forth the requirements and acceptance limits and specify the inspection responsibilities.	Supplement 10S-1 Section 2 "Supplementary Requirements for Inspection" states "Inspection requirements and acceptance criteria shall include specified requirements contained in applicable design documents or other pertinent technical documents...Inspection activities shall be documented and controlled by instructions, procedures, drawings, checklists, travelers, or other appropriate means."	B.12 "Inspection" states "Inspection planning...identifies the characteristics and activities to be inspected, the inspection techniques, the acceptance criteria and the organization responsible for performing the inspection."	
If mandatory inspection hold points are required, the specific hold points shall be indicated in appropriate documents.	Supplement 10S-1 Section 4 states "If mandatory inspection hold points are required... the specific hold points shall be indicated in appropriate documents."		
Information concerning, inspection shall be obtained from the related design drawings, specifications and/or, other controlled documents.	Supplement 10S-1 Section 2 states "Inspection requirements and acceptance criteria shall include specified requirements contained in the applicable design documents or other pertinent technical documents..."		
When inspection techniques require specialized qualifications or skills, personnel performing	Supplement 10S-1 Section 3.2 states "Each person who verifies conformance of work activities for purposes	A.5. Personnel Training and Qualification "... When required by code, regulation, or standard,	

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the inspection shall meet applicable licensing requirements, codes, and standards appropriate to the discipline involved (see also Sections 5.2.7, 5.2.6 and 5.3.10).	of acceptance shall be qualified to perform the assigned inspection task."	specific qualification and selection of personnel is conducted in accordance with those requirements as established in the applicable NMC procedures. ..."	
If inspection is impossible or disadvantageous, indirect control by monitoring processing methods, equipment and personnel shall be provided.	Supplement 10S-1 Section 6.1 states "If inspection of processed items is impossible or disadvantageous, indirect control by monitoring of processing methods, equipment and personnel shall be provided."		
Both inspection and process monitoring shall be provided when control is inadequate without both.	Supplement 10S-1 Section 6.1 states "Both inspection and process monitoring shall be provided when control is inadequate without both."		
[In cases where documented verification of quality implied by the above requirements is not possible or feasible, the extent of inspection or performance testing to verify adequacy of structures, systems or components for service should be, in general, greater than otherwise required.]			N18.7 wording in brackets are included in this table for completeness; they do not establish requirements that either NQA-1 or the NMC QATR would need to address.
The owner organization shall evaluate inspection results along with test results (see Section 5.2.19) to determine whether the individual inspection and test programs demonstrate that the plant can be operated safely and as designed.	Supplement 10S-1 Section 7.3 states "The acceptance of the item shall be documented and approved by authorized personnel." Supplement 11S-1 Section 4 "Supplementary Requirements for Test Control" states "Test results shall be documented and evaluated by a responsible authority to assure that test requirements have been satisfied."	B.8 "NMC establishes and implements testing programs to demonstrate that items subject to the provisions of this QATR will perform satisfactorily in service, that the plant can be operated safely and as designed, and that the coordinated operation of the plant as whole is satisfactory."	
Records shall be kept in sufficient detail to permit adequate confirmation of the inspection program. The person recording the data as well as the person approving the inspection results shall be identified.	Supplement 10S-1 Section 9 states "Records shall, as a minimum, identify (a) through (f) below: (c) inspector"	B.12 "Inspection results are documented by the inspector and approved by authorized personnel."	
Deviations, their cause, and any corrective action completed or planned as a result of the deviations shall be documented. Inspection records shall be identified as such and shall be retrievable (see also Section 5.2.12).	Supplement 10S-1 Section 9 states "Records shall, as a minimum, identify (a) through (f) below: (f) reference to information on action taken in connection with nonconformances."	B.15 "NMC uses the list of records in Non-mandatory Appendix 17A-1, supplemented by the recommended retention times established in Regulatory Guide 1.28, position C.2 (Table 1), to establish the types of records that will be created	

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	BR 15 "...Controls shall provide for identification, documentation, evaluation, segregation when practical, and disposition of nonconforming items, ..." BR 16 "The identification, cause, and corrective action for significant conditions adverse to quality shall be documented..."	and retained in support of plant operation."	
5.2.18 Control of Special Processes. Measures shall be established and documented to assure that special processes accomplished under controlled conditions in accordance with applicable codes, standards, specifications, criteria, and other special requirements, use qualified personnel and procedures.		B.11 "Special Process Control" states "NMC establishes and implements provisions to assure that special processes that require interim process controls to assure quality, such as welding, heat treating, chemical cleaning, and nondestructive examination, are controlled. These provisions include assuring that special processes are accomplished by qualified personnel using qualified procedures and equipment. Special processes are performed in accordance with applicable codes, standards, specifications, criteria or other specially established requirements..."	
Qualification of personnel, procedures, and equipment shall comply with the requirements of applicable codes and standards.	Supplement 9S-1 Section 3.1.1 "Supplementary Requirements for Control of Processes" states "Qualification of personnel, procedures, and equipment shall comply with specified requirements."		
Special processes are those that require interim in-process controls in addition to final inspection to assure quality including such processes as welding, heat treating, chemical cleaning, and nondestructive examination.		B.11 "Special Process Control" states "NMC establishes and implements provisions to assure that special processes that require interim controls to assure quality, such as welding, heat treating, chemical cleaning, and nondestructive examination, are controlled..." Special processes are those where the results are highly dependent on the control of the process or the skill of the operator, or both, and for which the specified quality cannot be fully and readily determined by inspection or test of the final product."	
For special processes not covered by existing codes	Supplement 9S-1 Section 3.4 states "For special		

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or standards, or where item quality requirements exceed the requirements of established codes or standards, the necessary qualifications of personnel, procedures, or equipment shall be defined.	processes not covered by existing codes or standards or where quality requirements specified for an item exceed those of existing codes or standards, the necessary requirements for qualifications of personnel, procedures, or equipment shall be specified or referenced in the procedures or instructions."		
5.2.19 Test Control. A test program shall be established to assure that testing required to demonstrate that the item will perform satisfactorily in service is identified and documented, and that the testing is performed in accordance with written test procedures which incorporate or reference the requirements and acceptance limits contained in applicable design documents.		B.8 "Test Control" states "NMC establishes and implements testing programs to demonstrate that subject to the provisions of this QATR will perform satisfactorily in service...Tests are performed according to applicable procedures that include, consistent with the effect on safety, (1) instructions and prerequisites to perform the test, (2) use of proper test equipment, (3) acceptance criteria..."	
The test program shall cover all required tests including: (1) Tests during the preoperational period to demonstrate that performance of plant systems is in accordance with design intent and that the coordinated operation of the plant as a whole is satisfactory, to the extent feasible.	NQA-1 Subpart 2.8 Section 5.2 "Quality Assurance Requirements for Installation, Inspection, and Testing of Mechanical Equipment and Systems for Nuclear Power Plants" states (Preoperational Testing) "This testing involves the operation of all items in a system(s) or partial system(s) to assure that operation is in accordance with the design criteria and functional requirements."	B.8 "NMC establishes and implements testing programs to demonstrate that items subject to the provisions of this QATR will perform satisfactorily in service, that the plant can be operated safely and as designed, and that the coordinated operation of the plant as whole is satisfactory. These programs include criteria for determining when testing is required, such as ... pre-operational tests ..."	
(2) Tests during the initial operational phase to demonstrate the performance of systems that could not be tested prior to operation and to confirm those physical parameters, hydraulic or mechanical characteristics that need to be known, but which could not be predicted with the required accuracy, and to confirm that plant behavior conforms to design criteria.		B.8 "Test Control" states "These programs include criteria for determining when testing is required, such as...operational tests..."	
The initial start-up test program shall be planned to permit safe fuel loading and start-up; to increase power in safe increments; and to perform major testing at			These requirements apply to initial start-up testing. The NMC QATR covers only operating plants where initial start-up testing has been completed.

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specified power plateaus. If tests require the variation of operating parameters outside of their normal range, the limits within which such variation is permitted shall be prescribed. Prerequisites and record keeping shall be given attention and the scope of the testing shall demonstrate insofar as practicable that the plant is capable of withstanding the design transients and accidents. The suitability of plant operating procedures shall be checked to the maximum extent possible during the preoperational and initial start-up test programs.			
(3) surveillance test during, the operational phase to provide assurance that failures or substandard performance do not remain undetected and that the required reliability of safety-related systems is maintained (see Section 5.2.8).		<p>B.8 "These programs include criteria for determining when testing is required, such as proof tests before installation, pre-operational tests, post-maintenance tests, post-modification tests, inservice tests, and operational tests (such as surveillance tests required by Plant Technical Specifications), to demonstrate that performance of plant systems is in accordance with design intent.</p> <p>Appendix C "Surveillance testing: periodic testing to verify that safety related structures, systems and components continue to function or are in a state of readiness to perform their functions, and to provide assurance that failures or substandard performance do not remain undetected and that the required reliability of safety related systems is maintained. Such functions include keeping parameters within normal bounds or acting to put the plant in a safe condition if they exceed normal bounds."</p>	
(4) Tests during design, fabrication and construction activities associated with plant maintenance and modifications during the operational phase and the demonstration satisfactory performance following plant maintenance and		B.8 "These programs include criteria for determining when testing is required, such as proof tests before installation, pre-operational tests, post-maintenance tests, post-modification tests, inservice tests, and operational tests	

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modifications or procedural changes (see Section 5.2.7).		(such as surveillance tests required by Plant Technical Specifications), to demonstrate that performance of plant systems is in accordance with design intent." B.5 "NMC establishes and implements measures to verify the quality of purchased items and services, whether purchased directly or through contractors, at intervals and to a depth consistent with the item's or service's importance to safety, complexity, quantity and the frequency of procurement. Verification actions include testing, as appropriate, during design, fabrication and construction activities associated with plant maintenance or modifications."	
5.2.19.1 Preoperational Tests. [Preoperational tests are generally performed sequentially in accordance with written procedures.]			N18.7 wording in brackets are included in this table for completeness; they do not establish requirements that either NQA-1 or the NMC QATR would need to address.
Procedures shall ensure that prerequisites steps for equipment testing, such as completion of necessary construction, prior testing, safety precautions, and measures to preserve equipment status have been or will be performed (see also Sections 5.217 and 5.3.10).	Supplement 11S-1 "Supplementary Requirements for Test Control" Section 3 states "Test procedures shall include or reference test objectives and provisions for assuring that prerequisites for the given test have been met...Prerequisites shall include the following, as applicable: calibrated instrumentation, appropriate equipment, trained personnel, condition of test equipment..."		
A detailed prescribed physical inspection of equipment components and facilities shall be performed to ensure readiness for operation. Typical items to be covered include cleanliness, lubrication, setting of limit switches, calibration of instruments and presence of safety devices. The test procedure shall list the checks to be made and include acceptance criteria and reference sources, such as vendor's literature,	NQA-1, Subparts 2.4, 2.5 and 2.8 provide for such inspections and testing.		

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engineering drawings or plant specifications.			
A component test is a functional, operational or performance test of an individual piece of equipment or unit system under prescribed conditions. Typical parameters to be examined are direction of rotation, bearing temperatures, vibration, time delays, and ability to operate with remote and local controls. The procedure shall list checks to be made and provide acceptance criteria. Consideration should also be given to providing a run-in period to minimize early failures during operation of the plant.	NQA-1, Subparts 2.4, 2.5 and 2.8 provide for such inspections and testing.		
Individual system tests establish the functional adequacy by operation under prescribed conditions. The tests shall be designed to permit evaluation of system performance including, for example the measurement of flow, temperature, pressure, response time and vibration, transfer of power supply to emergency power and accuracy and response of control devices.	NQA-1, Subparts 2.4, 2.5 and 2.8 provide for such testing.		
The preoperational testing program should demonstrate, as nearly as can be practicably simulated, the overall integrated operation of the plant systems at rated conditions, including simultaneous operation of auxiliary systems. It may be necessary to defer portions of these tests until nuclear heat is available. The procedures used be similar to those discussed in 5.3.3 and 5.3.4, and they should be modified to require variation in control parameters, such as pump stops and restarts, cycling valves and varying flows so that system performance can be evaluated.	NQA-1, Subparts 2.4, 2.5 and 2.8 provide for such testing.		
For additional requirements in matters relating to preoperational test programs. American National Standard N45.2.8-1975 is generally	ANSI N45.2.8 = NQA-1 Subpart 2.8		

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applicable. [8]			
5.2.19.2 Tests Prior to and During Initial Plant Operation. Prior to placing a nuclear power plant into operation, a preoperational test program shall be performed to demonstrate the functional adequacy of-plant components systems and structures.		B.8 "Test Control" states "These programs include criteria for determining when testing is required, such as...pre-operational tests..."	
Following fuel loading an initial start-up test program shall be conducted to evaluate plant performance as the start-up progresses.		B.8 "Test Control" states "These programs include criteria for determining when testing is required, such as proof tests before installation, pre-operational tests ... and operational tests ... to demonstrate that performance of plant systems is in accordance with design intent."	
Responsibilities. The ultimate responsibility for the preparation and execution of adequate preoperational and initial start-up test programs rests with the owner organization. If design or construction is performed by other than the owner organization, design organizations involved should participate in definition of the programs, and the construction organization involved may supply manpower or supervision for execution of part or all of the program, but the owner organization shall determine that the program is adequate and that the results are satisfactory.		B.8 Test Control "NMC establishes and implements testing programs to demonstrate that items subject to the provisions of this QATR will perform satisfactorily in service, that the plant can be operated safely and as designed, and that the coordinated operation of the plant as a whole is satisfactory. ..."	
Scheduling. A schedule shall be provided and maintained to provide assurance that all necessary tests are performed and properly evaluated on a timely basis. Testing shall be scheduled so that the safety of the plant is never dependent on the performance of an untested system (see also Section 5.2.8).		B.8 Test Control "... These programs include criteria for determining when testing is required ..."	
5.2.19.3 Tests Associated with Plant Maintenance, Modifications or Procedure Changes. Tests shall be performed following plant modifications or significant changes in		B.8 "NMC establishes and implements testing programs to demonstrate that items subject to the provisions of this QATR will perform satisfactorily in service, that the plant can be operated safely and as	

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operating procedures to confirm that the modifications or changes reasonably produce expected results and that the change does not reduce safety of operations.		designed, and that the coordinated operation of the plant as whole is satisfactory. These programs include criteria for determining when testing is required, such as proof tests before installation, pre-operational tests, post-maintenance tests, post-modification tests, inservice tests, and operational tests (such as surveillance tests required by Plant Technical Specifications), to demonstrate that performance of plant systems is in accordance with design intent."	
5.3 Preparation of Instructions and Procedures. The administrative controls and quality assurance program shall be carried out throughout plant life in accordance with written procedures. Activities affecting safety at nuclear power plants shall be described by written procedures of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions and procedures. These procedures shall include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished. These procedures shall provide an approved preplanned method of conducting operations. Procedures shall be prepared and approved prior to implementation as required by 4.3 and 5.2.15.	BR5 "Instructions, Procedures, and Drawings" states "Activities affecting quality shall be prescribed by and performed in accordance with documented instructions, procedures, or drawings of a type appropriate to the circumstances. These documents shall include or reference appropriate quantitative or qualitative acceptance criteria for determining that prescribed activities have been satisfactorily accomplished."	Introduction: "The NMC Quality Assurance Topical Report describes the methods and establishes quality assurance program and administrative control requirements that meet 10CFR50, Appendix B and apply during the operational phase of plant life. ... A.1 Activities affecting quality are prescribed by and performed according to documents (such as instructions, procedures or drawings) of a type appropriate to the circumstances and which, where applicable, include quantitative or qualitative acceptance criteria." B.14 "NMC establishes and implements provisions to specify the format and content of, and control the development, review, approval, issue, use and revision of documents that specify quality requirements or prescribe activities affecting quality or safe operation to assure the correct documents are being employed. These provisions assure that specified documents are reviewed for adequacy, approved prior to use by authorized persons, ...	
5.3.1 Procedure Scope. Each procedure shall be sufficiently detailed for a qualified individual to perform the required function without direct supervision, but need not		Appendix B "Procedures are sufficiently detailed for a qualified individual to perform the required function without direct supervision, but may not provide a complete	

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provide a complete description of the system or plant process.		description of the system or plant process."	
<p>5.3.2 Procedure Content. The format of procedures may vary from plant to plant, depending on the policies of the owner organization. However, procedures shall include, as appropriate, the following elements:</p> <p>(1) Title. Each procedure shall contain a title descriptive of the work or system or unit to which it applies, a revision number or date, and an approval status.</p> <p>(2) Statement of Applicability. The purpose for which the procedure is intended shall be clearly stated; for example, for use during reactor or plant start-up. If the purpose is not clear from the title, a separate statement of applicability should be provided, which may identify the reasons for particular operations.</p> <p>(3) Reference. References, including reference to technical specifications, shall be included in procedures as applicable. References shall be identified within the body of procedures when the sequence of steps requires other tasks to be performed prior to or concurrent with a particular step within that task.</p> <p>(4) Prerequisites. Each procedure shall identify those independent actions or procedures which shall be completed and plant conditions which shall exist prior to its use. Prerequisites applicable only to certain sections of a procedure shall be so identified.</p> <p>(5) Precautions. Precautions shall be established to alert the individual performing the task of those important measures which shall be used to protect equipment and personnel, including the public, or to avoid an abnormal or emergency situation. It may be convenient to specify</p>		<p>Appendix B "The format of procedures may vary from plant to plant within NMC; however, procedures include the following elements, as appropriate to the purpose or task covered. These elements are not intended to imply a specific format is required:</p> <p>Title/status: each procedure is given a title descriptive of the work or subject it addresses, and includes a revision number and/or date and an approval status.</p> <p>Purpose/Statement of applicability: the purpose for which the procedure is intended is clearly stated (if not clear from the title).</p> <p>References: applicable references, including reference to appropriate Technical Specifications, are included. References are included within the body of the procedure when the sequence of steps requires other tasks to be performed (according to the reference) prior to or concurrent with a particular step.</p> <p>Prerequisites: identifies those independent actions or procedures that must be accomplished and plant conditions which must exist prior to performing the procedure. A prerequisite applicable to only a specific portion of a procedure is so identified.</p> <p>Precautions: alert the user to those important measures to be used to protect equipment and personnel, including the public, or to avoid an abnormal or emergency situation during performance of the procedure. Cautionary notes applicable to specific steps are included in the main body of the procedure and are identified as such.</p> <p>Limitations and actions:</p>	

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<p>precautions separately. Cautionary notes as applicable to specific steps in the procedure shall be included in the main body of the procedure and shall be identified as such.</p> <p>(6) Limitations and Actions. Limitations on the parameters being controlled and appropriate corrective measures to return the parameter to the normal control band shall be specified. It may be convenient to specify limitations and setpoints in a separate section. Where appropriate, quantitative control guides should be provided; for example, an appropriate step of a procedure should say "Manually adjust the feedwater flow controller to maintain the reactor water level at x feet," rather than "Manually adjust the feedwater flow to maintain water level."</p> <p>(7) Main Body. The main body of a procedure shall contain step-by-step instructions in the degree of detail necessary for performing a required function or task.</p> <p>(8) Acceptance Criteria. Procedures shall contain, where applicable, acceptance criteria against which the success or failure of test-type activity would be judged. In some cases there would be qualitative criteria, i.e., a given event does or does not occur. In other cases quantitative values would be designated.</p> <p>(9) Checkoff Lists. Complex procedures shall have checkoff lists. These lists may be included as part of the procedure or may be appended to the procedure.</p>		<p>limitations on the parameters being controlled and appropriate corrective measures to return the parameter to the normal control band are specified.</p> <p>Main body: contains the step-by-step instructions in the degree of detail necessary for performing the required function or task.</p> <p>Acceptance criteria: the quantitative or qualitative criteria against which the success or failure (as of a test-type activity) of the step or action would be judged.</p> <p>Check-off lists: complex procedures use check-off lists (aka checklists) which may be included as part of the procedure or appended to it."</p>	
<p>5.3.3 System Procedures.</p> <p>Instructions for energizing, filling, venting, draining, starting up, shutting down, changing modes of operation and other instructions appropriate for operations of systems related to the safety of the plant shall be delineated in</p>		<p>Appendix B "System Procedures: contain instructions for energizing, filling, venting, draining, starting up, shutting down, changing modes of operation and other instructions appropriate for operations of systems related to the safety of the plant. Separate procedures</p>	

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system procedures. Procedures for correcting off-normal conditions shall be developed for those events where system complexity may lead to operator uncertainty. System procedures shall contain checkoff lists where appropriate.		may be developed for correcting off-normal conditions for those events where system complexity may lead to operator uncertainty. System procedures contain check-off lists where appropriate."	
5.3.4 General Plant Procedures. [General plant procedures provide instructions for the integrated operations of the plant. In addition to the characteristics of procedures presented in 5.3.1 and 5.3.2 details concerning specific general plant procedures are emphasized in the following sections.]			N18.7 wording in brackets are included in this table for completeness; they do not establish requirements that either NQA-1 or the NMC QATR would need to address.
5.3.4.1 Start-up Procedures. Start-up procedures shall be provided that include starting the reactor from cold or hot conditions and establishing power operation, with the generator synchronized to the line. Recovery from reactor trips shall be- in accordance with the start-up procedure and shall be subject to the determinations set forth in 5.2.1. (I) Prerequisites. Start-up procedures shall include provisions for documented determination that. Prerequisites have been met, including confirmation that necessary instruments are operable and properly set; valves are properly aligned; necessary systems procedures, tests and calibrations have been completed; and required approvals have been obtained. Checkoff lists are normally used for this purpose. (2) Main Body. The main body of the start-up procedures shall include the major steps of the start-up sequence, including reference to appropriate system procedures. Such major steps shall include or reference detailed instructions for their		Appendix B " Start-up Procedures : contain instructions for starting the reactor from cold or hot conditions and establishing power operation. This includes documented determination that prerequisites have been met, including confirmation that necessary instrumentation is operable and properly set; necessary system procedures, tests and calibrations have been completed; and required approvals have been obtained. The main body includes the major steps of the start-up sequence, including reference to appropriate systems procedures. Start-up procedures contain check-off lists where appropriate."	

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performance, for example, minimum instrumentation requirements, coverage of control rod withdrawal sequence or soluble poison dilution, manipulation of controls, establishment of feed and steam flow and turbine start-up and synchronization. Checkoff lists should be used for the purpose of confirming completion of major steps in proper sequence.			
<p>5.3.4.2 Shutdown Procedures. Shutdown procedures shall be provided to guide operations during and following controlled shutdown or reactor trips and shall include instructions for establishing or maintaining hot standby or cold shutdown conditions, as applicable. The major steps involved in shutting down the plant shall be specified, including detailed instructions for the performance of such actions as monitoring and controlling reactivity, load reduction and cooldown rates, sequence of activating or deactivating equipment, requirements for prompt analyses of causes of reactor trips or abnormal conditions requiring unplanned controlled shutdowns, and provisions for decay heat removal. Checkoff lists should be used for the purpose of confirming completion of major steps in proper sequence.</p>		<p>Appendix B "Shutdown Procedures: contain instructions for operations during controlled shutdown and following reactor trips, and include instructions for establishing or maintaining hot standby or cold shutdown conditions, as applicable. The major steps involved in shutting down the plant are specified, including instructions for such actions as monitoring and controlling reactivity, load reduction, cooldown rates, activating or deactivating equipment, and provisions for decay heat removal. Check-off lists are used, as appropriate, for confirming completion of major steps in proper sequence."</p>	
<p>5.3.4.3 Power Operation and Load Changing Procedures.</p> <p>Procedures for steady-state power operation and load changing shall be provided that include, for example, provisions for use of control rods, chemical shim, coolant flow control or any other system available for long- or short-term control of reactivity, making deliberate load changes, responding to unanticipated load changes and adjusting operating parameters.</p>		<p>Appendix B "Power Operation and Load Changing Procedures: contain instructions for steady-state power operation and load changing that include provisions for use of control rods, chemical shim, coolant flow channel control, or for any other system available for short- or long-term control of reactivity, making deliberate load changes and adjusting operating parameters."</p>	

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<p>5.3.4.4 Process Monitoring Procedures.</p> <p>Procedures for monitoring performance of plant systems shall be required to assure that core thermal margins and coolant quality are maintained at all times, that integrity of fission product barriers is maintained at all times and that engineered safety features and emergency equipment are in a state of readiness to maintain the plant in a safe condition if needed. The limits (maximum and minimum) for significant process parameters shall be identified. The nature and frequency of this monitoring shall be covered by operating procedures, as appropriate.</p>		<p>Appendix B "Process Monitoring Procedures: contain instructions for monitoring performance of plant systems to assure that core thermal margins and coolant quality are maintained in acceptable status at all times, that integrity of fission product barriers is maintained, and that engineered safety features and emergency equipment are in a state of readiness to keep the plant in a safe condition if needed. Maximum and minimum limits for process parameters are appropriately identified."</p>	
<p>5.3.4.5 Fuel-Handling Procedures.</p> <p>Fuel-handling operations shall be performed in accordance with written procedures. These procedures shall specify actions for core alterations, accountability of fuel and partial or complete refueling operations that include, for example, continuous monitoring of the neutron flux throughout core loading, periodic recording of data, audible annunciation of abnormal flux increases and evaluation of core neutron multiplication to the safety of loading increments. Provisions shall be made for preparing specific procedures for each refueling outage and for receipt and shipment of fuel. [Plant procedures should, nonetheless, prescribe the general preplanning for the fuel-handling program and its associated safety measures and should identify those aspects of the program for which procedures are to be prepared for each refueling outage.] (1) Prerequisites. Prerequisites shall be</p>		<p>Appendix B "Fuel Handling Procedures: contain instructions for core alterations, accountability of fuel and partial or complete refueling operations that include, for example, continuous monitoring of neutron flux throughout core loading, periodic data recording, audible annunciation of abnormal flux increases, and evaluation of core neutron multiplication to verify safety of loading increments. Procedures are also provided for receipt and inspection of new fuel, and for fuel movements in the spent fuel storage areas. Fuel handling procedures include prerequisites to verify the status of systems required for fuel handling and movement; inspection of replacement fuel and control rods; designation of proper tools, proper conditions for spent fuel movement, proper conditions for fuel cask loading and movement; and status of interlocks, reactor trip circuits and mode switches. These procedures provide requirements for refueling, including proper sequence,</p>	<p>N18.7 wording in brackets are included in this table for completeness; they do not establish requirements that either NQA-1 or the NMC QATR would need to address.</p>

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<p>provided in the fuel-handling procedures that include, for example, the status of plant systems required for refueling; inspection of replacement fuel, control rods, poison curtains and internals; designation of proper tools; proper conditions for spent fuel movement; proper conditions for fuel cask loading and movement; and status of interlocks, reactor trip circuits and mode switches.</p> <p>(2) Main Body. The main body of fuel-handling procedures shall include requirements for refueling for example, the status of the core, instructions for proper 'sequence, orientation and seating of fuel and components, rules for minimum operable instrumentation, 'actions to' be followed in the event of fuel damage rules for periods when refueling is interrupted, verification of the shutdown margin and the frequency-of determination, communications between control room and the fuel loading station, independent verification of fuel and component location, criteria for stopping refueling and for reducing the size of the fuel loading increment, and a containment evacuation plan and its associated safety measures. Documentation of final fuel and component serial numbers and locations shall be maintained.</p>		<p>orientation and seating of fuel and components, rules for minimum operable instrumentation, actions for response to fuel damage, verification of shutdown margin, communications between the control room and the fuel handling station, independent verification of fuel and component locations, criteria for stopping fuel movements, and documentation of final fuel and component serial numbers and locations."</p>	
<p>5.3.5 Maintenance Procedures.</p> <p>Maintenance procedures shall contain applicable items listed under 5.3.2 and, in addition, measures to cover the features of maintenance described below.</p> <p>(1) Preparation for Maintenance. Maintenance procedures shall reflect considerations listed under 5.2.6. Adherence to applicable radiation protection measures shall</p>		<p>Appendix B "Maintenance Procedures: contain instructions in sufficient detail to permit maintenance work to be performed correctly and safely, and include provisions for conducting and recording results of required inspections or tests. Appropriate referencing to other procedures or vendor manuals is provided. Instructions are also provided, although not necessarily in Maintenance</p>	

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<p>be prescribed. These measures shall specify protective clothing and radiation monitoring needed to assure safety.</p> <p>(2) Performance of Maintenance. The procedures shall contain enough detail to permit the maintenance work to be performed correctly and safely, and shall include provisions for conducting and recording results of required tests and inspections. References should be made to vendor manuals, plant procedures, drawings and other sources as applicable.</p> <p>(3) Post Maintenance Check Out and Return to Service. Instructions shall be included or referenced, for returning the equipment to its normal operating status.</p> <p>(4) Supporting Maintenance Documents. Where appropriate sections of related documents, such as vendor manuals, equipment operating and maintenance instructions, or sip-proved drawings with acceptance criteria provide adequate instructions to assure the required quality of work, the applicable sections of the related documents shall be referenced in the procedure or may, in some cases, constitute adequate procedures in themselves. Such procedure shall receive the same level of review and approval as operating procedures.</p>		<p>Procedures, for equipment removal and return to service, and appropriate radiation protection measures (such as protective clothing and radiation monitoring)."</p>	
<p>5.3.6 Radiation Control Procedures.</p> <p>Procedures shall be provided for implementation of a radiation control program to meet applicable program requirements. The radiation control program involves the acquisition of data and provision of equipment to perform necessary radiation surveys, measurements and evaluations for the assessment and control of radiation hazards associated with a nuclear</p>		<p>Appendix B "Radiation Control Procedures: contain instructions for implementation of program requirements necessary to meet regulatory commitments, including acquisition of data and use of equipment to perform necessary radiation surveys, measurements and evaluations for the assessment and control of radiation hazards. These procedures provide requirements for monitoring both external and internal exposures of employees,</p>	

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power plant. Procedures shall be developed and implemented for: monitoring both external and internal exposures of employees, utilizing, accepted techniques, routine radiation surveys of work areas; environmental monitoring in the vicinity of the plant; radiation monitoring of maintenance and special work activities; and for maintaining records demonstrating the adequacy of measures taken to control radiation exposures of employees and others.		utilizing accepted techniques; routine radiation surveys of work areas; environmental monitoring in the vicinity of the plant; radiation monitoring of maintenance and special work activities, and for maintaining records demonstrating the adequacy of measures taken to control radiation exposures to employees and others."	
5.3.7 Calibration and Test Procedures. Procedures shall be provided for periodic calibration and testing of safety-related instrumentation and control systems. Procedures shall also be provided for periodic calibration of measuring and test equipment used in activities affecting the quality of these systems. The procedures shall provide for meeting surveillance schedules and for assuring measurement accuracy adequate to keep safety-related parameters within operational and safety limits.		Appendix B " Calibration and Test Procedures: contain instructions for periodic calibration and testing of safety related instrumentation and control systems, and for periodic calibration of measuring and test equipment used in activities affecting the quality of these systems. These procedures provide for meeting surveillance requirements and for assuring measurement accuracy adequate to keep safety related parameters within operational and safety limits."	
5.3.8 Chemical-Radiochemical Control Procedures. Procedures shall be provided for chemical and radiochemical control activities. They should include, for example, the nature and frequency of sampling and analyses; instructions for maintaining coolant quality within prescribed limits; and limitations on concentrations of agents that could cause corrosive attack, foul heat transfer surfaces or become sources of radiation hazards due to activation. Procedures shall also be provided for the control, treatment and management of radioactive wastes and		Appendix B " Chemistry-radiochemistry Control Procedures: contain instructions for chemical and radiochemical activities such as the nature and frequency of sampling and analyses; maintaining coolant quality within prescribed limits; limitations on concentrations of agents that could cause corrosive attack, foul heat transfer surfaces or become sources of radiation hazards due to activation; control, treatment and management of radioactive wastes and control of radioactive calibration sources, including shipping."	

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control of radioactive calibration sources.			
<p>5.3.9 Emergency Procedures.</p> <p>Procedures shall be provided to guide operations during potential emergencies. They shall be written such that a trained operator will know in advance the expected course of events that will identify an emergency and the immediate action he shall take. [Since emergencies may not follow anticipated, patterns, the procedures should provide, sufficient flexibility to accommodate variations. Emergency procedures that cover 'actions 'for manipulations of controls to prevent accidents or lessen their consequences should be based on a general sequence of observations and actions. Emphasis should be placed on operator responses to observations and indications in the control room; that is, when immediate operator actions are required to prevent or mitigate the consequences of a serious condition, procedures require that those actions be implemented promptly. The emergency procedure format given in 5.3.9.1 provides a basis for coping with emergencies and is an acceptable format for prescribing operator observations and actions. Emergency procedures may contain supplemental background information to further aid operators in taking proper emergency actions, but this information shall be separated from the procedural actions. It is extremely difficult to distinguish between procedures prepared for the purpose of correcting off-normal conditions which in themselves do not constitute actual emergency situations, but which conceivably can degenerate into true emergencies in the absence of positive corrective action, and</p>		<p>Appendix B "Emergency Procedures: contain instructions for response to potential emergencies so that a trained operator will know in advance the expected course of events that will identify an emergency and the immediate actions that should be taken in response. Format and content of emergency procedures are based on regulatory and Owner's Group(s) guidance that identify potential emergency conditions and generally require such procedures to include a title, symptoms to aid in identification of the nature of the emergency, automatic actions to be expected from protective systems, immediate operator actions for operation of controls or confirmation of automatic actions, and subsequent operator actions to return the reactor to a normal condition or provide for a safe extended shutdown period under abnormal or emergency conditions."</p>	<p>N18.7 wording in brackets are included in this table for completeness; they do not establish requirements that either NQA-1 or the NMC QATR would need to address.</p>

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procedures required for coping with true emergencies that have already occurred. Some owner organizations choose the term "Off normal Procedures" for the same purpose that others choose "Emergency Procedures." When initially available intelligence provided to operating personnel via instrument readings, physical conditions, and personal observations may not clearly indicate the difference between a simple operational problem and a serious emergency, the actions outlined in the emergency procedures shall be based on a conservative course of action by the operating crew. Considerable judgment on the part of competent personnel is required before departing from the emergency procedure.]			
<p>5.3.9.1 Emergency Procedure Format and Content.</p> <p>Emergency procedures shall include as appropriate, the following elements:</p> <p>(1) Title. The title shall be descriptive of the emergency for which the procedure is provided.</p> <p>(2) Symptoms. Symptoms shall be included to aid in the identification of the emergency. They should include alarms, operating conditions and probable magnitudes of parameter changes. If a condition is peculiar only to an emergency under consideration, it should be listed first.</p> <p>(3) Automatic Actions. The automatic actions that will probably occur as a result of the emergency shall be identified.</p> <p>(4) Immediate Operator Actions. These steps shall specify immediate actions for operation of controls or confirmation of automatic actions that are required to stop the degradation of conditions and mitigate their consequences. Examples</p>		Appendix B " Emergency Procedures : contain instructions for response to potential emergencies so that a trained operator will know in advance the expected course of events that will identify an emergency and the immediate actions that should be taken in response. Format and content of emergency procedures are based on regulatory and Owner's Group(s) guidance that identify potential emergency conditions and generally require such procedures to include a title, symptoms to aid in identification of the nature of the emergency, automatic actions to be expected from protective systems, immediate operator actions for operation of controls or confirmation of automatic actions, and subsequent operator actions to return the reactor to a normal condition or provide for a safe extended shutdown period under abnormal or emergency conditions."	

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<p>include the following:</p> <p>(a) The verification of automatic actions. This step is based on equipment operating as designed and the sequence of events following an expected course. Since variations from the expected course may occur, operators should be prepared to manipulate controls as necessary to cope with the problem. However, the procedure should caution the operator not to place systems in "manual" unless misoperation in "automatic" is apparent and should require him to make frequent checks for proper operation of systems placed in manual control. (b) Assurance that reactor is in a safe condition. This step usually means shutdown of the reactor with sufficient reactivity margin and establishment of required core cooling. (c) Notification to plant personnel of the nature of the emergency. (d) Determination that the reactor coolant system pressure boundary is intact. (e) Confirmation of the availability of adequate power sources. (f) Confirmation that containment and exhaust systems are operating properly in order to prevent uncontrolled release of radioactivity. (5) Subsequent Operator Actions. Steps shall be included to return the reactor to a normal condition or to provide for a safe extended shutdown period under abnormal or emergency conditions</p>			
<p>5.3.9.2 Events of Potential Emergency.</p> <p>Potential emergency conditions shall be identified and procedures for coping with them shall be prepared. The following categories of events may, depending upon the design of the plant, be considered as examples of potential emergencies for which procedures are written and for which immediate action is indicated:</p>		<p>Appendix B "Emergency Procedures": contain instructions for response to potential emergencies so that a trained operator will know in advance the expected course of events that will identify an emergency and the immediate actions that should be taken in response. Format and content of emergency procedures are based on regulatory and Owner's Group(s) guidance that</p>	

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<p>(1) Loss of coolant from identified and unidentified sources, from small loss to design basis accident loss</p> <p>(2) Reactor transients and excursions</p> <p>(3) Failure of vital equipment.</p> <p>(4) Loss or degradation of vital power sources</p> <p>(5) Civil disturbances</p> <p>(6) Abnormally high radiation levels</p> <p>(7) Excessive release of radioactive liquid or gaseous effluent</p> <p>(8) Malfunction of reactivity control system</p> <p>(9) Loss of containment integrity</p> <p>(10) Conditions that require use of standby liquid poison systems</p> <p>(11) Possible natural occurrences</p> <p>(12) Fires</p>		<p>identify potential emergency conditions and generally require such procedures to include a title, symptoms to aid in identification of the nature of the emergency, automatic actions to be expected from protective systems, immediate operator actions for operation of controls or confirmation of automatic actions, and subsequent operator actions to return the reactor to a normal condition or provide for a safe extended shutdown period under abnormal or emergency conditions."</p>	
<p>5.3.9.3 Procedures for Implementing Emergency Plan.</p> <p>Implementing procedures for emergency plan actions shall contain, as appropriate, the following elements:</p> <p>(1) Individual assignment of authorities and responsibilities for performance of specific tasks to specific individuals or staff positions.</p> <p>(2) Protective action levels and protective measures outlined for the emergency identified.</p> <p>(3) Specific actions to be taken by coordinating support groups.</p> <p>(4) Procedures for medical treatment and handling of contaminated individuals.</p> <p>(5) Special equipment requirements for items such as medical treatment, emergency personnel removal, specific radiation detection, personnel dosimetry and rescue operations, procedures for making this equipment available, plus operating instructions for such equipment, and provisions for its periodic inspection and maintenance.</p> <p>(6) Identification of emergency communications network, including</p>		<p>Appendix B "Emergency Plan Implementing Procedures: contain instructions for activating the Emergency Response Organization and facilities, protective action levels, organizing emergency response actions, establishing necessary communications with local, state and federal agencies, and for periodically testing the procedures, communications and alarm systems to assure they function properly. Format and content of such procedures are such that requirements of each site's NRC approved Emergency Plan are met."</p>	

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<p>communications required for personnel identification and effective coordination of all support groups.</p> <p>(7) Description of alarm signals in each facility. At sites with multiple units, alarm signals should be consistent from one unit to another. (Signals for initiating protective measures should be clear and distinct from process or operational alarm system to avoid confusion.)</p> <p>(8) Procedures required to restore the plant to normal conditions following an emergency.</p> <p>(9) Requirements for periodically testing of procedures, communications network and alarm systems to assure that they function properly.</p> <p>See also U.S. Nuclear Regulatory Commission (NRC) "Guide to the Preparation of Emergency Plans for Production and Utilization Facilities." [17]</p>			
<p>5.3.10 Test and Inspection Procedures.</p> <p>Test and inspection procedures shall contain a description of objectives; acceptance criteria that will be used to evaluate the results; prerequisites for performing the tests or inspections including any special conditions to be used to simulate normal or abnormal operating conditions; limiting conditions; and the test or inspection procedure. This procedures shall also specify any special equipment or calibrations required to conduct the test or inspection. Test and inspection results shall be documented and evaluated by responsible authority to assure that test and inspection requirements have been satisfied. Where tests and inspections are to be witnessed, the procedure shall identify hold points in the testing sequence to permit witnessing. The procedure shall require appropriate approval for the</p>		<p>Appendix B "Test and Inspection Procedures:" contain the objectives, acceptance criteria, prerequisites for performing the test or inspection, limiting conditions, and appropriate instructions for performing the test or inspection. These procedures also specify any special equipment or calibrations required to conduct the test or inspection and provide for appropriate documentation and evaluation by responsible authority to assure test or inspection requirements have been satisfied. Where necessary, hold or witness points are identified within the procedures and require appropriate approval for the work to continue beyond the designated point. These procedures provide for recording the date, identification of those performing the test or inspection, as-found condition, corrective actions performed (if any), and as-left condition, as appropriate for the subject</p>	

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work to continue beyond the designated hold point. The test and inspection procedures shall require recording the date, identification of those performing the test or inspection, as-found condition, corrective actions performed, if any, and as-left condition.		test or inspection."	
6. References			Because most references from N18.7 have been superseded, and the QATR section A.7.3 establishes the nature and level of commitment to certain references, this section is not addressed in this matrix.