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U.S. NUCLEAR REGULATORY COMMISSION

Revision 2
February 1978

REGULATORY GUIDE

OFFICE OF STANDARDS DEVELOPMENT

REGULATORY GUIDE 1.33

QUALITY ASSURANCE PROGRAM REQUIREMENTS (OPERATION)

C. REGULATORY POSITION

4. Section 4.5, "Audit Program," of ANSI N18.7-1976/ANS-3.2 states that 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 ensure that an audit of all safety-related functions is completed within a period of 2 years. In amplification of this requirement, the following program elements should be audited at the indicated frequencies:

a. 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.

b. The conformance of facility operation to provisions contained within the technical specifications and applicable license conditions—at least once per 12 months.

c. The performance, training, and qualifications of the facility staff—at least once per 12 months.

5. The guidelines (indicated by the verb "should") of ANSI N18.7-1976/ANS-3.2 contained in the following sections have sufficient safety importance to be treated the same as the requirements (indicated by the verb "shall") of the standard:

a. Section 4.4—The guidelines concerning review activities of the onsite operating organization, except the guideline that refers to screening subjects of potential concern.

b. Section 5.2.3—The guideline concerning review and updating of standing orders.

c. Section 5.2.4—The guideline concerning review, updating, and cancellation of special orders.

d. Section 5.2.7.1—The guidelines that address adequate design and testing of replacement parts.

e. Section 5.2.13.4—The guideline concerning special handling tools and equipment.

f. Section 5.2.19(2)—The guideline for checking plant operating procedures during the testing program.

g. Section 5.2.19.1—The guidelines for preoperational tests, except the guideline that refers to a

run-in period for equipment. In accordance with the guidelines, the prerequisite steps for each test should be completed prior to the start of the preoperational test.

h. Section 5.3.2—The guidelines concerning the content (excluding format) of procedures for the guidelines that address (1) a determination of applicability in Section 5.3.2(2), (2) inclusion of references in procedures, as in Section 5.3.2(3), and (3) inclusion of control guides in Section 5.3.2(6).

i. Section 5.3.9—The guidelines concerning emergency procedures requiring prompt initiation of immediate operator actions which prevent or mitigate the consequences of a condition.

j. Section 5.3.9.1—The guidelines concerning the content (excluding format) for: the inclusion of symptoms in Section 5.3.9.1(1); the inclusion of symptoms in Section 5.3.9.1(2); automatic operation in Section 5.3.9.1(3); immediate operator actions excluding those guidelines contained in Section 5.3.9.1(4); and subsequent actions in Section 5.3.9.1(5).

<u>ANSI N18.7-1976</u>	<u>NQA-1 (1994)</u>	<u>SNC QATR</u>	<u>COMMENTS</u>	<u>NEI 06-14, Revision</u>
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<p>4.5 Audit Program.</p> <p>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><u>NOTE:</u> Regulatory Guide 1.33 amplifies the above requirement “the following program elements should be audited at the indicated frequencies:</p> <ul style="list-style-type: none"> a. 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. b. The conformance of facility operation to provisions contained within the technical specifications and applicable license conditions — at least once per 12 months. 		<p>SECTION 18 AUDITS</p> <p>'SNC has established the necessary measures and governing procedures to implement audits to verify that activities covered by this QATR are performed in conformance with the requirements established. The audit programs are themselves reviewed for effectiveness as a part of the overall audit process. In addition to audits, SNC commits to perform surveillances as described in Appendix C to this QATR.'</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 audits, based on the status, performance and safety importance of the activity or process being assessed. Dynamic scheduling provides for rapid focus shifts of audit resources depending on the actual performance of the plant and plant staff. The scheduling approach at SNC 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. SNC's approach provides for response to both internal and external cues to determine what and when to assess performance.</p>	<p>SECTION 18 AUDIT</p> <p>'[CA] has established procedures to implement audits to verify that activities covered by this QATR are performed in conformance with the requirements established. The audit programs are themselves reviewed for effectiveness as a part of the overall audit process.'</p>
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<u>ANSI N18.7-1976</u>	<u>NQA-1 (1994)</u>	<u>SNC QATR</u>	<u>COMMENTS</u>	<u>NEI 06-14, Revision</u>
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<p>c. The performance, training, and Qualifications of the 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>				
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The proposed QATR represents a change from a QA program description based on RG 1.28 and RG 1.33 to a program based on NQA-1-1994, as supplemented by the requirements of N18.7-1976. As stated in Part III of the QATR, the licensees consider that the collective requirements of the QATR and NQA-1-1994 are equivalent to N18.7-1976 and RG 1.33, Revision 2. This approach has previously been approved by the NRC staff as an acceptable approach to adopting NQA-1-1994 as the basis for licensee QA programs (Reference 3).

The NRC staff determined that current QA program commitments for each of the SNC plants had been acceptably retained by the common QATR. The staff further determined that the QATR, as supplemented by the guidance of NQA-1-1994, provides an acceptable alternative to an explicit commitment to N18.7-1976 and RG 1.33, Revision 2. **(NRC SER ML071510506)**

SNC Submittal
 April 30, 2007
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<u>ANSI N18.7-1976</u>	<u>NQA-1 (1994)</u>	<u>SNC QATR</u>	<u>COMMENTS</u>	<u>NEI 06-14, Revision</u>
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<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 shall screen subjects of potential concern to independent reviewers and perform</p>		<p>1.2.2 STANDARD PLANT 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 nuclear plant general 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.'</p> <p>4.0 Reviews</p> <p>The PRB shall be responsible for:</p> <p>(a) Review of (1) all procedures and programs required by facility Technical Specifications administrative controls and changes thereto that require a regulatory evaluation under the facility's 10 CFR 50.59 and 10 CFR 72.48 screening program, (2) changes to the quality assurance program description determined to be reductions in the commitment under the provisions of 10 CFR 50.54(a), and (3) any other proposed procedures, programs, or changes thereto affecting facility nuclear safety as determined by the NPGM.</p> <p>(b) Review of all proposed changes to nuclear facility Technical Specifications.</p> <p>(c) Review of all proposed tests and experiments that affect nuclear safety.</p>	<p>The Plant Review Board 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>	<p>Proposed Revision</p> <p>Bracket Text:</p> <p>[The onsite operating normal duties of plant continuing monitoring <i>[Plant Manager/VP]</i> i conditions and to ver are conducted safely administrative contro</p> <p>- One review func SER ML043270</p>
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<p>preliminary investigations (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>		<ul style="list-style-type: none"> (d) Review of all proposed changes or modifications to systems or equipment that affect nuclear safety. (e) Rendering determinations in writing or meeting minutes if any item considered under (a) through (d) above, as appropriate and as provided by 10 CFR 50.59, 10 CFR 50.92, or 10 CFR 72.48, requires a license amendment or requires a significant hazards consideration determination. (f) Performance of special reviews and investigations and reports as requested by the Chairperson of the PRB or NPGM. (g) Investigations of all violations of Technical Specifications, including the preparation and forwarding of reports covering evaluation and recommendations to prevent recurrence, to the NPGM, Project Vice President, the CNO, and to the Chairperson of the NSRB. (h) Review of all nuclear facility reportable events. (i) Review of facility operations to detect potential safety hazards 		
<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</p>		<p>Part II, Section 5: “SNC has established the necessary measures and governing procedures to ensure that activities affecting quality are prescribed by and performed in accordance with instructions, procedures or drawings of a type appropriate to the circumstances and which, where applicable, include quantitative or qualitative acceptance criteria to implement the QAP as described in the QATR. Such documents are prepared and controlled according to Part II, Section 6 of this QATR. In addition, means are provided for dissemination to plant staff of instructions of both general and continuing applicability, as well as those of short-term applicability. Provisions are included for reviewing, updating, and canceling such procedures.”</p>		<p>Part II, Section 5: [CA] has established the necessary measures and governing procedures to ensure that activities affecting quality are prescribed by and performed in accordance with instructions, procedures or drawings of a type appropriate to the circumstances and which, where applicable, include quantitative or qualitative acceptance criteria to implement the QAPD as described in the QATR. Such documents are prepared and controlled according to Part II, Section 6 of this QATR. In addition, means are provided for dissemination to plant staff of instructions of both general and continuing applicability, as well as those of short-term applicability. Provisions are included for reviewing, updating, and canceling such procedures.”</p>

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<p>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>Appendix E: "This appendix contains a description of the various types of procedures used by SNC to govern the design, operation, and maintenance of its nuclear generating plants. Each procedure shall be sufficiently detailed for a qualified individual to perform the required function without direct supervision, but need not provide a complete description of the system or plant process."</p>		<p>Proposed Part V</p> <p>This Part contains a d procedures used by [f maintenance of its nu shall be sufficiently de the required function v provide a complete de</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 parameters, personnel actions, or other similar matters. Provisions shall be made for periodic review, updating and cancellation of special orders.</p>		<p>Appendix E: "Special Orders"</p> <p>Management instructions, which have short-term applicability and require dissemination, are issued to encompass special operations, housekeeping, data taking, publications and their distribution, plotting process parameters, personnel actions, or other similar matters. Provisions are made for periodic review, updating, and cancellation of these documents, where appropriate.</p>		<p>Proposed Part V</p> <p>"Special Orders"</p> <p>Management instructi and require dissemina operations, housekee distribution, plotting p other similar matters. updating, and cancell appropriate.</p>
<p>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. Maintenance shall be scheduled</p>	<p>SECTION 14 INSPECTION, TEST, AND OPERATING STATUS</p> <p>SNC has established the necessary measures and governing procedures to identify the inspection, test, and operating status of items</p>	<p>Appendix E: "Maintenance Procedures"</p> <p>These documents contain instructions in sufficient detail to permit maintenance work to be performed correctly and safely, and include provisions, such as hold or witness points, for conducting and recording results of required inspections or tests. These documents may include applicable inspection or test instructions subject to the requirements for test and inspection procedures below. Appropriate referencing to other procedures, standards, specifications, or supplier manuals is</p>		<p>Proposed Part V</p> <p>"Maintenance Proce</p> <p>These documents cor permit maintenance w and include provisions conducting and recor tests. These documen</p>

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<p>and planned so as not to compromise the safety of the plant.</p>	<p>and components subject to the 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. These measures also establish the necessary authorities and controls for the application and removal of status indicators or labels.</p>	<p>provided. When not provided through other documents, instructions for equipment removal and return to service, and applicable radiation protection measures (such as protective clothing and radiation monitoring) will be included. Additional maintenance procedure requirements are addressed in NQA-1-1994, Subpart 2.18, Section 2.2, Procedures.”</p>		<p>test instructions subject to inspection procedures, standards, and procedures provided. When not provided, instructions for equipment removal and return to service, and applicable radiation protection measures (such as protective clothing and radiation monitoring) will be included. Additional maintenance procedure requirements are addressed in NQA-1-1994, Subpart 2.18, Section 2.2, Procedures.”</p> <p>Part IV Proposed</p> <p>[Operational procedures for equipment removal and return to service, and applicable radiation protection measures (such as protective clothing and radiation monitoring) will be included. Additional maintenance procedure requirements are addressed in NQA-1-1994, Subpart 2.18, Section 2.2, Procedures.”]</p>
<p>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.</p>	<p>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.”</p>			

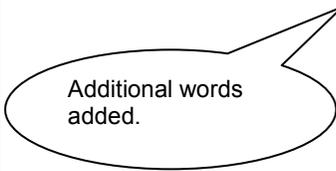
<u>ANSI N18.7-1976</u>	<u>NQA-1 (1994)</u>	<u>SNC QATR</u>	<u>COMMENTS</u>	<u>NEI 06-14, Revision</u>
<p>[General rules for the development of procedures under a maintenance program which is consistent with the provisions of 5.2.7 shall be written before start-up.] These general rules shall form the 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).</p>	<p>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.</p>	<p>Part II, Section 5: 'SNC has established the necessary measures and governing procedures to ensure that activities affecting quality are prescribed by and performed in accordance with instructions, procedures or drawings of a type appropriate to the circumstances and which, where applicable, include quantitative or qualitative acceptance criteria to implement the QAP as described in the QATR.'</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 SNC QATR would need to address.</p>	<p>Part II, Section 5: [CA] has established procedures to ensure prescribed by and per procedures or drawing circumstances and wh quantitative or qualita QAPD as described in</p>
<p>A preventive maintenance 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.</p>	<p>NQA-1 Subpart 2.18 '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</p>			

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	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 SNC 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	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.'			

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performance of the new component to be evaluated and thereby minimize the possibility of a hidden deficiency producing a systematic 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 been demonstrated.]			N18.7 wording in brackets are included in this table for completeness; they do not establish requirements that either NQA-1 or the SNC QATR would need to address.	
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	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	Part II, Section 13: '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.'		Part II, Section 13: Special controls (such as accelerometers, inert content levels and temperature levels) are required to maintain a

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specified, provided, and their existence verified.	special protective environments (such as inert gas atmosphere, specific moisture content levels, and temperature levels) shall be specified, provided, and their existence verified.”			
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 procedures and at specified times, to verify that the tools and equipment are adequately maintained,	Supplement 8S-1 Section 3.3 states “Special handling tools and equipment shall be inspected and tested in 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	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			

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environments or the need for special control.	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.	ANSI N45.2.2 = NQA-1 Subpart 2.2	Part II, Section 13.2: 'In establishing provisions for handling, storage and shipping, SNC commits to compliance with NQA-1-1994, Basic Requirement 13 and Supplement 13S-1. SNC also commits to compliance with the requirements of NQA-1-1994, Subpart 2.2, with the clarifications and exceptions shown below.'		Part II, Section 13.2: In establishing provisions for handling, storage and shipping, [CA] commits to compliance with NQA-1-1994, Basic Requirement 13 and Supplement 13S-1. SNC also commits to compliance with the requirements of NQA-1-1994, Subpart 2.2 and also, during the construction phase of the plant, to comply with NQA-1-1994, Subpart 2.2, with the clarifications and exceptions shown below. Appendix 2.1, with the clarifications and exceptions shown below.
<p>5.2.19 Test Control.</p> <p>(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.</p>		Part II, Section 11: 'SNC has established the necessary measures and governing procedures 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. 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, in-service 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. Programs also include provisions for establishing and adjusting test schedules and maintaining status for periodic or recurring tests. 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, and (4) mandatory verification points as necessary to confirm satisfactory test completion. Test results are documented and evaluated by the organization performing the test and reviewed by a responsible authority to assure that the test requirements have been		Part II, Section 11: [CA] has established the necessary measures and governing procedures to demonstrate that items subject to the provisions of the QAPD 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. 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, in-service 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. Programs also include provisions for establishing and adjusting test schedules and maintaining status for periodic or recurring tests. 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, and (4) mandatory verification points as necessary to confirm satisfactory test completion. Test results are documented and evaluated by the organization performing the test and reviewed by a responsible authority to assure that the test requirements have been

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		satisfied. If acceptance criteria are not met, retesting is performed as needed to confirm acceptability following correction of the system or equipment deficiencies that caused the failure.'		have been satisfied. If testing is performed a following correction of that caused the failure
<p>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 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.</p>			<p>These requirements apply to initial start-up testing. The SNC QATR is intended to cover initial start up testing, if a decision is made to design and build a new plant. At this time, this section is not applicable to SNC's scope of responsibilities.</p>	
<p>5.2.19.1 Preoperational Tests.</p> <p>[Preoperational tests are generally performed sequentially in accordance with written procedures.]</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 SNC QATR would need to address.</p>	

<u>ANSI N18.7-1976</u>	<u>NQA-1 (1994)</u>	<u>SNC QATR</u>	<u>COMMENTS</u>	<u>NEI 06-14, Revision</u>
<p>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).</p>	<p>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...”</p>			
<p>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, engineering drawings or plant specifications.</p>	<p>NQA-1, Subparts 2.4, 2.5 and 2.8 provide for such inspections and testing.</p>	<p>Part II, Section 10.1: 'In establishing inspection requirements, SNC commits to compliance with NQA-1-1994, Basic Requirement 10, Supplement 10S-1 and Subpart 2.4, with the clarification that follows below. In addition, for situations comparable to original new plant construction, SNC commits to compliance with the requirements of Subparts 2.5 and 2.8 for establishing appropriate inspection requirements.'</p>		<p>Part II, Section 10.1: In establishing inspection requirements, SNC commits to compliance with NQA-1-1994, Basic Requirement 10, Supplement 10S-1 and Subpart 2.4, with the clarification that follows below. In addition, for situations comparable to original new plant construction, SNC commits to compliance with the requirements of Subparts 2.5 and 2.8 for establishing appropriate inspection requirements.'</p>
<p>A component test is a functional, operational or performance test of an</p>	<p>NQA-1, Subparts 2.4, 2.5 and 2.8 provide for such inspections and testing.</p>	<p>Part II, Section 10.1: 'In establishing inspection requirements, SNC commits to compliance with NQA-1-1994, Basic Requirement 10, Supplement 10S-1 and Subpart 2.4, with the clarification that</p>		<p>Part II, Section 10.1: In establishing inspection requirements, SNC commits to compliance with NQA-1-1994, Basic Requirement 10, Supplement 10S-1 and Subpart 2.4, with the clarification that</p>

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<p>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.</p>		<p>follows below. In addition, for situations comparable to original new plant construction, SNC commits to compliance with the requirements of Subparts 2.5 and 2.8 for establishing appropriate inspection requirements.'</p>		<p>clarification. In addition requirements of Subpart appropriate inspection</p>
<p>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.</p>	<p>NQA-1, Subparts 2.4, 2.5 and 2.8 provide for such testing.</p>	<p>Part II, Section 10.1: 'In establishing inspection requirements, SNC commits to compliance with NQA-1-1994, Basic Requirement 10, Supplement 10S-1 and Subpart 2.4, with the clarification that follows below. In addition, for situations comparable to original new plant construction, SNC commits to compliance with the requirements of Subparts 2.5 and 2.8 for establishing appropriate inspection requirements.'</p>		<p>Part II, Section 10.1: In establishing inspection compliance with NQA- Supplement 10S-1 and clarification. In addition requirements of Subpart appropriate inspection</p>
<p>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</p>	<p>NQA-1, Subparts 2.4, 2.5 and 2.8 provide for such testing.</p>	<p>Part II, Section 10.1: 'In establishing inspection requirements, SNC commits to compliance with NQA-1-1994, Basic Requirement 10, Supplement 10S-1 and Subpart 2.4, with the clarification that follows below. In addition, for situations comparable to original new plant construction, SNC commits to compliance with the requirements of Subparts 2.5 and 2.8 for establishing appropriate inspection requirements.'</p>		<p>Part II, Section 10.1: In establishing inspection compliance with NQA- Supplement 10S-1 and clarification. In addition requirements of Subpart appropriate inspection</p>

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<p>auxiliary systems. It may be necessary to defer portions of these tests until nuclear heat is available. The procedures used should 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.</p>				
<p>For additional requirements in matters relating to preoperational test programs. American National Standard N45.2.8- 1975 is generally applicable. [8]</p>	<p>ANSI N45.2.8 = NQA-1 Subpart 2.8</p>	<p>Part II, Section 10.1: 'In establishing inspection requirements, SNC commits to compliance with NQA-1-1994, Basic Requirement 10, Supplement 10S-1 and Subpart 2.4, with the clarification that follows below. In addition, for situations comparable to original new plant construction, SNC commits to compliance with the requirements of Subparts 2.5 and 2.8 for establishing appropriate inspection requirements.'</p>		<p>Part II, Section 10.1: In establishing inspection requirements, SNC commits to compliance with NQA-1-1994, Basic Requirement 10, Supplement 10S-1 and Subpart 2.4, with the clarification that follows below. In addition, for situations comparable to original new plant construction, SNC commits to compliance with the requirements of Subparts 2.5 and 2.8 for establishing appropriate inspection requirements.'</p>
<p>5.3.2 Procedure Content.</p> <p>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: (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. (2) Statement of Applicability. The purpose for which the procedure is intended shall be clearly stated; for example, for</p>		<p>Appendix E :</p> <p>Procedure format and content may vary from one location to the other. However, procedures include the following elements as appropriate to the purpose or task to be described.</p> <ul style="list-style-type: none"> • Title/status <p>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> <ul style="list-style-type: none"> • Purpose/Statement of applicability/Scope <p>The purpose for which the procedure is intended is clearly stated (if not clear from the title). The</p>		<p>Proposed Part V</p> <p>Procedure format and content may vary from one location to the other. However, procedures include the following elements as appropriate to the purpose or task to be described.</p> <ul style="list-style-type: none"> • Title/status <p>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> <ul style="list-style-type: none"> • Purpose/Statement of applicability/Scope <p>The purpose for which the procedure is intended is clearly stated (if not clear from the title). The</p>

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<p>use during reactor or plant startup. 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. (3) Reference. References, including reference to technical specifications, shall be included in procedures as applicable. References should 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 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.</p>		<p>systems, structures, components, processes or conditions to which the procedure applies are also clearly described.</p> <ul style="list-style-type: none"> • References Applicable references, including reference to appropriate Technical Specifications, are required. 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. • Prerequisites/Initial Conditions Prerequisites/initial conditions identify 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. • Precautions 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. • Limitations and actions Limitations on the parameters being controlled and appropriate corrective measures to return the parameter to the normal control band are specified. 		<p>systems, structures, components, processes or conditions to which the procedure applies are also clearly described.</p> <ul style="list-style-type: none"> • References Applicable references, including reference to appropriate Technical Specifications, are required. 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. • Prerequisites/Initial Conditions Prerequisites/initial conditions identify 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. • Precautions 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. • Limitations and actions Limitations on the parameters being controlled and appropriate corrective measures to return the parameter to the normal control band are specified.

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<p>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>		<ul style="list-style-type: none"> • Main body <p>The main body of the procedure contains the step-by-step instructions in the degree of detail necessary for performing the required function or task.</p> <ul style="list-style-type: none"> • Acceptance criteria <p>The acceptance criteria provide 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>		<ul style="list-style-type: none"> • Main body <p>The main body of the procedure contains the step-by-step instructions in the degree of detail necessary for performing the required function or task.</p> <ul style="list-style-type: none"> • Acceptance criteria <p>The acceptance criteria provide 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>

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<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 shall 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</p>		<p>Appendix E: Emergency Operating Procedures</p> <p>'These documents 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 SNC QATR would need to address.</p>	<p>Proposed Part V Emergency Operating</p> <p>'These documents 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>
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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 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.]

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<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. (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 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</p>		<p>Appendix E: Emergency Operating Procedures</p> <p>'These documents 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>Proposed Part V</p> <p>Emergency Operatin</p> <p>'These documents con emergencies so that a expected course of ev the immediate actions and content of emerg and Owner's Group(s) emergency conditions include a title, [sympto the emergency,] autom protective systems, im controls or confirmatio operator actions to rel provide for a safe exte emergency conditions</p>
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<p>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>				
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