ANS 3.2 Side-By Side Comparison

Proposed ANS 3.2 Wording American National Standard ANSI/ANS 3.2-2012 Administrative Controls for the Operational Phase of Nuclear power Plants	Staff Comments/COLP Verification	Wording from ANS 3.2 1976	Wording from ANS 3.2 1982
1. Scope, Applicability and Purpose			
1.1 Scope and Applicability.			
This standard provides requirements and recommendations for managerial and administrative controls to ensure that activities associated with operating a nuclear power plant are carried out without undue risk to the health and safety of the public. This standard provides requirements for implementing managerial and administrative controls consistent with requirements of 10 CFR 50, Appendix B [1].[1] This standard is not specifically intended for application to test, mobile, experimental reactors, nor reactors not subject to U.S. Nuclear Regulatory Commission licensing. Although the standard is based on USNRC requirements the approach is applicable with modifications to reflect the regulatory requirements in the country of application. Applicable sections of this standard may be used in those cases for activities similar to those addressed herein.		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]1	
1.2 Purpose.			
This standard contains requirements for managerial and administrative controls for nuclear power plants during the operational phase of plant life. This phase is generally considered to commence prior to initial fuel loading at a time identified by the owner organization. Certain initial construction activities may extend past fuel loading and certain operational activities may take place prior to fuel loading. The owner organization is expected to identify those activities that are included in these overlapping time periods and are expected to specify whether the		This Standard fully and completely describes the general requirements and guidelines of American National Standard Quality Assurance Program Requirements for Nuclear Power Plants, N45.2-1971, [2] as those requirements and guidelines apply during the operational phase of plant life.	

[1] Numbers in brackets refer to corresponding numbers in Sec. 4, "References."

activities are to be considered as operational or as construction activities. This phase continues until the operating license is withdrawn. The managerial and administrative controls of this standard promote safe, reliable and efficient plant operation. This standard may be applied to other activities consistent with the degree to which those activities affect plant reliability. In keeping with this intent, the provisions in this standard may be applied to operational activities other than those specified in the Scope, consistent with the degree to which those activities affect these functions, compliance with regulations specifying radiation dose and contamination criteria, or plant reliability. Applicable portions of this standard may also be used for activities at reactors specifically excluded in the Scope. This standard is intended to be implemented together with the applicable elements of ASME NQA-1-2008 and the NQA-1a-2009 addenda [2]. ASME NQA-1 is the standard that provides the appropriate Quality Assurance requirements for all phases. This standard provides the managerial and administrative requirements needed to assure safe operation of a facility.			
2 Definitions		**2. Definitions**	**2. Definitions**
2.1 Glossary of Terms **The terms defined in NQA-1 apply to this standard and are not duplicated herein.**		**2.2 Glossary or Term**	**2.2 Glossary of Terms**
experiments: performance of those plant operations executed under controlled conditions in order to establish characteristics or values not previously known.		Experiments. Performance of those plant operational carried out under controlled conditions in ord., to establish characteristics or values not previously known.	Experiments. Performance of those plant operations carried out under controlled conditions in order to establish characteristics or values not previously known.
independent review: review completed by personnel not having direct responsibility or direct involvement in the work function		Independent review. Review completed by personnel not having direct	Independent review. Review completed by personnel not having direct responsibility

under review.		responsibility for the work function under review regardless of whether they operate as a part of an organizational unit or as individual staff members (see review).	for the work function under review regardless of whether they operate as a part of an organizational unit or as individual staff members (see review).
managerial and administrative controls: rules, orders, instructions, procedures, policies, practices, and designations of authority and responsibility.		Administrative controls. Rules, order, instruction&, procedures, policies, practices and designations of authority and responsibility.	Administrative controls •. Rules, order instructions, procedures, policies, practices and designations of authority and responsibility.
owner organization: the organization, including the on-site operating organization, that has overall legal, financial, and technical responsibility for the operation of one or more nuclear power facilities.		Owner organization. The organization, including the onsite operating organization, which has overall legal, financial and technical responsibility for the operation of one or more nuclear power plants.	
operating organization: the organization concerned with daily operation, maintenance, and related technical services. This organization may include personnel located off-site who provide operational support.	**New Definition**		
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 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.	
3 Requirements			
3.1 Organization		**3. Owner Organization**	**3. Owner Organization**
3.1.1 General		**3.1 General**	**3.1 General**
Managerial and administrative controls which comply with this standard shall be established. The controls shall be in effect at all times during the operational phase. The controls shall require that	NQA-l, Basic Requirement 2. Ok.	The owner organization shall establish an administrative controls and quality assurance program which complies with	The owner organization shall establish an administrative control and quality assurance program which complies with

decisions are made at the proper level and with the necessary reviews. The organization responsible for establishing and executing the administrative controls in accordance with this standard may delegate any or all of the work to others, but shall retain overall responsibility.		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 part thereof, in accordance with this Standard, but shall retain responsibility therefore.	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 decision affecting safety 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 part. thereof, in accordance with this standard. but shall retain responsibility there for.
3.1.2 Assignment of Authority and Responsibility.		**3.2 Assignment of Authority and Responsibility**	3.2 **Assignment of Authority and Responsibility**
Lines of authority, responsibility, and communication shall be established and defined for the corporate, plant operating, and support organizations. 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.	NQA-1, Basic Requirement 2. Ok.	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 communication shall be established from the highest management level through intermediate levels to 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	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 control and quality assurance program to ensure safety and efficiency. Lines of authority responsibility and communication shall be established and well defined from the highest management level through intermediate level, to and including all onsite operating organization position with involvement in activities affecting the safety of the nuclear power plant including those offsite organizational positioning under assigned responsibility for procurement, design and construction, quality assurance and technical support activities. These relationships shall be documented

		descriptions or 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 *con*trols and quality assurance program required by this Standard. The persons or organizations responsible for defining and measuring the overall effectiveness of the program shall be designated, shall be sufficiently independent from cost and scheduling considerations when opposed to safety considerations, shall have direct access to responsible management at a level where appropriate action can be accomplished, and shall report regularly on the effectiveness of the program to the plant manager and the cognizant offsite management. Persons or organizations performing functions or 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. The organizational structure and the functional responsibility assignments shall be such that: (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. (2) Verification or conformance to established program requirements is accomplished by a qualified person who does not have responsibility for performing	and Updated, as appropriate in the form of organizational chart, functional description of departmental responsibilities and relationships and job description for key personnel positioned or in equivalent forms of documentation.

		or directly supervising the work. The method and extent or such verification shall be commensurate with the importance of the activity to plant safety and reliability. In structuring the organization and assigning responsibility, quality assurance should be recognized as an interdisciplinary function involving many organizational component 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 extends to various levels in all participating organizations. From the top executive to all workers whose activities may influence quality.	
3.1.3 Plant Operating Organization		**3 .4. 1 General**	**3 .4. 1 General**
3.1.3.1 General Management shall establish and periodically assess the adequacy of the plant operating organization and shall ensure that necessary changes to the organization are made in a timely manner.	NQA-1, Basic Requirement 2. Ok.	A number of factors influence management in its decision regarding the establishment of an onsite operating organization.	A number of factors influence management in its decision regarding the establishment of an onsite operating organization.
When establishing the plant operating organization, the owner organization should evaluate the physical size and complexity of the nuclear power plant, the number of units, the extent of assistance provided by technical support organizations, and the extent of reliance on consultants and the availability of qualified personnel from other sources.	NQA-1, Basic Requirement 2. Ok.	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 (room other sources to assist in activities. such as initial startup, refueling. maintenance or	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 startup refueling, maintenance or modification

		modification work.	work.
3.1.3.1.1 Requirements for the Plant Operating Organization		**3. 4. 2 Requirements for the Onsite Operating Organization**	**3. 4. 2 Requirements for the Onsite Operating Organization**
The plant operating organization shall include one or more individuals knowledgeable in the following fields: nuclear power plant operation; nuclear power plant mechanical systems; nuclear power plant electrical systems; instrumentation and control (electronic) systems; nuclear engineering; heat transfer, fluid flow and thermodynamics; chemistry and radiochemistry; radiation protection; risk assessment; and quality assurance.	NQA-1, Basic Requirement 1. Ok.	The onsite operating organization shall include one or more individuals knowledgeable in the following field. : 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 (or members of the onsite operating organization and offsite technical sup. port 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, NIS.1-1971 Personnel whose qualifications do not meet those specified in NIS.l 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 . except that the QA experience cited for Levels I, II, and III should be interpreted to mean actual experience in carrying out the types of inspection. examination. or testing a being performed.	The Onsite operating organization shall include. At a minimum, one or more individual knowledgeable in the following fields: nuclear power plant operation: nuclear power plant mechanical systems; nuclear power plant electrical and electronic systems; nuclear engineering; heat transfer, fluid flow and thermodynamics; chemistry and radiochemistry; radiation protection; and quality assurance. Initial incumbents or replacements for members of the onsite operating organization 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. Qualification and Training of Personnel for Nuclear Power Plants, ANS UAN & S.1-l981.
Staffing requirements for positions in the plant's operating organization that are to be filled by personnel holding NRC operator and senior operator licenses are normally delineated in the plant's Safety Analysis Report. These positions shall be specified. Requirements for the minimum number of personnel	Staffing should be in alignment with 50.54.	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.	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.

holding such licenses who are to be present at the plant under various operating conditions and situations shall also be specified, normally in the plant's Technical Specifications.		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.	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.
3.1.3.1.2 Technical Support for the On-Duty Operating Staff The shift staffing shall include, or have available for consultation, individuals in technical areas that are related to the safe operation of the facility. The technical areas include thermodynamics and fluid flow, reactor engineering, systems engineering, transient and accident analysis, instrumentation and controls, quality assurance, radiation protection, and chemistry and radiochemistry.			**3.4.3 Technical Support of the Off-Duty Operating Staff.** The owner organization shall establish provisions for assuring that the shift organization includes, or has available for consultation, persons with professional level expertise in technical areas that are related to the safe operation of the plant. The technical areas include, as a minimum, thermodynamics/fluid flow, reactor engineering, systems engineering transient and accident analysis, radiation protection, and chemistry radiochemistry. These personnel shall be available (at the station or on call and capable of responding to the plant within two hours) for the purpose of providing technical advice to the shift supervisor on a 24-hour-a-day basis. They may be part of the plant organization or they may be part of the offsite technical support for the plant staff, except that an individual appropriately Qualified in the first four areas listed above shall be onsite and capable of responding to the control room within ten minutes after the start of an emergency.
3.1.4 Operating Organization Authorities and Responsibilities		**5.2.1 Responsibilities and Authorities Of Operating Personnel**	
Responsibilities and authorities of plant operating personnel and those persons assigned to provide immediate support for the plant operations personnel shall be delineated for both normal and emergency conditions. The following requirements shall be	Essentially, equivalent to 1976 version,	The responsibilities and authorities of the plant operating personnel shall be delineated. These shall include, as a	See 5.2.1.2 below.

established:	Section 5.2.1. Ok.	minimum: (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 safety system set points and automatic shutdown does not occur. (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. (3) 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. (4) The responsibility to believe and respond conservatively to instrument indications unless they are proved to be incorrect. (5) The responsibility to adhere to the plant's Technical Specifications. (6) The responsibility to review routine operating data to assure safe operation.	
3.1.4.1 Plant Control Responsibilities		**5.2.1 Responsibilities and Authorities or Operating Personnel**	**5.2.1 Control of Plant Operations**
Responsibilities and authorities shall be established so that at all times it is clear which individuals have responsibility for directing the various plant operating and control room activities. In	Essentially, equivalent to 1976	(1) The reactor operator's Authority and responsibility for shutting the reactor down	Responsibilities and authorities of onsite operating personnel and those person! assigned to provide immediate support for

addition, there shall be clear identification of the individual(s) responsible for determining the circumstances, analyzing the cause, and determining that operations may proceed safely after an unexplained event or before the reactor is returned to power after a trip.	version, Section 5.2.1(1) & (2).	when he determines that the safety of the reactor is in jeopardy or when operating parameters exceed any of the reactor protection safety system set points and automatic shutdown does not occur. (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.	the onsite operations personnel shall be delineated for both normal and emergency conditions. at minimum. These rules of practice shall establish the following:
3.1.4.2 General Authorities and Responsibilities of Operating Personnel		**5.2.1 Responsibilities and Authorities Of Operating Personnel**	**5.2.1.2 General Authorities and responsibilities of Operating Personnel**
The general authorities and responsibilities of operating personnel shall be clearly delineated and shall include the following: (1) the authority and responsibility of licensed personnel for shutting down the reactor when it 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. (2) the responsibility to respond conservatively to instrument indications unless they are determined to be incorrect. (3) the responsibility to adhere to plant procedures (see also Section 3.5.1). (4) the responsibility to adhere to the plant's License Conditions and Technical Specifications. (5) the responsibility to review routine operating data to ensure safe operation.	Essentially, equivalent to 1976 version, Section 5.2.1(1) & (2).	The responsibilities and authorities of the plant operating personnel shall be delineated. These shall include, as a minimum: (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. (2) The responsibility to determine the circumstances, analyze the cause, and determine that operational can proceed safely before the reactor is returned to power after a trip or An unscheduled unexplained power reduction. (3) 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. (4) The responsibility to believe and respond conservatively to instrument indications unless they are proved to be incorrect.	Rules of practice shall clearly delineate the general authorities and responsibilities of operating personnel, including the following: 1) The reactor operator's authority and responsibility (or shutting down the reactor when be 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. (2) The responsibility to behave and respond conservatively to instrument indications unless they are proved to be incorrect (3) The responsibility to adhere to the plant's operational and emergency procedures. (see also 5.2.21.) (4) The responsibility to adhere to the plant's Technical Specification. (5) The responsibility to review routine operating data to assure safe operation.

		(5) The responsibility to adhere to the plant's Technical Specifications. (6) The responsibility to review routine operating data to assure safe operation.	
3.1.4.3 Authority and Responsibilities of the Operations Shift Supervisor		**5.2.1 Responsibilities and Authorities. Of Operating Personnel**	**5.2.1.3 Authority and Responsibilities of the Shift Supervisor**
The operations shift supervisor (sometimes called the Shift Manager) shall manage the activities of the operating shift to ensure integrated direction of all activities. The authority and responsibilities of the operations shift supervisor during normal operation and emergency events shall be clearly delineated and shall include the following: (1) the operations shift supervisor shall have the authority and responsibility to direct all activities pertaining to plant operations. (2) the responsibilities of the operations shift supervisor shall be to maintain a comprehensive understanding of operational conditions that affect the safety of the plant as a matter of highest priority. Control room command duties, responsibilities, and authorities shall be clearly specified. The operations shift supervisor shall not become totally involved in any single operation when multiple operations are required in the control room. If the operations shift supervisor is temporarily absent from the control room area during routine operations, a qualified licensed senior operator shall be designated to assume the control room command function.	New addition. Ok. Similar to 1982 version 5.2.1.3.	The responsibilities and authorities of the plant operating personnel shall be delineated. These shall include, as a minimum: (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 did not occur. (2) The responsibility to determine the circumstances, analyze the cause, and determine that operation" can proceed safely before the reactor is returned to power after a trip or an unscheduled or unexplained power reduction. (3) 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. (4) The responsibility to believe and respond conservatively to instrument indications until they are proved incorrect. (5) The responsibility to adhere to the plant's Technical Specifications.	Rules of practice shall clearly delineate the authority and responsibilities of the shift supervisor during normal operation and emergency events, including the following: (1) The shift supervisor shall have the authority and responsibility to direct all activities affecting the safety of the nuclear power plant. Transfer of authority and responsibility to plant staff members in management levels above the shift supervisor shall be predetermined. Transfer of this authority and responsibility shall be documented for routine shift turnover and emergency conditions. (2) The responsibilities of the shift supervisor shall be primarily to maintain the broadest perspective of operational conditions affecting the safety of the plant as a matter of highest priority at all times. The idea of command and control shall be reinforced and the shift supervisor shall be instructed not to become totally involved in any single operation in times of emergency when multiple operations are required in the control room. If the shift supervisor is temporarily absent from the control room during routine operations, a lead control room operator shall be designated to assume the control room command function. Temporary duties, responsibilities, and authority shall be clearly specified. (3) During emergency conditions, the duty station for the shift supervisor shall be the

		(6) The responsibility to review routine operating data to ensure safe operation.	central control room. The shift supervisor, until properly relieved, shall remain in the control room at all times during such situations to direct the activities of control room operators.
In order to perform the preceding functions effectively, the operations shift supervisor shall not be encumbered with unnecessary on-shift administrative duties.	Worded slightly different than 1976 version, Section 3.4.2. Intent is the same. Ok.	**3.4.2 Requirements for the Onsite Operating Organization** The onsite operating organization shall include one or more individuals knowledgeable in the following field!!: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 (or 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, NIS.1-1971. Personnel whose qualifications do not meet those specified in NIS.l 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 interpreted to mean actual experience in carrying out the types of	**3.4.2 Requirements for the onsite Operational Organization** The Onsite operating organization shall include. At a minimum, one or more individual knowledgeable in the following fields: nuclear power plant operation: nuclear power plant mechanical systems; nuclear power plant electrical and electronic systems; nuclear engineering; heat transfer, fluid flow and thermodynamics; chemistry and radiochemistry; radiation protection; and quality assurance. Initial incumbents or replacements for members of the onsite operating organization 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. Qualification and Training of Personnel for Nuclear Power Plants, ANS UAN & S.1-l981.

		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 be specified. The Plant Manager shall have Overall responsibility for the execution of the administrative control. 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 practice: shall be designated and assigned the responsibility to verify that the program is being effectively implemented. Depending on the organizational structure, the individual or organizational unit may report functionally to offsite plant management or an offsite organization (see also 3.2). Reporting to onsite plant management is preferable since such an arrangement usually resulting in improved communications in identifying problems and initiating corrective action. 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 such that the required attention can be devoted, as required, to verifying that the program is being effectively executed. The individual	

		or organizational unit shall report on the effectiveness of the program to the Plant Manager and to either cognizant management as may be designated. The activities shall be periodically audited by designated offsite personnel.	
3.1.4.4 Responsibilities of Others in the Plant Operating Organization		**3.4.2 Requirements for the Onsite Operating Organization.**	**3.4.2 Requirements for the Onsite Operational Organization**
The authority and responsibility of other personnel whose actions or decisions could affect normal plant operations or exacerbate an abnormal or accident condition shall be delineated. As a minimum, personnel performing maintenance or testing shall not work on plant systems and equipment unless permission has been granted by designated operating personnel.	New addition. Ok. §No discussion of the role of the Plant Manager, as in 1976 version, Section 3.4.2.	The onsite operating organization shall include one or more individuals knowledgeable in the following field: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 (or 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, NIS.1-1971. Personnel whose qualifications do not meet those specified in NIS.l 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. except that the QA experience cited for Levels I, II, and III should be interpreted to mean actual experience in carrying out the types of inspection. examination. or testing activity	The Onsite operating organization shall include. At a minimum, one or more individual knowledgeable in the following fields:nuclear power plant operation: nuclear power plant mechanical systems; nuclear power plant electrical and electronic systems; nuclear engineering; heat transfer, fluid flow and thermodynamics; chemistry and radiochemistry; radiation protection; and quality assurance. Initial incumbents or replacements for members of the onsite operating organization 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. Qualification and Training of Personnel for Nuclear Power Plants ANSI/ANs 3.1-l981 (SI Personnel whose qualifications are not addressed in ANS-3.1 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 in accordance with the requirements of NQA-1-1979, except that cited experience shall be limited to actual experience in carrying out the types of inspection. examination, or testing activity being performed. The owner organization shall designate the position in the onsite operating organization which shall be filled

		being performed.	by personnel holding NRC operator and senior operator license. Requirements for the minimum number of personnel holding such licenses who shall be present at the plant under various operating conditions and situation shall also be specified_
3.1.4.5 Transfer of Authority and Responsibility			**5.2.1.4 Transfer of Responsibility**
Transfer of authority and responsibility to plant staff members in management levels above the operations shift supervisor shall be predetermined. The transfer of responsibility from one shift to another, as well as the transfer of authority during emergency conditions shall be documented and shall involve: (1) Persons authorized to relieve the operations shift supervisor. Only personnel meeting the qualification requirements of the operations shift supervisor position shall relieve the on-duty shift supervisor. (2) The line of ascension of authority. (3) The authority and limitations of technical and management personnel to direct activities in the control room.	New addition. Ok. Similar to 1982 version, Section 5.2.1.4.		Rules of practice shall be established for the transfer of responsibility from one shift to another, as well as the transfer of authority during emergency conditions. These rules of practice shall delineate: (1) Persons authorized to relieve the shift supervisor. (2) The line of ascension of authority during both normal and emergency conditions when one or more persons of management authority above the shift supervisor are present in the central control room. Only personnel meeting the qualification requirements of the shift supervisor position shall have the authority to relieve the on-duty shift supervisor from the responsibility to direct activities affecting the safety of the nuclear power plant. (3) The authority, and limitations thereon, of technical and management personnel to direct activities in the central control room. (4) Interfaces between groups such as the utility's corporate organization, vendors, the architect-engineer, contractors and consultants, NRC and other local state or federal agencies.
To ensure that personnel on succeeding shifts have a clear understanding of the condition of equipment and systems, each on-shift duty station shall have procedures for the turnover of duties. These procedures shall include documented turnover action appropriate to the duty station acknowledging the status of the plant	New addition. Ok. Similar to 1982 version, Section		See above

and transfer of authority. Overall plant status, maintenance and test status, planned activities, and any identified trends applicable to the duty station shall be explained. In addition, the following items shall be identified: (1) critical parameters that are not within normal limits, (2) systems that are not in their normal configuration, or are in a degraded mode of operation permitted by the Technical Specifications, and (3) any time that limitations are placed on continued operation.	5.2.1.4.		
3.1.4.6 Control Room Access		**5.2.9 Plant Security and Visitor Control**	**5.2.1.5 Control Room Access**
Access to the control room shall normally be limited to on-shift personnel and other persons whose job function requires their physical presence in the control room. Access to the control room for the purpose of general familiarization and other non-work-related activities shall be authorized only for good cause.	New addition. Ok. Similar to 1982 version, Section 5.2.1.5. Slightly similar to 1976 version, Section 5.2.9.	Procedures shall be developed to supplement features and physical barriers design to control access to the pant and as appropriate to vital area within the plant information concerning specification designated features and administrative provision of the plant and visitors controls procedures such as fences and lightings lock control for doors gates and compartments ……..the security and visitors control for doors gates an challenging of strangers By operating crew and a program of reemployment screening (or potential employee. See American National Standard Industrial Security for Nuclear Power Plant, N18.7-1971, for guidance and provisions for security measures adequate to protect nuclear power plants.	Access to the control room shall normally be limited to assigned shift personnel and other persons whose job function requires their physical presence in the control room. This control shall be exercised by physical security controls and by administrative controls implemented by the shift supervisor or other emergency coordinators that have assumed control. Access to the control room for the purpose of general familiarization and other non-work-related activities shall be authorized only for good cause. To facilitate the assistance by technical support personnel to the shift operating crew in an emergency, provisions shall be made to provide a technical support center for these persons

During emergency conditions, access to the control room should also be limited. A technical support center, operational support center, and emergency operations facility are provided for support personnel.	New addition. Ok. Similar to 1982 version, Section 5.2.1.5.	N/A	See above
3.2 Program			
The managerial and administrative controls employed shall provide control over activities affecting the quality of safety-related structures, systems, and components to an extent consistent with the scope and purpose of this standard. Managerial and administrative controls shall establish requirements pertaining to the conduct and control of plant activities such that affected personnel are provided with a clear understanding of operating philosophy and management policies, as well as methods and techniques for performing required work. These controls shall be established in appropriate policies, procedures, and/or instructions for the operating and support organizations.			
3.2.1 Operating Organization Review			
The operating organization shall provide, as a part of the normal duties of plant supervisory personnel, timely and on-going monitoring of operating activities to assist the plant manager in keeping abreast of general plant conditions and to verify that day-to-day operations are conducted safely in accordance with the established administrative controls. These monitoring activities are considered to be an integral part of the routine supervisory function and are important to the safety of plant operation.	.		
The operating organization shall perform reviews periodically and as situations demand, to evaluate plant operations and plan future activities. The important elements of the reviews shall be documented. Such reviews serve a useful purpose but shall not take the place of the reviews described in Section 3.2.2, or audits described in Section 3.18. The onsite operating organization			

shouldscreen subjects of potential concern to independent reviewers (see section 3.2.2.2 (1) through (8)) and perform preliminary investigations. The plant manager shall ensure the timely referral of the applicable matters discussed in the reviews to appropriate management and independent reviewers.			
3.2.2 Independent Review		**4.3 Independent Review Program**	**4.3 Independent Review Program**
Activities occurring during the operational phase shall be independently reviewed on a periodic basis. The independent review program shall be functioning prior to initial core loading. This Standard does not advocate any specific organizational structure for complying with the independent review function, but, in lieu thereof, delineates essential elements of satisfactorily comprehensive programs for review that shall be applied in the manner best suited to the owner organization involved. An Independent Review Body (IRB) as described in 3.2.2.3 or an Independent Review Committee (IRC) as described in 3.2.2.4 shall be used to perform the independent review function. The terms IRB and IRC are intended to be generic in nature and may be substituted with the specific owner organization's terms.		Activities occurring during the operational phase shall be independently reviewed on a periodic basis. The independent review program shall be functional prior to initial core loading.	Activities occurring during the operational phase shall be independently reviewed on a periodic basis. The independent review program shall be functional prior to initial core loading.
3.2.2.1 Personnel		**4.3.1 Personnel**	**4.3.1 Personnel**
Personnel assigned responsibility for independent review 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: (1) Nuclear power plant operations (2) Nuclear engineering (3) Chemistry and radiochemistry (4) Metallurgy (5) Nondestructive testing	IAW NRC Safety Evaluation ML050210276	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; (1) Nuclear power plant operations (2) Nuclear engineering (3) Chemistry and radiochemistry (4) Metallurgy (5) Nondestructive testing	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; (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 engineering (9) Electrical engineering (10) Administrative control and quality assurance practices (11) Training (12) Emergency plans and related procedures and equipment.		(6) Instrumentation and control (7) Radiological safety (8) Mechanical engineering 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.	(6) Instrumentation and control (7) Radiological safety (8) Mechanical engineering (9) Electrical engineering (10) Administrative controls and quality assurance practices (11) Emergency plans and related organization, procedure and equipment (12) Other appropriate fields associated with the unique characteristics of the nuclear power plant involved.
An individual may possess competence in more than one specialty area. If sufficient experience is not available within the owner organization, independent reviews shall be supplemented through outside consultants or organizations. Provisions shall be made to assure that appropriate expertise is brought to bear in reviews of operational phase activities.		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 be made to assure that appropriate expertise is brought to bear in reviews of operational phase activities.	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 be made to assure that appropriate expertise is brought to bear in reviews of operational phase activities.
Persons fulfilling the independent review function shall be qualified as follows: (1) Supervisor or Chairperson: a. Education: baccalaureate in engineering or related science. b. Minimum experience: 6 years combined managerial and technical support. (2) Reviewers: a. Education: - Baccalaureate in engineering or related science for those independent review personnel who are required to review problems in nuclear power plant operations, nuclear engineering, chemistry and radiochemistry, metallurgy, nondestructive testing,	IAW NRC Safety Evaluation ML050210276		

instrumentation and control, radiological safety, mechanical engineering, and electrical engineering. - High school diploma or equivalent for those independent review personnel who are required to review problems in administrative control and quality assurance practices, training, and emergency plans and related procedures and equipment. - Alternatives to the education requirements may be applied consistent with USNRC Regulatory Guide 1.8 [4]. b. Minimum experience: 5 years experience in their own area of responsibility (1 through 12 above).			
3.2.2.2 Scope of Review		**4.3.4 Subjects Requiring Independent Review**	**4.3.4 Subjects Requiring Independent Review**
The independent review function shall perform the following:		The following subjects shall be reviewed by the independent review body:	The following subjects shall be reviewed by the independent review body:
(1) Reviews proposed changes to the facility as described in the safety analysis report (SAR) and verifies that changes do not adversely affect safety and if a technical specification change or NRC review is required.		(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). 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 as defined in10CFR 50.59(a)(2).	(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). 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 as defined in10CFR 50.59(a)(2).
(2) Reviews proposed tests and experiments not described in the SAR prior to implementation. Verifies the determination of whether changes to proposed tests and experiments not described in the SAR require a technical specification change or license amendment. .		(2) Proposed changes in procedures, Proposed changes in the facility, or proposed tests or experiments any of which involves a change in the technical specification or an unreviewed safety question as defined in 10 CFR 50.59(c). Matters of this kind shall be referred to the independent review body by the 0nsite operating organization (see 4.4) following	(2) Proposed changes in procedures, Proposed changes in the facility, or proposed tests or experiments any of which involves a change in the technical specification or an unreviewed safety question as defined in 10 CFR 50.59(c). Matters of this kind shall be referred to the independent review body by the 0nsite operating organization (see 4.4) following

		its review, or by other functional organizational units within the owner organization, prior to implementation.	its review, or by other functional organizational units within the owner organization, prior to implementation.
(3) Reviews proposed technical specification changes and license amendments relating to nuclear safety prior to NRC submittal and implementation, except in those cases where the change is identical to a previously approved change.		(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.	(3) Changes in the technical specifications or license amendments relating to nuclear safety prior to submittal to the Commission for approval and prior to implementation.
(4) Reviews violations, deviations, and events that are required to be reported to the NRC. This review includes the results of investigations and recommendations resulting from such investigations to prevent or reduce the probability of recurrence of the event.		(4) Violations, deviations, and reportable events which require reporting to the NRC in writing 24 hours, such as	(4) Violations, deviations, and reportable events which require reporting to the NRC in writing. Review of events covered under this subsection shall include the results of any investigations made and the recommendations resulting from such investigations to prevent or reduce the probability of recurrence of the event.
(5) Reviews any matter related to nuclear safety that is requested by the plant manager or any IRB/IRC member.			(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.
(6) Reviews corrective actions for significant conditions adverse to quality.			
(7) Reviews internal audit reports.			
(8) Reviews the adequacy of the internal audit program every 24 months.			
3.2.2.3 Independent Review Body			

A group may function to perform the reviews of 3.2.2.2 and is described as an independent review body (IRB). In discharging its review responsibilities, the IRB keeps safety considerations paramount when opposed to cost or schedule considerations. One or more organizational units may collectively perform this function. 1. The IRB reviews shall be supplemented as follows: a. A qualified person, independent of the preparer, reviews proposed changes in the procedures as described in the SAR prior to implementation of the change to determine if a technical specification change or NRC approval is required. b. Audits of selected changes in the procedures described in the SAR are performed to verify that procedure reviews and revision controls are effectively implemented. c. Competent individual(s) or group(s) other than those who performed the original design but who may be from the same organization verify that changes to the facility do not result in a loss of adequate design or safety margins. 2. The results of IRB reviews of matters involving the safe operation of the facility are periodically independently reviewed. This review is intended to support management in identifying and resolving issues potentially affecting safe plant operation. This review supplements the existing corrective action programs and audits. a. The review is performed by a team consisting of personnel with experience and competence in the activities being reviewed, but independent from cost and schedule considerations and from the organizational unit[s] responsible for those activities. b. The review is supplemented by outside consultants or organizations as necessary to ensure the team has the requisite expertise and competence. c. Results of the review are documented and reported to responsible management.	IAW NRC Safety Evaluation ML050210276		

d. Management periodically evaluates issues they determine warrant special attention, such as deficient plant programs, declining performance trends, employee concerns, or other issues related to safe plant operations and determine what issues warrant the review. e. Management determines the scheduling and scope of review and the composition of the team performing the review.			
3.2.2.4 Independent Review Committee			**4.3.2.1 Committee Composition**
When an independent review committee is assigned independent review responsibilities: 1. The independent review committee reports to a management level above the plant manager. 2. The independent review committee shall be composed of no less than 5 persons and no more than a minority of members are from the on-site operating organization. Competent alternates are permitted if designated in advance. The use of alternates shall be restricted to legitimate absence of the principles. 3. Results of the meeting shall be documented and recorded and disseminated promptly to appropriate members of management having responsibility in the area reviewed. 4. Consultants and contractors are used for the review of complex problems beyond the expertise of the independent review committee.	IAW NRC Safety Evaluation ML050210276		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 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.
5. During the period of initial operation, meetings shall be conducted no less frequently than once per calendar quarter. Afterwards meetings are conducted no less than twice a year.		**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.	**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. It is intended that committee decisions

			normally be made at formal meetings. However, in extenuating circumstances where it is impractical to convene a quorum for a formal meeting within a necessary time constraint, alternative means such as a conference call are acceptable. In such cases, action taken shall be reviewed by a quorum of the independent review body at its next regularly scheduled meeting.
6. A quorum for formal meetings shall consist of not less than a majority of the members, or duly appointed alternates. The chairperson or duly appointed alternate shall be present for all meetings; and no more than a minority of the quorum shall have line responsibility for operation of the plant.		**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.	**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.
3.2.3 Indoctrination and Training			
Qualification requirements for positions in the plant operating organization shall be established in accordance with the provisions of plant technical specifications, American National Standard for Selection, Qualification and Training of Personnel for Nuclear Power Plants, USNRC Regulatory Guide 1.8 [4]. USNRC Regulatory Guide 1.8 [4].or ASME NQA-1-2008 and the NQA-1a-2009 addenda [2] as applicable. Training shall be in accordance with ASME NQA-1-2008 and the NQA-1a-2009 addenda [2].	Refers to guidance in NQA-1		
3.2.4 Maintenance			

Maintenance activities that may affect the functions of structures, systems, or components shall**:** (1) be performed in a manner to assure quality, availability, and reliability at least equivalent to that specified in the original or updated design bases and requirements. (2) provide for the conduct of appropriate inspections and performance tests to demonstrate that maintenance has been properly performed. (3) be planned and performed in accordance with written procedures, documented instructions or drawings appropriate to the circumstances which conform to applicable codes, standards, specifications, and criteria. (4) be documented in accordance with applicable codes, standards and regulatory commitments. This documentation shall be retained as specified in 3.17. (5) be scheduled and planned so as not to violate plant Technical Specifications or compromise the safety of plant personnel or equipment. Planning shall evaluate 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 shouldinclude evaluation of equipment out-of-service to ensure the increased risk is known and compensatory measures are taken when appropriate. Planning should also evaluate the use of special processes, equipment and materials, potential hazards to personnel and equipment and the benefits of minimizing equipment unavailability. (6) contain general rules for the development, review, and approval, prior to use, of repair, replacement, recurring, and routine maintenance procedures consistent with the provisions of this standard. (7) provide for a preventive maintenance program, based on performance and condition monitoring, that prescribes the frequency and type of maintenance to be performed. A preliminary program based on service conditions, industry experience with comparable equipment and supplier recommendations, should be developed prior to fuel loading. The program should be revised and updated as	NRC did not endorse subpart 2.18 of NQA-1 in RG1.33. See note under section 2.2 Would affect the Glossary. May be needed to support section 5.2.7 and 5.2.7.1 in ANS 3.2-1976 version.		

experience is gained with the equipment. Equipment history files should be created, kept current, and periodically evaluated for adverse trends. The files should be organized to provide complete and easily retrievable equipment history. (8) provide for the prompt determination, evaluation, recording, and dissemination to appropriate personnel of the causes of malfunctions or unacceptable performance (see also Section 3.16). Industry experience with malfunctioning equipment shouldbe reviewed and evaluated to determine whether a component of the same type can be expected to perform its function reliably. (9) provide requirements to implement appropriate corrective actions prior to replacement or repair of similar components in systems that performed unsatisfactorily. (10) address aging, generic, and common cause effects to prevent possible recurrence and to inform appropriate industry communication organizations. (11) provide assurance that replacement components shall receive adequate testing or shall be of a design for which experience indicates a high probability of satisfactory performance. (12) evaluate phased replacement to permit in-service monitoring of new components thus minimizing the possibility of a hidden deficiency producing a systematic failure. (13) evaluate implementing and monitoring an augmented testing and inspection program following a large-scale component replacement (or repair) until such time that a suitable level of performance has been demonstrated.			
3.2.5 Housekeeping and Cleanliness Control			
Housekeeping and cleanliness shall be controlled in accordance with ASME NQA-1-2008 and the NQA-1a-2009 addenda [2].	NRC did not endorse subpart 2.18 of NQA-1 in RG1.33.		

	May be needed to support section 5.2.7 and 5.2.7.1 in ANS 3.2-1976 version.		
3.3 Design Control			
Design activities, including modifications, associated with structures, systems, and components (SSC)s shall be controlled in accordance with ASME NQA-1-2008 and the NQA-1a-2009 addenda [2].	Essentially, equivalent to NQA- 1. Ok. 1982 version states to do IAW NQA-1. No unique additional requirements.		
3.4 Procurement Document Control			
Procurement Documents shall be controlled in accordance with ASME NQA-1-2008 and the NQA-1a-2009 addenda [2].	Essentially, equivalent to NQA- 1. Ok. 1982 version states to do IAW NQA-1. No unique additional requirements.		
3.5 Instructions, Procedures, and Drawings			
Instructions, procedures, and drawings shall be used in accordance with ASME NQA-1-2008 and the NQA-1a-2009 addenda [2]. Appendix A includes a listing of typical procedures that are considered to affect safe operation or the quality of SSCs			

that shouldbe addressed through the managerial and administrative controls program. Specific requirements for operational procedures are as follows.			
3.5.1 Procedure Adherence		5.2.2 Procedure Adherence	5.2.2 Procedure Adherence
Procedures shall be followed, and the requirements for their use shall be prescribed in writing. Procedures and changes thereto are controlled in accordance with Section 3.6 of this standard.	Essentially, equivalent to NQA-1. Similar to 1982 version, Section5.2.2.	Procedure shall be followed, and the requirements for use of procedures shall be prescribed in writing. 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. Temporary changes which clearly do not change the intent of the approved procedure, shall at a minimum be approved by two member 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 operator's license on the unit affected. Such changes shall be documented and if appropriate, incorporated in the next revision of the affected procedure.	Procedures shall be (allowed, and the requirements for use of procedures shall be prescribed in writing. Rules shall be established which provide methods by which temporary changes to approved procedures can be made, including the designation of 8 person or persons authorized to approve such changes. 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 procedure. At least one of these shall be a member of plant supervision. For changes to procedures which may affect the operational status of plant systems or equipment. the changes shall be approved by two members of the plant supervision, at least one of whom holds a senior operator' 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, or an emergency not following the path upon which the approved procedure is based, operations personnel shall be instructed to take action so as to protect public health and safety, and minimize personnel injury and damage to the facility.	Essentially, equivalent to ANS 3.2 1976, section 5.2.2.	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.	In the event of an emergency not covered by an approved procedure, or an emergency not following the path upon which the approved procedure is based, operations personnel shall be instructed to take action so as to protect health and safety, and minimize personnel injury and damage to the facility.

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:	Essentially, equivalent to ANS 3.2 1976, section 5.2.2.	Guidance should be provided to identify the manner in which procedures are to be implemented. Example of such guidance include identification of those tasks that require:	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.	Essentially, equivalent to ANS 3.2 1976, section 5.2.2.	(1) The written procedure to be present and followed step by step while the task is being performed	(I) The written procedure to be present. Either on paper or on a suitable electronic or other display, and followed step by step while the task is being performed.
(2) Memorization of procedural steps.	Essentially, equivalent to ANS 3.2 1976, section 5.2.2.	(2) The operator to have committed the procedural step to memory	(2) The operator to have committed the procedural steps to memory.
(3) Verification of completion of significant steps, by initials or signatures on check-off lists. Startup and shutdown procedures are examples of procedures that require verification.	Essentially, equivalent to ANS 3.2 1976, section 5.2.2.	(3) Verification of completion of significant steps by initial or signature of \check off list	(3) Verification of completion of significant steps. by initials or signatures of check off lists.
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 startup, tasks which are infrequently performed, and tasks in which operations shall be performed in a specified sequence, and emergency operating procedures. Routine procedural actions that are frequently repeated may not require the procedure to be present; however, periodic procedure reference may be needed to verify the adequacy of procedures and task performance, and accurate adherence. Copies of all procedures shall be available to appropriate members of the plant staff. Those procedures that are necessary for use by the reactor operators shall be available and readily accessible in the control room. If an electronic display is relied upon as the written procedure, a hard copy should be available as backup. If documentation of an action is required, the necessary documentation shall be recorded as the task is performed.	Essentially, equivalent to ANS 3.2 1976, section 5.2.2.	5.2.2 Procedure Adherence Procedure shall be followed and the requirement for use of procedures shall be prescribed in writing. 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. Temporary changes which clearly do not change the intent of the approved procedure shall at 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 operator's license on the unit affected. Such changes shall be documented and if appropriate, incorporated in the next	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 startup tasks which are infrequently performed, and tasks in which operation 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 frequently repeated might not require the procedure to be present. Copies of all procedure shall be available to appropriate members of the plant staff. Those procedures which may be necessary for' use by the reactor operator's shall be available in the control room. If documentation of an action is required the necessary data shall be recorded as the task is performed. Examples of procedures requiring

		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. Guidance should be provided to identify the manner in which procedures are to be implemented. Examples of such guidance include identification of those skill that require: (1) The written procedure to be present 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 initial or signature of check off list The type of procedures that shall he present and referred to directly are those developed examples jobs where reliance on memory cannot be trusted. e.g., reactor "start-up tasks which are infrequently Performed any tasks in which operation) must be performed in a specified sequence. Procedure steps for which action should be committed to memory include, or example, action in emergency procedures. Routine procedural actions that are frequently repeated may not require the procedure to be present Copies of all procedures shall be available to appropriate members of the plant staff documentation of an action is required. the necessary data shall be recorded as the task is performed. Examples of procedure requiring verification are furnished in	verification are furnished in 5.3.4.1 and 5.3.4.2.

		5.3.4.1 And 5.3.4:2.	
3.5.2 Content and Format			
Procedure format and content may vary from one owner organization, or group therein, to the other. However, procedures shall include the following elements as appropriate to the purpose or task to be described.	See section 5.3.2 of 3.5.1 on the ANS 3.2 sheet		
3.5.2.1 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.	See section 5.3.2 of 3.5.1 on the ANS 3.2 sheet		
3.5.2.2 Purpose/Statement of Applicability/Scope			
The purpose for which the procedure is intended is clearly stated (if not clear from the title). The systems, structures, components, processes or conditions to which the procedure applies are also clearly described.	See section 5.3.2 of 3.5.1 on the ANS 3.2 sheet		
3.5.2.3 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.	See section 5.3.2 of 3.5.1 on the ANS 3.2 sheet		
3.5.2.4 Prerequisites/Initial Conditions			
Prerequisites/initial conditions identify those independent actions or procedures that shall be accomplished and plant conditions that are required to exist prior to performing the procedure. A prerequisite applicable to only a specific portion of a procedure is	See section 5.3.2 of 3.5.1 on the ANS 3.2		

so identified.	sheet		
3.5.2.5 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.	See section 5.3.2 of 3.5.1 on the ANS 3.2 sheet		
3.5.2.6 Limitations and Actions			
Limitations on the parameters being controlled and appropriate corrective measures to return the parameter to the normal control band are specified.	See section 5.3.2 of 3.5.1 on the ANS 3.2 sheet		
3.5.2.7 Main Body			
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.	See section 5.3.2 of 3.5.1 on the ANS 3.2 sheet		
3.5.2.8 Acceptance Criteria			
The acceptance criteria provide the quantitative or qualitative criteria against which the success or failure of the step or action (such as for a test type activity) would be judged.	See section 5.3.2 of 3.5.1 on the ANS 3.2 sheet		
3.5.2.9 Checklists			
Complex procedures should utilize checklists which may be	See section 5.3.2 of 3.5.1 on the ANS 3.2		

included as part of the procedure or appended to it.	sheet		
3.5.3 Plant Procedures			
Plant procedures provide instructions for controlling plant activities. Typical examples of these types of plant procedures and their characteristics are as follows.	Essentially, equivalent to ANS 3.2 1976, section 5.3.4.		
3.5.3.1 Administrative Control Procedures			
These include administrative procedures, directives, policies, standards, and similar documents that control the programmatic aspects of facility activities. These administrative documents ensure that the requirements of regulatory and license commitments are implemented. Several levels of administrative controls are applied ranging from those affecting the entire owner organization to those prepared at the implementing group level. These documents establish responsibilities, interfaces, and standard methods (rules of practice) for implementing programs	Replacement for 5.1, ANS 3.2 1976, more general. No problems identified. Ok. Section 5.2 “Rules of Practice,” replaced by part 26 requirements. So ok to remove. Section 5.2.1 is elaborated in other parts of the new ANS 3.2. Different levels of detail than ANS 3.2 1976 version. Section 5.3.3.	**5.3.3 System Procedures.** 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 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 check off lists where appropriate.	
3.5.3.2 Operating Orders/Procedures		**5.2.3 Operating Order**	**5.2.3 Operating Orders**
Instructions of general and continuing applicability to the conduct of business to the plant staff are provided. Examples where these	Similar to 1982	A mechanism shall be provided for dissemination to the plant staff of	A mechanism shall be provided for dissemination to the plant staff of

are applied include, but are not limited to, 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. Provisions are made for periodic review and updating of these documents, where appropriate.	version, Section 5.2.3.	instructions of general and continuing applicability to .the conduct of business. Such instruction... ~, 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 should be made for periodic review and updating of standing orders.	instructions of general and continuing applicability to the conduct of business. Such instructions. sometimes also referred to as administrative procedures, 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 operating orders.
3.5.3.3 Special Orders		**5.2.4 Special Order**	**5.2.4 Special Orders**
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.	Essentially, equivalent wording as ANS 3.2, 1976 version, section 5.2.4	A mechanism shall be provided for issuing management instructions which have short-term applicability and which require dissemination. Such instructions sometimes referred to as special orders, should encompass special operational, housekeeping, data taking, publication and their distribution, plotting process parameters, personnel actions or other familiar material Provisions should be made for periodic review, updating and cancellation of special orders.	A mechanism shall be provided for issuing management instructions which have short-term applicability and which require dissemination. Such instructions, sometimes referred to as 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.
3.5.3.4 Temporary Procedures		**5.2.5 Temporary Procedures**	**5.2.5 Temporary Procedures**
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 the normal procedures. These procedures ensure orderly and uniform operations for short periods when the plant, a system, or a component of a system is performing in a manner not addressed by existing detailed procedures or has been modified or extended in such a manner that portions of existing procedures do not apply. Temporary procedures include designation of the period of time during which they may be used and are subject to the procedure review process as applicable.	Essentially, equivalent wording as ANS 3.2, 1976 version, section 5.2.5	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 ensure 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 extended in such a manner that	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 ensure 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 extended in such a manner that portions of existing procedures do not apply. Temporary procedures shall include

		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.	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. Temporary procedures shall be approved by the management representative assigned approval authority.
3.5.3.5 Engineering Procedures			
These documents provide instructions for the preparation of engineering documents, engineering analysis, and implementation of engineering programs. This includes activities such as designs; calculations; fabrication, equipment, construction, and installation specifications; drawings; analysis and topical reports; and testing plans or procedures. They include appropriate references to industry codes and standards, design inputs, and technical requirements. Additional criteria for these procedures are contained in ASME NQA-1-2008 and the NQA-1a-2009 addenda [2].	New section in line with NQA-1 requirements. Ok.		
3.5.3.6 Installation Procedures			
These documents provide instructions for the installation of components generally related to new construction and certain modification activities. They include appropriate reference to industry standards, installation specifications, design drawings, and supplier and technical manuals for the performance of activities. These documents include provisions, such as hold or witness points, for conducting and recording results of required inspections or tests. These documents may include applicable inspection and test instructions subject to the requirements for test and inspection procedures below.	New section in line with NQA-1 requirements. Installation in operating plants equivalent to design and construction phase.		
3.5.3.7 System Procedures			
These documents 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. Actions to correct off-normal conditions are invoked following an operator observation or	§ New section similar to 1982 version Sections		

an annunciator alarm indicating a condition which, if not corrected, could degenerate into a condition requiring action under an emergency procedure. Separate procedures may be developed for correcting off-normal conditions for those events where system complexity may lead to operator uncertainty	3.2 & 3.5.5.2.		
3.5.3.8 Start-up Procedures		**5.3.4.1 Start-up Procedures**	**5.3.4.1 Start-up Procedures**
These documents contain instructions for starting the reactor from cold or hot conditions and establishing power operation. This includes documented determination that prerequisites have been satisfied, including confirmation that necessary instruments are operable and properly set, valves are properly aligned, necessary system procedures, tests and calibrations have been completed, and required approvals have been obtained.	Essentially, equivalent wording as ANS 1976 version, section 5.3.4.1	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 5.2.1.1.	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 5.2.1.1.
3.5.3.9 Shutdown Procedures		**5.3.4.2 Shutdown Procedures**	**5.3.4.2 Shutdown Procedures**
These documents contain guidance for operations during controlled shutdown and following reactor trips, including instructions for establishing or maintaining hot shutdown/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 and cool down rates, sequence for activating or deactivating equipment, requirements for prompt analysis for causes of reactor trips or abnormal conditions requiring unplanned controlled shutdowns, and provisions for decay heat removal.	Essentially equivalent wording as ANS 1976 version, section 5.3.4.2.	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 cool down 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. Check off list should be used for confirming completion of major steps in proper sequence.	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 cool down rates, sequence of activating or deactivating equipment, requirements for prompt analyses of causes or reactor trips or abnormal conditions requiring unplanned controlled shutdowns, and provisions for decay heat removal. Check off lists shall be used for the purpose of confirming completion of major steps in proper sequence.
3.5.3.10 Power Operation and Load Changing Procedures		**5.3.4.3 Power Operation and Load Changing Procedure.**	**5.3.4.3 Power Operation and Load Change·**
These documents contain instructions for steady-state power	Essentially equivalent	Procedures for steady- state power	Procedures for steady-state power

operation and load changing. These type documents include, as examples, provisions for use of control rods, chemical shim, coolant flow control, or any other system available for short-term or long-term control of reactivity, making deliberate load changes, responding to unanticipated load changes, and adjusting operating parameters. .	wording as ANS 1976 version, section 5.3.4.3.	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.	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 procedures, deliberate load changes, responding to unanticipated load changes and adjusting operating parameters
3.5.3.11 Process Monitoring Procedures		**5.3.4.4 Process Monitoring Procedures**	**5.3.4.4 Process Monitoring Procedures**
These documents 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 maintain the plant in a safe condition if needed. Maximum and minimum limits for process parameters are appropriately identified. Operating procedures address the appropriate nature and frequency of this monitoring.	Essentially equivalent wording as ANS 1976 version, section 5.3.4.4.	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 intergraded 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 (needed.. The limit (maximum and minimum) (or significant process parameters shall be identified. 'The nature and frequency of this monitoring shall be covered by operating procedures. as appropriate.	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.
3.5.3.12 Fuel Handling Procedures		**5.3.4.6 Fuel-Handling Procedures**	**5.3.4.5 Fuel- Handling Procedures**
These documents 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,	Essentially equivalent wording as ANS 1976 version, section 5.3.4.5.	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, (or 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	.Fuel handling operations shall be performed in accordance with written procedures. These procedure shall specify instructions for use of refueling equipment, actions for core alterations, accountability of fuel and partial or complete refueling operations that include, for example, continuous monitoring of the neutron flux: throughout

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, 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 (or other unique identifiers) and locations.		multiplication to verify 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 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. (2) Main Body. The main body of fuel hand line procedures shall include requirements for refueling; for sample, the status of the core, instructions (or 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 (or stopping refueling and (or reducing the size of the fuel loading increment, and a containment evacuation plan and its associated safe measures. Documentation of final fuel and component serial numbers and locations shall be maintained	core loading, periodic recording of data, audible annunciation of abnormal flux increase and evaluation of core neutron multiplication to verify 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 shall 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 provided in the fuel-handling procedures that include. for example, the status of plant systems required for refueling; inspection of replacement fuel control rod!:, 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. (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, administrative control of shift changes 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.
3.5.3.13 Maintenance Procedures			
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 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 ASME NQA-1-2008 and the NQA-1a-2009 addenda, Subpart 2.18 [2].	Essentially equivalent wording as ANS 1976 version, section 5.3.5. NRC did not endorse 2.18 of NQA-1 in RG 1.33	.	
3.5.3.14 Radiation Control Procedures			
These documents contain instructions for implementation of the radiation control program requirements necessary to maintain compliance with 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, utilizing accepted techniques; routine radiation surveys of work areas; effluent and 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	Essentially, equivalent wording as ANS 1976 version, section 5.3.6. Ok		

and others.			
3.5.3.15 Calibration and Test Procedures			
These documents contain instructions for periodic calibration and testing of instrumentation and control systems, and for periodic calibration of measuring and test equipment used in activities affecting the quality of these systems. These documents provide for meeting surveillance requirements and for assuring measurement accuracy adequate to keep safety-related parameters within operational and safety limits. Additional requirements for these procedures are contained in ASME NQA-1-2008 and the NQA-1a-2009 addenda [2].	Essentially, equivalent wording as ANS 1976 version, Section 5.3.7. Ok.		
3.5.3.16 Chemical and Radiochemical Control Procedures			
These documents contain instructions for chemical and radiochemical control activities and include: 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. These documents also provide for the control, treatment, and management of radioactive wastes, and control of radioactive calibration sources.	Essentially equivalent wording as ANS 1976 version, section 5.3.8. Ok.		
3.5.3.17 Emergency Operating Procedures		**5.3.9 Emergency Procedures**	**5,3.9 Emergency Procedures**
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 for the plant type that identify potential emergency conditions and generally require such procedures to include, as appropriate, 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	Revised section.	Procedures shall be provided to guide operations during potential emergencies, They shall be written so that a trained operator will know in advance the expected course of events that will identify an emergency and the immediate action he should take. Since emergencies may not follow anticipated patterns the procedures should provide sufficient flexibility to accommodate variations. Emergency	Procedures shall be provided to guide operations during potential emergencies. They shall be written so that a trained operator will know the action he should take. Since emergencies may not follow anticipated patterns. the procedures should provide sufficient flexibility to accommodate variations. These procedures may be based upon plant

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.		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 observational 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 should 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 action&, but this information shall be separated from the procedural actions. It is extremely difficult to distinguish between procedures prepared (or the purpose of connecting off· normal conditions which in themselves do not compatible 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 procedure" for the same purpose that others choose "Emergency Procedures." When initially available intelligence provided to operating personnel via instrument readings, physical condition&, 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	symptoms or plant event or both Symptomatic procedures specify operator actions based on the determination of the plant status. Event procedures specify operator actions based on the determination of the event. The content and format of symptomatic procedures are not covered in this standard. An acceptable format and content for event procedures is given in 5.3.9.1. Emergency procedures that cover actions for manipulations of control 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 operator actions are required to prevent or mitigate the consequences of a serious condition. procedures shall require that those actions be implemented in a timely fashion. Emergency procedures may contain supplemental background information to aid operator's further in taking proper emergency actions, but this information shall be separated from the procedural actions. When initially available intelligence provided to operating personnel via instrument readings, physical conditions, and personal observations may not indicate clearly 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. Departure from the emergency procedure shall require the

		before departing room the emergency procedure.	prior approval of the off-duty shift supervisor or, if the on-duty shift supervisor is unavailable, the licensed senior operator in the control room. Signals that initiate engineered
3.5.3.18 Emergency Plan Implementing Procedures		**5.3.9.3 Procedure for Implementing Emergency Plan**	**5.3.9.3 Procedure for Implementing Emergency Plan**
These documents 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 these procedures are such that requirements of each facility's nuclear regulator approved Emergency Plan are satisfied.	Revised section.	Implementing procedures for emergency plan actions shall contain, as appropriate, the following elements: (1) Individual assignment of authorities and responsibilities for performance of specific tasks to specific individuals or staff positions. (2) Protective action level and protective measurers outlined for the emergency identified. (3) Specific actions to be taken by coordinating support group.(4) Procedures for medical treatment and handling of contaminated individuals.(5) Special equipment requirements (or items such as medical treatment. emergency personnel removal, specific radiation detection. personnel doeimetry and rescue operations. procedures for making this equipment available, plus operating instructions for such equipment, and provisions for its periodic inspection and maintenance. (6) Identification of emergency communications network, including communications required for personnel identification and effective coordination of all support groups. (7) Description of alarm signal in each facility. At sites with multiple units, alum signals should be consistent from one unit to another. (Signals for initiating protective	Implementing procedures for emergency plan actions shall contain, as appropriate, the following elements: (1) Assignment of authority and responsibilities for performance of specific tasks to operating staff positions. (21 Protective action levels and protective measures outlined for the emergency identified. (31 Specific actions to be taken by coordinating support groups. (4) Procedures for medical treatment and handling of contaminated individuals (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. (6) Identification of emergency communications network, including communications required for personnel identification and effective coordination of all support groups. (7) Description of alarm signal 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. (8) Produces required to restore the plant to normal conditions following an emergency (9) Requirements for periodically testing of procedures communications network and alarm systems to assure that they function properly. See also U.S. Nuclear Regulatory Commission (NRC) "Guide to the Preparation of Emergency Plans (or Production and Utilization facilities,"	measures should be dear and distinct from process or operational alarm system to avoid confusion. (8) Procedures required to restore the plant to normal or safe shutdown conditions following an emergency. (9) Requirements for periodic testing of procedures communications network and alarm systems to assure that they function properly. For additional guidance see the following American National Standards: Facilities and Medical Care for Onsite Nuclear Power Plant Radiological Emergencies. ANSI/ANS 3.2.1-1979: Emergency Control Centers for Nuclear Power Plants. ANSI/ANS 3.2 979: and Radiological Emergency Preparation Exercises for Nuclear Power Plants, ANSI ANS 3.2 1979.
3.5.3.19 Test and Inspection Procedures		**5.3.10 Test and Inspection Procedures**	**5.3.10 Test and Inspection Procedures**
These documents provide the necessary measures to assure quality is achieved and maintained for the nuclear facilities. The instructions for tests and inspections may be included within other procedures, such as installation and maintenance procedures, but will contain the objectives, acceptance criteria, prerequisites for performing the test or inspection, limiting conditions, and appropriate instructions for performing the test or inspection, as applicable. 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	Essentially equivalent wording as ANS 1976 version, section 5.3.10.	Test and inspection procedures shall contain a description of objectives; acceptance criteria t used to evaluate the results; prerequisites for performing the tests or inspections including a conditions to be used. to simulate normal or a operating conditions; limiting conditions; and t inspection procedure. These procedures shall specify any special equipment or calibrations to conduct the test or inspection. Test and ins results shall be documented and evaluated by responsible authority to assume that test and requirements have been satisfied. Where test and inspections are to be witnessed, the procedure shall identify hold	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 1.0 simulate normal or abnormal operating conditions: limiting conditions: and the test *or* inspection procedure, including or referencing instruction, for restoration of the system to the condition consistent with the normal plant operating status,. If applicable. These procedures shall also specify any special equipment or calibrations required to conduct the test or

the subject test or inspection. Additional criteria for these procedures are contained in ASME NQA-1-2008 and the NQA-1a-2009 addenda [2].		points in the testing sequence to permit witnessing. The procedure shall require appropriate approval (or the work to continue beyond the implanted 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.	inspection. Test and inspection results shall be documented and evaluated by the responsible authority to assure that test and inspection requirements have been satisfied. Where tests and inspections are to be witnessing the procedure ,hall identify hold points in the testing !Sequence to permit witnessing The procedure shall require appropriate approval for the 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.
3.6 Document Control		**5.2.13.1 Procurement Document Control**	**5.2.15 Review, Approval, and Control of Procedures**
Document control activities associated with SSCs shall be accomplished in accordance with ASME NQA-1-2008 and the NQA-1a-2009 addenda [2]. The following requirements apply to plant procedures utilized during the operational phase.	Revision to 1976 version section 5.2.13.1. Previous requirements were addressed by NQA-1. Ok.	Measures shall be provided to assurance that applicable regulatory requirements, design bases and other requirements which are necessary to assure adequate quality are included or referenced in the procedures for procurement of items and services. To the extent necessary, procurement documents shell require suppliers to provide a quality assurance program consistent with the pertinent requirements of American National Standard Quality Assurance Program Requirement for Nuclear Power Plants, N4.S.2-1971. Where changes are made to procurement documents, they shall be subject to the same degree of control as was used in the preparation or the original documents. Procurement documents shall include provisions for the following. as	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. Such documents include those which describe organizational interfaces. or which prescribe activities affecting structures, systems or components important to safety. These documents also include operating and special order operating procedures emergency and off normal procedures, test procedures, equipment control procedures maintenance or modification procedures, refueling procedures, and material control procedures. These measures shall assure

		applicable: (I) Supplier Quality Assurance Program. Identification of quality assurance requirements applicable to the items or services procured. (2) Basic Technical Requirements Where specific technical requirements apply, such as drawings, specifications, and industrial codes and standards, they shall be identified by title 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. (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 shall be determined. (4) Documentation Requirements records to be prepared, maintained, submitted or made available for review, such as drawing specifications, procedures, procurement documents, inspection and test records. personnel and procedure qualifications, and material, chemical, and physical test requirements ETC	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 Procedures for operational phase activities of a nuclear power plant 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 procedure fully 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 documents. Each procedure shall be reviewed and approved prior to initial use. The frequency of subsequent review 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. Applicable procedures shall be reviewed following an unusual incident such as an accident an unexpected transient, significant operator error. Or equipment

			malfunctions. Applicable procedures shall be reviewed following any modification to For the first time owners (or licensees) of a unit from a particular nuclear steam supply system (NSSS) vendor the initial issuance of fuel loading and post fuel loading startup test procedure emergency procedures related to the NSSS, and system operating procedures for systems important to safety shall be reviewed by the appropriate design organization prior to approval. Plant procedures shall be reviewed by an individual knowledgeable in the area affected by the procedure no less frequently than every two years to determine if changes are necessary or desirable. This requirement for routine follow up review can be accomplished in several ways, including, but not necessarily limited to documented step-by-step use of the procedure, such as occurs when the procedure has a step-by-step check off associated with it or detailed scrutiny of the procedure as part of a documented training program. drill, simulator exercise. or other such activity. A revision of a procedure constitutes a procedure review Procedures shall be approved by the owner organization before initial use. Rules shall be established which provide for interdisciplinary review of procedures by knowledgeable personnel other than the originator and the approval of procedures and procedure channel by

			authorized individuals. 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 The reviewing organizations shall have access to pertinent background information upon which to base its approval and shall have adequate understanding of requirement and intent of the original document. 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. Document control measures shall provide for: (1) Identification of individuals or organizations responsible for preparing, reviewing, approving and issuing documents and revisions thereto (2) Identifying the proper document 1.0 be used in performing the activity (3) Coordination and control of interlace

			documents (4) Ascertaining that proper procurements and proper revisions are being used (5) Establishing current and updated distribution lists
The method, by which both permanent and temporary changes to approved procedures are made, shall be implemented through a procedure and shall include the designation of a person or persons authorized to approve such changes.			
Plant procedures shall be reviewed by an individual(s) knowledgeable in the aspects of the technical content and of human factors affected by the procedure within six months following startup after the first refueling outage of the unit to determine if changes are necessary or desirable. Applicable procedures shall also be reviewed following an unusual incident, such as an accident, an unexpected transient, significant operator error, or equipment malfunction, or following any modification to a system, or prior to use if the procedure has not been used in the previous two years.			
Technical review of documents affecting the plant should be accomplished to verify technical accuracy and to determine that no conflicts with Technical Specifications exist and no proposed changes require prior NRC approval. If a Technical Specification change is needed or prior NRC approval is required, changes proposed by the documents under review shall not be implemented until required approvals are obtained. The reviewers shall be other than the individuals who prepared the document. The technical review is the first step in the formal review process. The reviewer shall determine if additional cross-disciplinary review is required. Conflicts that develop shall be addressed and resolved prior to approval. Successful completion of the review shall be documented.	Consider deleting this paragraph. This would be addressed by 50.36 & by the independent review requirements that are being moved to NQA-1.		

Procedures shall be updated, as necessary, based on the results of the above reviews, or when procedure discrepancies are found such as through normal use or QA audits.			
3.7 Control of Purchased Material, Equipment and Services	Addressed by NQA-1. Ok.		
Control of purchased materials and services including the procurement and dedication of commercial grade items shall be accomplished in accordance with ASME NQA-1-2008 and the NQA-1a-2009 addenda [2].			
Procedure(s) shall be implemented to aid in the identification of counterfeit and fraudulently marketed products. As a minimum, procedure(s) shouldinclude selective inspections and testing of products to verify compliance with procurement requirements when products are suspect.	New revision to standard. Adding CF&SI guidance. Detail is sufficient. Ok.		
3.8 Identification and Control of Materials, Parts and Components			
Identification and control of materials, parts, and components shall be accomplished in accordance with ASME NQA-1-2008 and the NQA-1a-2009 addenda [2].	Essentially, equivalent to NQA- I. Ok.		
3.9 Control of Special Processes			
Special processes such as welding, heat treating, chemical cleaning, applied coatings, and nondestructive examination shall be controlled in accordance with ASME NQA-1-2008 and the NQA-1a-2009 addenda [2].	Essentially, equivalent to NQA- I. Ok.		
3.10 Inspection			
Inspection activities shall be accomplished in accordance with	Essentially, equivalent		

ASME NQA-1-2008 and the NQA-1a-2009 addenda [2].	to NQA- I. Ok.		
With respect to 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), the inspections may be carried out by personnel experienced in and knowledgeable of the scope, complexity, and nature of the work activity that they have not performed or directly supervised. For modifications and non-routine maintenance, inspections are to be conducted in a manner similar (frequency, type, and personnel performing such inspections) to that associated with construction phase activities.	Essentially, equivalent to NQA- I. Ok.		
3.11 Test Control			
Test activities shall be controlled in accordance with ASME NQA-1-2008 and the NQA-1a-2009 addenda [2]. Controls shall be established for operational phase surveillance, calibration, and in-service inspection and testing activities. Tests during the preoperational period shall be conducted to demonstrate that the performance of facility systems is in accordance with its design intent and that the coordinated operation of the facility as a whole is satisfactory, to the extent feasible. The preoperational testing program shoulddemonstrate, 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. Tests during the initial operational phase shall be conducted 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 behavior conforms to design criteria.	Essentially, equivalent to NQA- I. Ok.		
3.11.1 Tests Associated with Plant Maintenance, Modifications or Procedure Changes			

Tests shall be performed following plant modifications or significant changes in operating procedures to confirm that the modifications or changes reasonably produce expected results and that the change does not reduce safety of operations.	Essentially equivalent wording in ANS 1976 version, section 5.2.19.3		
3.12 Control of Measuring and Test Equipment			
Measuring and test equipment shall be controlled in accordance with ASME NQA-1-2008 and the NQA-1a-2009 addenda [2].	Essentially, equivalent to NQA- I. Ok.		
3.13 Handling, Storage and Shipping			
Handling, shipping, and storage activities shall be accomplished in accordance with ASME NQA-1-2008 and the NQA-1a-2009 addenda [2]. Additional requirements are addressed in ASME NQA-1-2008 and the NQA-1a-2009 addenda, Subpart 2.2 [2].	Essentially, equivalent to NQA- I. Ok.		
3.14 Inspection, Test and Operating Status			
Inspection, test and operating status shall be accomplished in accordance with ASME NQA-1-2008 and the NQA-1a-2009 addenda [2]. The following requirements shouldbe employed during the operational phase.	Items already addressed in NQA-1. Ok.		
(1) Equipment shall be controlled, as necessary, to maintain personnel and reactor safety and to avoid unauthorized operation of equipment.	Essentially, equivalent to NQA- I. Ok.		
(2) Control measures such as locking or tagging to secure and identify equipment in a controlled status shall be required. Independent verifications shall be conducted to ensure that necessary measures, such as tagging equipment, have been implemented correctly. Tagouts shall be designed and installed to prevent obstruction of other controls or indications.	Essentially, equivalent to NQA- I. Ok.		
(3) The status of equipment undergoing inspections, calibrations, maintenance and modification activities and tests shall be identified.	Essentially, equivalent to NQA- I. Ok.		

(4) Control room indicators and operating devices that are out-of-service shall be appropriately tagged or labeled or provided by a suitable means when applied to electronic displays where affixing a physical tag would not be feasible.	Essentially, equivalent to NQA- I. Ok.		
(5) Items which have not satisfactorily passed required inspections, calibrations or tests shall be identified. In cases where required documentary evidence is not available to demonstrate that items have passed inspections, calibrations or tests required by Technical Specifications, affected items shall be considered inoperable and reliance shall not be placed on them to fulfill their intended safety function(s). Local identification of deficiencies in equipment which require correction should be provided.	Essentially, equivalent to NQA- I. Ok.		
(6) Permission to release plant systems or equipment for maintenance or tests shall be granted by designated operating personnel holding a senior operator license who have been designated responsibility for granting such activities. Prior to granting permission, such operating personnel shall verify that the equipment or system may be safely released, determine how long it may be out of service, and determine what functional testing or redundant systems are required prior to and during the out-of-service period. Granting of such permission shall be documented. Independent verification shall be provided to the extent necessary to ensure that the proper system was removed from service. This may be accomplished by checking appropriate equipment and controls, or by indirect means such as observation of indicators and status lights. This requirement may be waived if the only way of accomplishing it would result in significant radiation exposure. Attention shall be given to the degraded protection available when a subsystem of a redundant safety system has been removed for maintenance or surveillance testing.		**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 (or maintenance, After permission has been granted to remove the equipment (room service, it shall be made are to work on. Measures shall provide (or protection of equipment and workers, Equipment and systems in a controlled status shall clearly identified. Strict control measures for such equipment shall be enforced. Conditions to be considered in preparing	**5.2.6 Equipment Control** 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. Control room & gouts shall be designed and installed to prevent obstruction of other instruments, controls, or indicating lights. Procedures shall also require that the status of inspection and tests performed upon individual items in the nuclear power plant be indicated by the 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. Procedures shall also provide for the identification of items which have not satisfactorily passed required inspections and tests, where necessary, to preclude

		equipment for maintenance include, for example: shutdown margin; method of emergency core cooling,; establishment of B 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 Equipment, as necessary, to maintain personnel and reactor l entry and to avoid unauthorized operation of equipment. 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 controlled status. The procedure shall require independent verification where appropriate, to ensure that necessary measure such as tagging equipment has been implemented correctly. Temporary modification such as temporary bypass lines electrical jumpers lifted electrical leads and temporary trip point settings shall be controlled by approved procedures which shall include the requirements for independent verification. A log shall be maintained of the current status of such temporary	inadvertent bypassing of such inspections and tests. In cases where require documentary evidence isn't available, the associated equipment or materials must be considered nonconforming in accordance with 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. Permission to release plant systems or equipment for maintenance or surveillance tests shall be granted by designated operating personnel Holding a senior operator license. Prior to granting permission, such operating personnel shall verify that the equipment or system can be released. determine how long it may be out of service and determine what functional testing of redundant systems is required prior to and during the out-of service period. 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 or surveillance testing. In addition to the requirements of the Technical Specifications additional conditions to be considered in preparing equipment for maintenance or surveillance testing include, for example; shutdown margin: method of emergency core cooling; establishment of a path for

		modifications The procedures shall also require that the status of inspections and tests performed upon individual items on the nuclear power plant be indicated by the 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. Procedures shall also provide for the identification of items which has satisfactorily passed required inspections and tests, where necessary to preclude inadvertent bypassing of such inspections and tests fn 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 inoperable and reliance shall not be placed on such systems to fulfill their intended safety functions. 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 normal conditions, such as removal of jumpers or signals used in maintenance or testing or such as re turning valves, breakers or switches to proper start-up or operating positions from "test" or "manual" position". When placed into service the equipment should receive additional surveillance during the run-in	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 top vent entry of extraneous material and to assure that foreign material is removed before the system is reclosed. After permission has been granted to remove a system 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, at a minimum, at any location where the equipment can be operated. When a system important to safety is removed from service, independent verification shall be provided to the extent necessary to assure that the proper system was removed. This may be accomplished by checking appropriate equipment and controls, or by indirect means such as observation of indicators and status light. This requirement may be waived if the only way of accomplishing it would result in significant radiation exposure. Reactor operators and the shift supervisor shall be informed of changes in equipment status and the effects of such changes. 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

		period.	independent verification by either a second person or by a functional test which conclusively proves the proper installation or removal of the temporary modification. A log or other documented evidence shall be maintained of the current status of such temporary modifications. When equipment I, 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 normal conditions, such as removal of jumpers or signal used in maintenance or testing or such as returning valves. breaker or switches to proper startup or operating positions from "test" or "manual" position, and assuring that all alarms which are indicative of inoperative status are extinguished. For equipment important to safety, proper alignment shall be independently verified by a second qualified person unless all equipment. Valves. and switches involved in the activity can be proven to be in their correct alignment by functional testing without. Adversely affecting the safety of the plant. A second inspection is where such verification would result. in significant radiation exposure. The person who performs the verification of correct implementation of equipment control measures or proper alignment prior to returning equipment to service shall be qualified to perform such tasks for the particular system involved, and shall process operating knowledge of the particular system involved and its

			relationship to plant safety.
(7) In addition to limiting conditions for operation and allowed outage times in Technical Specifications, additional conditions to be considered in preparing equipment for maintenance or surveillance testing may include: shutdown risk; 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 and ALARA considerations; handling hazardous materials; and electrical hazards. When entry into a closed system is required, entry of extraneous material shall be prevented. Any foreign material shall be removed and the removal verified before the system is re-closed. Foreign material may be allowed to remain if an analysis is performed to demonstrate that the material would not adversely affect plant safety.		**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 (or maintenance, After permission has been granted to remove the equipment (room service, it shall be made are to work on. Measures shall provide (or protection of equipment and workers, Equipment and systems in a controlled status shall clearly identified. Strict control measures for such equipment shall be enforced. Conditions to be considered in preparing equipment for maintenance include, for example: shutdown margin; method of emergency core cooling,; establishment of B 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	**5.2.6 Equipment Control** 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 normal conditions, such as removal of jumpers or signals used in maintenance or testing or such as returning valves. breaker or switches to proper startup or operating positions from "test" or "manual" positions and assuring that all alarms which are indicative of in inoperative status are extinguished. For equipment important to safety, proper alignment shall be independently verified by a second qualified person unless all equipment, valves, and switches involved in the activity can be proven to be in their correct alignment by functional testing without adversely affecting the safety of the plant. A second inspection is where such verification would result in significant radiation exposure. The person who performs the verification of correct implementation of equipment control measures or proper alignment prior to returning equipment to service shall be qualified to perform such verification for the particular system involved, and shall possess operating knowledge of the particular system

		that foreign material is removed before the system is reclosed. equipment. as necessary, to maintain personnel and reactor l entry and to avoid unauthorized operation of equipment. 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 controlled status. The procedure shall require independent verification where appropriate, to ensure that necessary measure such as tagging equipment has been implemented correctly. Temporary modification such as temporary bypass lines electrical jumpers lifted electrical leads and temporary trip point settings shall be controlled by approved procedures which shall include the requirements for independent verification. A log shall be maintained of the current status of such temporary modifications The procedures shall also require that the status of inspections and tests performed upon individual items on the nuclear power plant be indicated by the 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. Procedures shall also provide for the identification of items which has satisfactorily passed required inspections and tests, where necessary to	

		preclude inadvertent bypassing of such inspections and tests fn 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 inoperable and reliance shall not be placed on such systems to fulfill their intended safety functions. 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 normal conditions, such as removal of jumpers or signals used in maintenance or testing or such as re turning valves, breakers or switches to proper start-up or operating positions from "test" or "manual" position". When placed into service the equipment should receive additional surveillance during the run-in period.	
(8) A plant system(s) or component(s) shall be made safe to work on after permission has been granted to remove it from service. Equipment and systems in a controlled status shall be clearly identified at any location where the equipment can be operated. Control room supervision shall be promptly informed of changes in equipment status, including temporary modifications, and the effects of such changes. Equipment, which is in other than normal condition, shouldbe readily identifiable to the operating staff.		**5.2.6 Equipment Control** (See Above)	**5.2.6 Equipment Control** (See Above)

(9) Temporary plant modifications shall be clearly identified at the installed location(s) and at any location of operation which could be affected by the temporary modification.		**5.2.6 Equipment Control** (See Above)	**5.2.6 Equipment Control** (See Above)
(10) 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 normal conditions, such as removal of jumpers or signals used in maintenance or testing or returning valves, breakers or switches to proper startup or operating positions from "test" or "manual" positions. Steps shall be taken to ensure that all associated alarms and indications are returned to normal.		**5.2.6 Equipment Control** (See Above)	**5.2.6 Equipment Control** (See Above)
(11) Proper alignment of equipment shall be independently verified by a second qualified person unless all equipment, valves, and switches involved in the activity can be proven to be in their correct alignment by functional testing without adversely affecting the safety of the plant. Another exception is where such verification would result in significant radiation exposure. The person who performs the verification of correct implementation of equipment control measures or proper alignment prior to returning equipment to service shall be qualified to perform such tasks for the particular system involved, and shall possess operating knowledge of the particular system involved and its relationship to plant safety.		Conditions to be considered in preparing equipment for maintenance include, for example: shutdown margin; method of emergency core cooling establishment of B 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 equipment, as necessary, to maintain personnel and reactor l entry and to avoid unauthorized operation of equipment.	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 normal conditions, such as removal of jumpers or signals used in maintenance or testing or such as returning valves. breaker or switches to proper ,startup or operating positions from "test" or "manual" positions, and assuring that all alarms which are indicative of in inoperative status are extinguished. For equipment important to safety, proper alignment shall be independently verified by a second qualified person unless all equipment, valves. and switches involved in the activity can be proven to be in their correct alignment by functional testing without adversely affecting the safety of the plant. A second inspection is where such verification would result. in significant radiation exposure. The person who performs the verification of correct implementation of equipment control measures or proper alignment prior to returning equipment to service shall be qualified to perform such verification for the

			particular system involved, and shall possess operating knowledge of the particular system
(12) Equipment shouldreceive additional monitoring during an appropriate run-in period prior to being placed into service to perform its intended function. Final acceptance of equipment that is returned to service shall be made by the on-duty supervisor responsible for the unit.		When placed into service the equipment should receive additional surveillance during the run-in period,	**5.2.19.1. Preoperational Tests** 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 control. The procedure shall list checks to be made and provide acceptance criteria. Consideration should also be given to providing run-in period to minimize early failures during operation of the plant.
3.15 Nonconforming Items			
Nonconforming items shall be controlled in accordance with ASME NQA-1-2008 and the NQA-1a-2009 addenda [2].	Essentially, equivalent to NQA- I. Ok.		
3.16 Corrective Actions			
Corrective action activities shall be accomplished in accordance with ASME NQA-1-2008 and the NQA-1a-2009 addenda [2].	Essentially, equivalent to NQA- I. Ok.		
3.17 Plant Records Management			
Quality assurance records shall be controlled in accordance with ASME NQA-1-2008 and the NQA-1a-2009 addenda [2].	Essentially, equivalent to NQA- I. Ok.		

A list of typical lifetime records is included in ASME NQA-1-2008 and the NQA-1a-2009 addenda, Part III, Nonmandatory Appendix 17A-1, 200, List of Typical Lifetime Records [2], and should be considered for guidance purposes only. The list is not considered to be all-inclusive and the nomenclature of these records may vary. For records not listed in Appendix 17A-1, the type of record that most nearly describes the record in question should be followed with respect to its retention classification. The applicant or licensee itself shall ensure that it maintains sufficient records, both lifetime and nonpermanent, to furnish evidence of activities affecting quality	Nonmandatory Appendix 17A-1 will be endorsed through RG 1.33		
The storage of QA records in electronic media shall be consistent with the intent of US NRC Regulatory Issue Summary (RIS) 2000-18, “Guidance on Managing Quality Assurance Records in Electronic Media,” dated October 23, 2000 [4], and associated NIRMA Guidelines TG 11-1998 [5], TG15-1998 [6], TG16-1998 [7], and TG21-1998 [8]. The guidance of (RIS) 2000-18 shouldalso be applied to the record keeping and maintenance requirements in other parts of the regulations that accept the storage of records in the form of electronic media.	In accordance with NRC guidance.		
The use of optical disks for electronic records storage and retrieval systems shall comply with the USNRC guidance in Generic Letter 88-18, "Plant Record Storage on Optical Disks." [9]	In accordance with NRC guidance.		
3.18. Audit Program			
Audit activities shall be controlled in accordance with ASME NQA-1-2008 and the NQA-1a-2009 addenda [2]. Audit frequencies and inclusion of functional areas for audit during the operational phase is a combination of quality criteria and management direction that are specific to the operation phase as described below.	Reference to NQA-1. Ok.		
3.18.1 Audit Frequency			

3.18.1.1 Regularly Scheduled Internal Audits			
Internal audits of activities conducted during the operational phase should be performed in such a manner that an audit of applicable QA program elements is completed for each functional area within a period of two years. Internal audits of activities conducted during the operational phase should be performed in such a manner that an audit of applicable QA program elements is completed for each functional area within a period of two years. Internal audit frequencies of well established operational phase activities may be extended one year at a time beyond the above two year interval based on the results of an annual evaluation of the applicable functional area and objective evidence that the functional area activities are being satisfactorily accomplished. The evaluation shall include a detailed performance analysis of the functional area based upon applicable internal and external source data and due consideration of the impact of any functional area changes in responsibility, resources or management. The evaluation shall be considered a quality record and available for review by the regulator. However, the internal audit frequency interval shall not exceed a maximum of four years. If an adverse trend is identified in the applicable functional area, the internal audit frequency extension should be rescinded and an audit scheduled as soon as practicable.	Aligns with regulatory position in RG1.28		
Internal audits shall include the following areas, along with the specific quality assurance program elements included in ASME NQA-1-2008 and the NQA-1a-2009 addenda [2] and the owner organization's QA program. The audits shall take into consideration applicable regulatory and license requirements, and associated record keeping. (1) Compliance with and effectiveness of implementation (i.e. performance) of internal rules and procedures, such as for operating, design, procurement, maintenance, modification, refueling, surveillance, and test activities. (2) The conformance of facility operation to provisions contained within the Technical Specifications, including administrative controls and applicable license conditions. (3) The performance, training, and qualification of the plant staff.			

(4) The Fire Protection Program and implementing procedures. The audit shall include an inspection of fire protection equipment and program implementation utilizing either a qualified off-site licensed fire protection engineer or an outside qualified fire protection consultant at least every two years. This audit is not subject to the extension of the audit intervals described above. (5) Corrective actions taken following abnormal occurrences.			
Periodic reviews of other important areas, such as plant security, emergency preparedness, and radiation protection, may be conducted through internal audits.			
3.18.1.2 Regularly Scheduled External Audits			
External audits, e.g., supplier audits, should be performed on a triennial basis and supplemented by annual evaluations of the supplier's performance. A continuous or ongoing evaluation of the supplier's performance may be conducted in lieu of the annual evaluations provided that the results are reviewed in order to determine if corrective action is required.	Aligns with regulatory position in RG1.28		
If more than one purchaser utilizes a supplier, the purchaser may arrange for an audit of the supplier on behalf of itself and the other purchasers to reduce the number of external supplier audits. The scope of the audit should address the needs of all purchasers and the report shouldbe distributed to purchasers for whom the audit			

was conducted.			
Each purchaser relying on the results of such an audit remains individually responsible for the adequacy of the audit and for its use by their organization.			
4.0 References			
The user is advised to review each of the following references to determine whether it, a more recent version, or a replacement document is the most pertinent for each application. When alternate documents are used, the user is advised to document this decision and its basis.			
[1] Title 10, *Code of Federal Regulations*, Part 50, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants" [2] American National Standard ANSI/ASME NQA-1-2008 with NQA-1a-2009 Addenda, "Quality Assurance Requirements for Facility Application" [3] USNRC Regulatory Guide 1.8, Rev. 3 (May 2000), "Qualification and Training of Personnel for Nuclear Power Plants." [4] Regulatory Issue Summary (RIS) 2000-18, "Guidance on Managing Quality Assurance Records in Electronic Media," dated October 23, 2000 [5] Nuclear Information and Records Management Association, Inc. (NIRMA) Technical Guide (TG), TG 11-1998, "Authentication of Records and Media" [6] NIRMA TG15-1998, "Management of Electronic Records" [7] NIRMA TG16-1998, "Software Configuration management and Quality Assurance"			

[8] NIRMA TG21-1998, "Electronic Records Protection and Restoration" [9] USNRC Guidance in Generic Letter 88-18, "Plant Record Storage Optical Disks."			

APPENDIX A

TYPICAL PROCEDURES FOR PRESSURIZED WATER REACTORS

AND BOILING WATER REACTORS

The following are typical activities that affect safe operations and/or the quality of SSCs that should be covered by written procedures. This appendix is not intended as an inclusive listing of all needed procedures since many other activities carried out during the operation phase of nuclear power plants should be covered by procedures not included in this list.

1. Administrative Procedures

a Authorities and Responsibilities for Safe Operation and shutdown

b. Equipment Control (e.g., locking and tagging)

c. Procedure Adherence and Temporary Change Method

d. Procedure Review and Approval

e. Schedule for Surveillance Tests and Calibration

f. Shift and Relief Turnover

g. Log Entries, Record Retention, and Review procedures

h. Access to Containment

i. Bypass of Safety Functions and Jumper (temporary modification) Control

j. Maintenance of Minimum Shift Complement and call-in of personnel

k. Plant Fire Protection Program

l. Communication System Procedures

m. Core Design and Configuration

2. General Plant Operating Procedures

a. Cold Shutdown to Hot Standby

b. Hot Standby to Minimum Load (nuclear startup).

c. Recovery from Reactor Trip

d. Operation at Hot Standby

e. Turbine Startup and Synchronization of Generator

f. Changing Load and Load Follow (if applicable)

g. Power Operation and Process Monitoring

h. Power Operation with less than Full Reactor Coolant Flow

i. Plant Shutdown to Hot Standby

j. Hot Standby to Cold Shutdown

k. Preparation for Refueling and Refueling Equipment Operation

I. Refueling and Core Alterations

3. Procedures for Startup, Operation, and Shutdown of Safety-Related PWR Systems

Instructions for energizing, filling, venting, draining, startup, shutdown, and changing modes of operation should be prepared, as appropriate, for the following systems:

a. Reactor Coolant System

b. Control Rod Drive System (including part-length rods).

c. Shutdown Cooling System

d. Emergency Core Cooling System

e. Component Cooling Water System

f. Containment

(1) Maintaining Containment Integrity

(2) Special Containment Systems

(a) Atmosphere

(b) Subatmospheric

(c) Double-Wall Containment with Controlled Interspace

(d) Ice Condenser

(3) Containment Ventilation System

(4) Containment Cooling System

g. Atmosphere Cleanup Systems

h. Fuel Storage Pool Purification and Cooling System

i. Main Steam System

j. Pressurizer Pressure and Spray Control Systems

k. Feedwater System (feedwater pumps to steam generator)

I. Auxiliary Feedwater System

m. Service Water System

n. Chemical and Volume Control System (including Letdown/Purification System)

0. Auxiliary or Reactor Building Heating and Ventilation

p. Control Room Heating and Ventilation

q. Radwaste Building Heating and Ventilation

r. Instrument Air System

s. Electrical System

(1) Offsite (access circuits)

(2) Onsite

(a) Emergency Power Sources (e.g., diesel generator, batteries)

(b) A.C. System

(c) D.C. System

t. Nuclear Instrument System

(1) Source Range

(2) Intermediate Range

(3) Power Range

(4) Incore System

u Reactor Control and Protection System

v. Hydrogen Recombiner

4. Procedure for Startup, Operation, and Shutdown of Safety-Related BWR Systems

Instructions for energizing, filling, venting, draining, startup, shutdown, and changing modes of operation should be prepared, as appropriate, for the following systems:

a. Nuclear Steam Supply System (Vessel and Recirculating System)

b. Control Rod Drive System

c. Reactor Cleanup System

d. Liquid Poison System (Standby Liquid Control System)

e. Shutdown Cooling and Reactor Vessel Head Spray System

f. High Pressure Coolant Injection

g. Reactor Core Isolation Cooling System/Isolation Condenser

h. Emergency Core Cooling Systems

i. Closed Cooling Water System

j. Containment

(1) Maintaining Integrity

(2) Containment Cooling and Ventilation System

(3) Inerting and deinerting

k. Fuel Storage Pool Purification and Cooling System

l. Main Steam System (reactor vessel to turbine)

m. Turbine-Generator System

n. Condensate System (hotwell to feedwater pumps, including demineralizers and resin regeneration)

o. Feedwater System (feedwater pumps to reactor vessel)

p. Makeup System (filtration, purification, and water transfer)

q. Service Water System

r. Reactor Building Heating and Ventilation Systems

s. Control Room Heating and Ventilation Systems

t. Radwaste Building Heating and Ventilation Systems

u. Standby Gas Treatment System

v. Instrument Air System

w. Electrical System

(1) Offsite (access circuits)

(2) Onsite

(a) Emergency Power Sources (e.g., diesel generator, batteries)

(b) A.C. System

(c) D.C. System

x. Nuclear Instrument System

(1) Source Range

(2) Intermediate Range

(3) Power Range

(4) TIP System

y. Reactor Protection System

z. Rod Worth Minimizer

5. Procedures for Abnormal, Offnormal, or Alarm Conditions

Since these procedures are numerous and correspond to the number of alarm annunciators, the procedures are not individually listed. Each safety-related annunciator should have its own written procedure, which should normally contain (1) the meaning of the annunciator, (2) the source of the signal, (3) the immediate action that is to occur automatically, (4) the immediate operation action, and (5) the long-range actions.

6. Procedures for Combating Emergencies and Other Significant Events

a. Loss of Coolant (including significant PWR steam generator leaks) (inside and outside primary containment) (large and small, including leak-rate determination)

b. Loss of Instrument Air

c. Loss of Electrical Power (and/or degraded power sources)

d. Loss of Core Coolant Flow

e. Loss of Condenser Vacuum

f. Loss of Containment Integrity

g. Loss of Service Water

h. Loss of Shutdown Cooling

i. Loss of Component Cooling System and Cooling to Individual Components.

j. Loss of Feedwater or Feedwater System Failure

k. Loss of Protective System Channel

l. Mispositioned Control Rod or Rods (and rod drops)

m. Inability to Drive Control Rods

n. Conditions Requiring Use of Emergency Boration or Standby Liquid Control System

o. Fuel Cladding Failure or High Activity in Reactor Coolant or Offgas

p. Fire in Control Room or Forced Evacuation of Control Room

q. Turbine and Generator Trips

r. Other Expected Transients that may be Applicable

s. Malfunction of Automatic Reactivity Control System

t. Malfunction of Pressure Control System

u. Reactor Trip

v. Plant Fires

w. Acts of Nature (e.g., tornado, flood, dam failure, earthquakes)

x. Irradiated Fuel Damage While Refueling

y. Abnormal Releases of Radioactivity

z. Intrusion of Demineralizer Resin Into Primary System (BWR Plants)

7. Procedures for Control of Radioactivity (For limiting materials released to environment and limiting personnel exposure)

a. Liquid Radioactive Waste System

(1) Collection, Demineralizing, Filtering, Evaporating and Concentrating, And Neutralizing

(2) Sampling and Monitoring

(3) Discharging to Effluents

b. Solid Waste System

(1) Spent Resins and Filter Sludge Handling

(2) Baling Machine Operation

(3) Drum Handling and Storage

c. PWR Gaseous Effluent System

(1) Collection, Storage, and Discharge

(2) Sampling and Monitoring

(3) Air Ejector and Stack Monitoring

(4) Ventilation Air Monitoring

d. BWR Air Extraction. Offgas Treatment. and Other Gaseous Effluent Systems

(1) Mechanical Vacuum Pump Operation

(2) Air Ejector Operation

(3) Packing Steam Exhauster Operation

(4) Sampling

(5) Air Ejector, Ventilation, and Stack Monitor

e. Radiation Protection Procedures

(1) Access Control to Radiation Areas Includ1ing a Radiation Work Permit System

(2) Radiation Surveys

(3) Airborne Radioactivity Monitoring

(4) Contamination Control

(5) Respiratory Protection

(6)Training in Radiation Protection

(7) Personnel Monitoring

(8) Bioassay Program

(9) Implementation of ALARA Program

f. Area Radiation Monitoring System Operation

g. Process Radiation Monitoring System

h. Meteorological Monitoring Operation

8. Procedures for Control of Measuring and Test Equipment and for Surveillance Tests, Procedures. and Calibrations

a. Procedures of a type appropriate to the circumstances should be provided to ensure that tools, gauges, Instruments, controls, and other measuring and testing devices are properly controlled, calibrated. and adjusted at specified periods to maintain accuracy. Specific examples of such equipment to be calibrated and tested are readout instruments. Interlock permissive and prohibit circuits, alarm devices, sensors. signal conditioners, controls, protective circuits. and laboratory equipment.

b. Specific procedures for surveillance tests, inspections, and calibrations should be written (implementing procedures are required for each surveillance test. inspection. or calibration listed in the technical specifications):

(1) Pressurized Water Reactors

(a) Containment Leak-Rate Tests

(b) Containment Isolation Tests

(c) Containment Local Leak Detection Tests

(d) Containment Heat and Radioactivity Removal Systems Tests

(e) Containment Tendon Tests and Inspections

(f) Service Water System Functional Tests

(g) Main Steam Isolation Valve Tests

(h) Fire Protection System Functional Tests

(i) Boric Acid Tanks-Level Instrumentation Calibrations

(j) Emergency Core Cooling System Tests

(k) Control Rod Operability and Scram Time Tests

(l) Reactor Protection System Tests and Calibrations

(m) Permissive-Tests and Calibrations

(n) Refueling System Circuit Tests

(o) Emergency Boration System Functional Tests

(p) DNB Checks and Incore-Excore Flux Monitor Correlations

(q) Emergency Power Tests

(r) Auxiliary Feedwater System Tests

(s) NSSS Pressurization and Leak Detection

(t) Inspection of Reactor Coolant System Pressure Boundary

(u) Inspection of Pipe Hanger Settings

(v) Control Rod Drive System Functional Tests

(w) Heat Balance-Flux Monitor Calibrations

(x) Pressurizer and Main Steam Safety Valve Tests

(y) Leak Detection Systems Tests

(z) Axial and Radial Flux Pattern Determinations

(aa) Area, Portable, and Airborne Radiation Monitor Calibrations

(bb) Process Radiation Monitor Calibrations

(cc) Environmental Monitor Calibrations

(dd) Safety Valve Tests

(ee) Turbine Overspeed Trip Tests

(ff) Water Storage Tanks-Level Instrumentation Calibration

(2) Boiling Water Reactors

(a) Containment Leak-Rate and Penetration Leak-Rate Tests

(b) Containment Isolation Tests

(c) Containment Vacuum Relief Valve Tests

(d) Containment Spray System Tests

(el Standby Gas Treatment System Tests (including filter tests) \

(f) Service Water System Functional Tests

(g) Main Steam Isolation Valve Tests

(h) Fire Protection System Functional Tests

(i) Nitrogen Inerting System Tests

(j) Emergency Core Cooling System Tests

(k) Control Rod Operability and Scram Time Tests

(l) Reactor Protection System Tests and Calibrations

(m) Rod Blocks-Tests and Calibrations

(n) Refueling System Circuit Tests

(o) Liquid Poison System Tests

(p) Minimum Critical Heat Flux Checks and Incore Flux Monitor Calibrations

(q) Emergency Power Tests

(r) Isolation Condenser or RCIC Tests

(s) NSSS Pressurization and Leak Detection

(t) Inspection of Reactor Coolant System Pressure Boundary

(u) Inspection of Pipe Hanger Settings

(v) Control Rod Drive System Functional Tests

(w) Heat Balance

(x) Auto blowdown System Tests

(y) Leak Detection System Tests

(z) Axial and Radial Flux Pattern Determinations

(aa) Area, Portable, and Airborne Radiation Monitor Calibrations

(bb) Process Radiation Monitor Calibrations I

(cc) Environmental Monitor Calibrations

(dd) Safety Valve Tests

(ee) Turbine Overspeed Trip Test

(ff) Water Storage Tanks-Level Instrumentation Calibrations

(gg) Reactor Building Inleakage Tests

9. Procedures for Performing Maintenance

a. Maintenance that can affect the performance of safety-related equipment should be properly preplanned and performed in accordance with written procedures, documented instructions, or drawings appropriate to the circumstances. Skills normally possessed by qualified maintenance personnel

may not require detailed step-by-step delineation in a procedure. The following types of activities are among those that may not require detailed step-by-step written procedures:

(1) Gasket Replacement

(2) Trouble-Shooting Electrical Circuits

(3) Changing Chart or Drive Speed Gears or Slide Wires on Recorders

b. Preventive maintenance schedules should be developed to specify lubrication schedules, inspections of equipment, replacement of such items as filters and strainers, and inspection or replacement of parts that have a specific lifetime such as wear rings.

c. Procedures for the repair or replacement of equipment should be prepared prior to beginning work. Such procedures for major equipment that is expected to be repaired or replaced during the life of the plant should preferably be written early in plant life. The following are examples of such procedures for major equipment:

(1) Repair of PWR Steam Generator Tubes

(2) Replacement and Repair of Control Rod Drives

(3) Replacement of Recirculation Pump Seals

(4) Replacement of Important Strainers and Filters

(5) Repair or Replacement of Safety Valves

(6) Repair of Incore Flux Monitoring System

(7) Replacement of Neutron Detectors

d. Procedures that could be categorized either as maintenance or operating procedures should be developed for the following activities. Instructions for these activities may be included in systems procedures.

(1) Exercise of equipment that is normally idle

(2) Draining and Refilling Heat Exchangers

(3) Draining and Refilling Recirculation Loop

(4) Draining and Refilling the Reactor Vessel

(5) Draining and Refilling Steam Generators

(6) Removal of Reactor Head

(7) Disconnection and Reconnection of Wiring Penetrating Reactor Vessel Head

(8) Demineralizer Resin Regeneration or Replacement

e. General procedures for the control of maintenance, repair, replacement, and modification work should be prepared before reactor operation is begun. These procedures should include information on areas such as the following:

(1) Method for obtaining permission and clearance for operation personnel to work and for logging such work and

(2) Factors to be taken into account, including the necessity for minimizing radiation exposure to workmen, in preparing the detailed work procedures but that must operate when required

10. Chemical and Radiochemical Control Procedures

Chemical and radiochemical control procedures should be written to prescribe the nature and frequency of sampling and analyses, the instructions maintaining water quality within prescribed limits, and the limitations on concentrations of agents that may cause corrosive attack or fouling of heat-transfer surfaces or that may become sources of radiation hazards due to activation. These procedures should specify laboratory instructions and calibration of laboratory equipment. Extreme importance must be placed on laboratory procedures used to determine

concentration and species of radioactivity in liquids and gases prior to release including representative sampling, validity of calibration techniques, and adequacy of analysis.