Appendix 14A. Tables

Table 14-1. Compliance with Regulatory Guides (HISTORICAL INFORMATION - NOT REQUIRED TO BE REVISED**)**

Regulatory Guide	*Compliance*	*Affected Section(s)*	*Exception Taken*	*Justification*
1.68 Rev. 2	*Partial*	*C.3*	*The scope of testing will include, to the extent practicable, simulation of the effects of control system and equipment malfunctions that have been identified in the plant accident analysis as having a significant impact on the results of the analysis.*	*The inclusion of all control system and equipment malfunctions which could reasonably be expected to occur during plant lifetime is too broad. The scope of failures which could be expected to occur should be limited to those failures which would have a significant impact on the analysis of events evaluated in 15.0.*
		App. A 1.b (2)	*Correct failure mode on loss of power to chemical control system valves will be limited to pneumatic and solenoid actuated valves and components.*	*Only solenoid and pneumatically actuated components are subject to change of state on loss of actuating power.*
		App. A. 1.e	*Only those portions of power conversion systems designated as Duke Safety Class B are subject to thermal expansion and restraint testing. The adequacy of power conversion system piping designated Duke Safety Class F or G is demonstrated through visual verification during Hot Functional Testing and Initial Startup Testing.*	*Only power conversion system piping designated as Duke Safety Class B need be subject to thermal expansion and restraint testing. Portions of power conversion systems designated as Duke Safety Class F or G can be adequately verified by visual inspection for indications of piping interference and abnormal stressing of restraints. All piping inside the main steam and feedwater isolation valves is Duke Safety Class B.*

Regulatory Guide	*Compliance*	*Affected Section(s)*	*Exception Taken*	*Justification*
		App. A 1.g (1)	*Load carrying capability of breakers, motor controllers, switchgear, transformers, and cables will be demonstrated by proper normal operation of the specified equipment under conditions approximating full rated load. Current measurements will be made at selected normal power system locations to provide additional verification of proper equipment sizing*	*Verification of all components by direct measurement is impractical due to the large number of cables, transformers, switchgear, and load centers affected. Selected component direct measurements under conditions approximating full rated load combined with verification of normal operation during unit startup will be adequate to ensure proper sizing and selection of equipment.*
1.68 Rev. 2	*Partial*	*App. A 1.g (2)*	*Load - carrying capability of breakers, motor controllers, switchgear, transformers, and cables will be demonstrated by proper normal operation of the equipment under conditions approximating full rated load. Current and temperature readings will be obtained at selected essential power system locations to provide additional verification of proper equipment selection and sizing.*	*Verification of all components by direct measurement is impractical due to the large number of cables, transformers, switchgear, and load centers affected. Selected component direct measurements under conditions approximating full rated load combined with verification of normal operation during unit startup will be adequate to ensure proper sizing and selection of equipment.*
		App. A 1.g (2)	*The ability of essential loads to start under minimum and maximum design voltage conditions will be verified during preoperational testing of the emergency diesel generators and the offsite power system.*	*The conditions encountered during these tests simulate the range of voltages under which essential loads would be required to start and operate.*
		App. A 1.i (20)	*Sufficient measurements and/or observations will be made to ensure that gross bypass leakage paths are not present for ice condenser containments.*	*Where adequate measurement methods do not exist, visual inspection procedures are adequate to limit the bypass leakage area present.*

Regulatory Guide	***Compliance***	***Affected Section(s)***	***Exception Taken***	***Justification***
		App. A 1.j *App. A 1.n*	*Instrumentation and control as well as auxiliary and miscellaneous systems to be tested will be selected based on the criteria for selection of systems to be tested given in Section C.1 of the regulatory guide. The extent to which the operability of these systems is verified is based on a graded approach determined by the system or component's importance to safety and normal operation.*	*The systems which will be required to be tested by the criteria presented in Section C.1 vary from one plant design to another. The criteria for selection of systems to be tested given in Section C.1 of the guide in combination with a graded approach to the degree of testing to be performed provide a valid basis for the development of tests to be conducted.*
		App. A 4.c *App. A 5.e*	*Pseudo-ejected-rod measurements will not be performed on Unit 2.*	*The calculational codes and analytical methods used for nuclear analysis of the reactor core are presented in FSAR Section 4.3.3. The validity of these codes and safety analysis assumptions for ejected rod worth will be verified as part of the extensive startup testing on Unit 1. The core design and control rods utilized on Unit 2 are identical to those for Unit 1. Control rod bank worths measurements should be sufficient to verify adequacy of ejected rod predictions. Therefore, without any gross errors in the measured bank rod worths, the Unit 2 pseudo ejected rod worth should be within the safety analysis assumptions.*

Regulatory Guide	***Compliance***	***Affected Section(s)***	***Exception Taken***	***Justification***
		App. A 4.g *A 5.z*	*Demonstration of proper process or effluent monitoring system response based on correlation with independent laboratory analysis will be conducted only for those monitors for which process or effluent levels exceed the minimum sensitivity of the detector.*	*During initial startup testing historical data has shown that process and effluent monitors may not experience levels in excess of the minimum sensitivity of the monitor. A meaningful correlation with laboratory analysis is not possible for these monitors.*
		App. A 4.h *A.4.r* *A.5.a.a.*	*Demonstration of the operability of reactor coolant/secondary purification and clean up systems. Formal testing will not be performed.*	*Normal Station Chemistry procedures used during initial start-up maintain water quality within the Technical Specification limits. Normal Station procedures demonstrate Reactor Coolant System and Secondary System water quality. Systems needed to control water chemistry are functionally tested prior to power ascension. During power operation the reactor coolant and secondary side sampling is used to monitor water quality in accordance with Technical Specifications.*
		App. A.4.i	*Specific testing to demonstrate the operability of control rod sequences and inhibit/blocking functions over the reactor power level range during low power testing will not be performed.*	*The capability of the Rod Control System to function properly is demonstrated prior to initial criticality by the Rod Control System Alignment Test (see Section 14.5). Performing this test prior to criticality meets the intent of Regulatory Guide 1.68, Revision 2, Appendix A.4.*

Regulatory Guide	*Compliance*	*Affected Section(s)*	*Exception Taken*	*Justification*
		App. A.4.j	*Specific testing to demonstrate the capability of primary containment ventilation during low power testing will not be performed.*	*The temperature of the upper and lower containment is routinely monitored once every 24 hours and verified to be within Technical Specification limits during operation. This surveillance is sufficient to demonstrate the capability of the system to maintain the containment temperatures within the allowed limits during operation.*
		App. A.4.k	*Specific testing to demonstrate the operability of steam driven ESF/plant auxiliaries and power conversion equipment during low power testing will not be performed.*	*The operability of the steam driven equipment is demonstrated during the Hot Functional Testing. The testing of Auxiliary Feedwater System, Feedwater and condensate system functional testing is described in the test abstracts (Section 14.4).*
		App. A.4.l	*Specific testing to demonstrate the operability and stroke times of main steam line/branch line/bypass valves used for protective functions during low power testing will not be performed.*	*The operability and stroke times of the main steam isolation valves are verified during Reactor Coolant System Hot Functional Testing (FSAR, Section 14.4).*
		App. A.4.n	*Specific testing to demonstrate the operability of control room computer system will not be performed during low power testing.*	*The operability of the plant process computer is assured through extensive testing prior to initial criticality.*
		App. A.4.o	*Specific testing to determine control rod scram times will not be performed during low power testing.*	*The rod drop test is performed at temperature and pressure prior to initial criticality. Refer to the abstract for the Rod Cluster Control Assembly Drop Time Test (Section 14.5).*

Regulatory Guide	***Compliance***	***Affected Section(s)***	***Exception Taken***	***Justification***
		App. A 4.p	*Demonstration of the operability of pressurizer code relief valves at rated temperature may be demonstrated by a bench test verification, performed by the valve vendor. Results of the vendor tests as well as copies of the test procedures will be available for review.*	*Operability of the pressurize code relief valves need not be conducted by means of an installed functional test due to the undesirable additional transient imposed on the valves and associated discharge piping.*
			Demonstration of operability of main steam safety valves will not be performed during low power testing.	*The open and closure set points of the main steam safety valves are verified temperature during Hot Functional Testing (Section 14.4).*
			Demonstration of operability of pressurizer/main steam PORV will not be performed during low power testing.	*Pressurizer PORV's tested during precritical activities. Refer to Section 14.5.*
		App. A.4.q	*Demonstration of the operability of RHR systems will not be performed during low power testing.*	*The operability of the Residual Heat Removal System up to its temperature and pressure limits is demonstrated by the Residual Heat Removal System Functional Test and the Reactor Coolant System Hot Functional Test, prior to criticality. The steam dump control operability is verified during the Reactor Coolant System Hot Functional Test.*
		App. A.4.s	*Vibration measurement of reactor vessel and reactor coolant components will not be performed during low power testing.*	*The reactor internals vibration testing has been performed for similar plants in the past and a Catawba instrument vibration test program is not necessary. The recommendations of the Regulatory Guide 1.20 position C.3 are satisfied by the inspection program discussed in FSAR Section 3.9.2.4.*

Regulatory Guide	***Compliance***	***Affected Section(s)***	***Exception Taken***	***Justification***
		App. A.4.u	*Specific testing to demonstrate major or principal plant control system will not be performed during low power testing.*	*Major plant control system operation at temperature and pressure conditions has been demonstrated during the Reactor Coolant System Hot Functional Test (Abstract, Section 14.4). Other specific control system testing is performed at appropriate power levels during startup testing, as described in Section 14.5 and Figure 14-1.*
1.68 Rev. 2	*Partial*	*App. A 5*	*Test and acceptance criteria will be developed to demonstrate the ability of major principal plant control systems to automatically control process variables within design limits around the nominal reference value.*	*Control system testing should verify proper control of process variables within the design control deadband, not over the range of design values of process variables. Proper control of process variables will be demonstrated during power escalation over the range of 0 to 100% F.P.*
	Partial	*App. A 5.a*	*Power coefficient measurements will not be performed at 100% power but will be performed at 90% power instead (Unit 1 Only). Power coefficient measurements will not be performed on Unit 2.*	*NSSS vendor does not recommend performing this test at 100% power due to potential of violating axial flux difference Technical Specification. Unit 2 has essentially identical fuel and core loading as Unit 1. Errors between measured and predicted power coefficients at 30%, 50%, 75% and 90% on Unit 1 were less than the acceptance criterion value of ±0.5%. There is no reason for Unit 2 measurements to be different from their predicted values.*

Regulatory Guide	***Compliance***	***Affected Section(s)***	***Exception Taken***	***Justification***
		App. A 5.b	*Departure from nucleate boiling ratio (DNBR), maximum average planar linear heat generation rate (MAPLHGR), and minimum critical power ratio (MCPR) will not be directly verified during power escalation testing.*	*Axial, Radial, and Total Peaking will be directly measured and verified during power escalation testing and will be used to verify DNBR and linear heat rate margin by analysis.*
	Partial	*App. A 5.f*	*Core thermal and nuclear parameters will not be demonstrated to be in accordance with predictions following a return of the rod to its bank position.*	*The reactor core will be under xenon transient conditions at this time. There would be insufficient time to gather data under transient conditions. There are no NSSS vendor predictions for this configuration.*
		App. A 5.g	*Special testing to demonstrate control rod sequencers/withdrawal block functions operation will not be performed.*	*The capability of the Rod Control System to function properly is demonstrated prior to initial criticality by the Rod Control System Alignment Test (Abstract, Section 14.5). Performing this test prior to criticality meets the intent of Regulatory Guide 1.68, Revision 2, Appendix A.4.*
		App. A 5.h	*Rod drop times will not be measured at power.*	*Measuring rod drop times at power would require disabling all position indication for the rods in violation of plant Technical Specifications.*
		App. A 5.i	*Test to demonstrate incore/excore instrumentation sensitivity to detect rod misalignment will not be performed at full power.*	*From vendor predictions the Xenon and power distributions at 50% and 100% are similar. The performance of this test at 50% should adequately demonstrate the capability and sensitivity of incore/excore instrumentation to detect control rod misalignments equal to or less than Technical Specifications.*

Regulatory Guide	***Compliance***	***Affected Section(s)***	***Exception Taken***	***Justification***
		App. A 5.k	*Special testing to demonstrate ECCS operation will not be performed during low power ascension testing.*	*Testing to demonstrate this capability in accordance with Regulatory Guide 1.79 will be conducted during the preoperational testing program. Please refer to the Abstract for the Safety Injection System Functional Test (Section 14.4).*
	Partial	*App. A 5.l*	*Specific testing to demonstrate capabilities of RHR systems will not be performed during power ascension testing.*	*The capability of systems and components to remove decay heat will be demonstrated during the Station Blackout Test (Abstract, Section 14.5). Testing to demonstrate the capability of the Residual Heat Removal System has been discussed in the response to item A.4.g. Testing is also performed to demonstrate that damaging water hammer does not occur in the feedwater piping (see Section 14.5).*
	Partial	*App. A 5.m*	*Differential pressure measurements will not be made across the core or major reactor coolant system components.*	*Measured Reactor Coolant System loop flows will be compared with predicted Reactor Coolant System loop flows. Any gross deviation of actual loop or core pressure drops from predicted values will be identified by detection of the corresponding deviation of measured flow from prediction.*
			Idle loop flows will not be determined during power ascension testing.	*Tech. Specs. does not allow for less than full flow operation.*

Regulatory Guide	***Compliance***	***Affected Section(s)***	***Exception Taken***	***Justification***
			Specific measurements for vibration levels of reactor coolant system components will not be performed during power ascension testing.	*The Reactor Coolant System operation will be shown to be as designed by the performance of the Unit Load Steady-State Test (Abstract, Section 14.5) at various power levels. Reactor Coolant System flow rates will be recorded during the NSSS Thermal Output Test and compared with predictions. Additional vibration testing is not necessary for Catawba reactor internals, since plants of similar design have been extensively tested and found satisfactory. The recommendations of Regulatory Guide 1.20 Position C.3 are satisfied by inspection program discussed in Section 3.9.2.4.*
		App. A 5.o	*Calibration and demonstration of the response of reactor coolant system leak detection systems will not be performed during power ascension.*	*As a normal station operating procedure the periodic surveillance test and Reactor Coolant System Leak Test is run at no load conditions following fuel loading prior to initial criticality (see Section 14.5). In addition the Reactor Coolant Leakage detection Systems are calibrated and tested prior to initial criticality as required by the Technical Specifications.*

Regulatory Guide	***Compliance***	***Affected Section(s)***	***Exception Taken***	***Justification***
		App. A.5.p	*Vibration monitoring of reactor vessel internals will not be performed during power ascension testing.*	*The vibrational monitoring of reactor vessel internals is not necessary for Catawba since many plants of essentially the same design have been extensively tested and found satisfactory. The recommendations of Regulatory Guide 1.20, Position C.3 are satisfied by the inspection program discussed in Section 3.9.2.4.*
		App. A.5.q	*Proper operation of failed fuel detection systems will not be performed during power ascension testing.*	*Failed fuel is detected through radio-chemical analysis of reactor coolant samples. The Reactor Coolant System will be sampled and analyzed for specific activity as required by Technical Specifications.*
		App. A 5.r	*A verification of computer inputs and performance calculations which are utilized to ensure compliance with the provisions of the station operating license or accident analysis bases will be performed.*	*Inputs and calculations which do not serve to ensure compliance with provisions of station operating license or accident analysis bases do not need to be verified.*
		App. A 5.t	*Capacities, set points, and reset pressures for the pressurizer mechanical code relief valves will be verified by vendor testing and verification.*	*Vendor testing is adequate to ensure proper operation of the pressurizer code relief valves. Transient test data obtained during power escalation testing will be utilized to verify proper operation of the pressurizer mechanical code relief valves when reactor coolant system pressure transients of sufficient magnitude to verify proper operation are observed.*

Regulatory Guide	***Compliance***	***Affected Section(s)***	***Exception Taken***	***Justification***
1.68 Rev. 2	*Partial*	*App. A 5.u*	*Operability of main steam isolation valves and branch steam isolation valves will not be verified during power escalation testing at the 25% F.P. platean.*	*Operability of the main steam isolation valves and branch steam isolation valves under full temperature and pressure conditions will be verified during hot functional testing.*
		App. A 5.w	*Demonstration of performance of penetration/shielding cooling system will not be performed during power ascension testing.*	*The Catawba Nuclear Station design does not utilize shielding or penetration cooling systems. Adequate design performance for the main steam line penetrations is verified by concrete temperature measurements taken during Reactor Coolant System Hot Functional Testing (Abstract, Section 14.4).*
		App. A.5.c.c	*Specific testing for demonstration that gaseous/liquid waste processing, storage and release systems will not be performed during power ascension testing.*	*The operability of Liquid and Gaseous Waste Processing Systems is demonstrated prior to the startup testing phase. For details see the Abstract for the Waste Gas System Functional Test, Section 14.4.*
		App.A.5.e.e	*Specific testing for demonstration that containment injection and purging systems operate within design will not be performed during power ascension testing.*	*The capability of this system is demonstrated during the preoperational test phase. For details see the Abstract for the Containment Ventilation and Purge Functional Test Section 14.4).*

Regulatory Guide	***Compliance***	***Affected Section(s)***	***Exception Taken***	***Justification***
	Partial	*App. A.5.f.f*	*Specific testing to verify ventilation systems can maintain area design limits will not be performed for containment systems during power ascension testing.*	*The temperatures in upper and lower containment will be monitored at least once per 24 hours during operation and verified to be within Technical Specification limits. This surveillance will be sufficient to verify the capability of the system to maintain temperatures within limits in the normal operating mode.*
1.68 Rev. 2	*Partial*	*App. A 5.i.i.*	*Plant dynamic response for limiting reactor coolant pump trips will not be demonstrated at 100% F.P.*	*The critical parameter of interest in the analysis of the limiting loss of reactor coolant flow is DNBR verses time. Since DNBR is not a directly observable parameter the determination of DNBR behavior verses time following a loss of flow depends primarily on the determination of flow coast down vs. time and the behavior of local clad heat flux verses time following the loss of flow. The behavior of local clad heat flux verses time cannot be determined directly and the analysis of this behavior is dependent on verification of reactor trip response time for a loss of flow event. Both flow coast down and reactor trip response time for a loss of flow may be determined directly during the flow coast down test. No additional meaningful data could be obtained from performance of this test at power. Plant dynamic response from power following a four pump reactor coolant pump trip will be verified by the station blackout test.*

Regulatory Guide	*Compliance*	*Affected Section(s)*	*Exception Taken*	*Justification*
	Partial	*App. A 5.k.k*	*Dynamic response of the plant to the loss or bypassing of the feedwater heater(s) from a credible single failure or operator error that would result in the most severe case of feedwater temperature reduction will be performed from 90% F. P. Feedwater reduction test will not be performed at 50% F. P.*	*The Feedwater Temperature Variation Test will be performed at 90% power. Performance of this test at 90% power will provide a severe test of the ability to respond to this transient and control the plant, and will assure that this can be accomplished throughout the range of power operation.*
1.68 Rev. 2	*Partial*	*App. A 5.1.1*	*Dynamic response of the plant to turbine trip will be demonstrated from the maximum power level at which a reactor trip would not be automatically initiated.*	*Because of the reactor trip-on-turbine trip logic, reactor trips will automatically be actuated upon loss of turbine during the turbine trip test and the unit loss of electrical load test at full power. The resulting transients and plant dynamic response will not be significantly different for these two tests if both are initiated from full load. Performance of the turbine trip test from the highest power below the actuating point of the reactor trip-on-turbine trip logic will allow documentation of the plant dynamic response for the runback situation. The unit loss of electrical load test will be performed from full power to demonstrate the dynamic response to a turbine trip with reactor trip situation.*

Regulatory Guide	***Compliance***	***Affected Section(s)***	***Exception Taken***	***Justification***
	App. A 5.m.m		*A main steam isolation will not be demonstrated at power.*	*The severity of the transient to plant systems and components does not justify performance of the test. Proper operation of the main steam isolation valves is demonstrated during hot functional testing at full temperature and pressure. It should be noted that in the 15.0 analysis of the inadvertent closure of main steam isolation valves at power (Section 15.2.4), this transient is bracketed by the turbine trip analysis. A turbine trip will be performed at power during startup testing.*
	Partial	*App. A.5.o.o.*	*Verify that piping and component, movements, vibrations and expansions will not be performed during power ascension testing except as specified on FSAR Table 3-85.*	*Acceptable expansion movements and vibrations will be demonstrated earlier in the test program by the Reactor Coolant System Thermal Expansion and Restraint Test (Abstract, Section 14.4) and the Piping System Vibration Test (Abstract, Section 14.4). These tests will not be repeated during the power ascension testing program.*
1.79 Rev. 1	*Partial*	*C.1.b (2)*	*A cold recirculation test will not be performed as specified by C.1.b (2). Proper functioning of valves and interlocks required to ensure proper system alignment in the sump recirculation made following a LOCA will be verified.*	*Vendor testing and verification is adequate to ensure vortex control, proper system pressure drops, and that adequate net positive suction head will exist for post-LOCA sump recirculation.*

Regulatory Guide	***Compliance***	***Affected Section(s)***	***Exception Taken***	***Justification***
1.140 Rev. 1	*Partial*	*C.3,5,6*	*The provisions of these sections of the guide, insofar as they pertain to the preoperational test program, will be implemented in accordance to a graded approach to system testing as defined in Regulatory Position C.1 of Regulatory Guide 1.68 Rev. 2. The relative importance of each normal ventilation system shall be determined by evaluating the function of each system in: (1) minimizing offsite releases (2) lowering exceptional exposures in accordance with ALARA principles.*	*Adoption of a graded implementation philosophy allows more flexibility in adopting the testing provisions of the guide to specific system applications. This will allow the intent of the guide to be satisfied while maintaining consistency with the testing philosophy applied to other plant systems.* *Alden Research Laboratory has demonstrated by a scale model testing of the recirculation sump that there is adequate vortex control, proper system pressure drops and that adequate net positive suction head will exist post-LOCA for the sump recirculation.*
1.133 Rev. 0	*Adopted*	*C.3.a. (1)* *C.3.a. (2). (a)* *See Section 1.7 for position on other sections of the guide.*	*Only these sections of the guide pertain to to the start-up test program and are thus adopted for use.*	

Regulatory Guide	***Compliance***	***Affected Section(s)***	***Exception Taken***	***Justification***
1.80 Rev. 0	*Partial*	*C.9*	*Loss of instrument air simulation of a gradual freezing and plugging of instrument air lines will not be performed.*	*Location of essential portions of the instrument air system at Catawba precludes the possibility of freezing of any small amounts of water which might accumulate. Verification of dryer performance serves to assure that large amounts of water will not accumulate in the system. If plugging should occur, system response to a gradual loss of instrument air is bounded by the loss of instrument air test performed under C.8.b.*
		C.10	*The loss of instrument air test will not be repeated with valves in their normal operating procedure.*	*Valves which are not in their normal operating position when the loss of air test of C.8.b is performed will be verified to fail to their correct position. Any valve which is in other than its normal operating alignment when the test of C.8.b is performed and which is already in its failed position will be individually verified to fail to the correct position from its normal operating position following the test of C.8.b.*
		C.11	*The results of instrument air testing will not be included in the Startup Report.*	*Instrument air testing is conducted as a preoperational rather than a startup test.*
1.52 Rev. 2	*See Section 1.7*			
1.41 Rev. 0	*Adopted*			
1.30 Rev. 0	*See Section 1.7*			

Regulatory Guide	*Compliance*	*Affected Section(s)*	*Exception Taken*	*Justification*
1.22 Rev. 0	*See Section 1.7*			
1.20 Rev. 2	*See Section 1.7*			
1.9 Rev. 0	*See Section 1.7 and Section 14.4*			
1.68.2 Rev. 1	*Adopted*			
1.95	*Adopted*			
1.128	*See Section 8.1.5.2*			

Table 14-2. Preoperational and Startup Test Schedule (HISTORICAL INFORMATION – NOT TO BE REVISED)

	Unit 1	***Unit 2***
Begin Preoperational Testing		
Begin Hot Functional Testing		*7/15/85*
Initial Fuel Loading	*7/18/84*	*1/1/86*
Initial Criticality	*1/7/85*	*3/17/86*
Begin Low Power Testing	*1/7/85*	*3/17/86*
Begin Power Ascension Testing	*1/21/85*	*4/8/86*
Commercial Operation	*6/29/85*	*8/19/86*