Appendix 1A. Tables

Table 1-1. Shared Facilities and Equipment

[HISTORICAL INFORMATION IN ITALICS BELOW NOT REQUIRED TO BE REVISED]
(Note: This table 1-1 is not applicable to 10CFR50 Appendix A General Design Criterion 5, Sharing of Structures, Systems, and Components.)

System	*Components Shared*	*Quantity Provided*
Chemical & Volume Control System	*Chiller Pumps*	*3*
	Boric Acid Transfer Pump	*4*
	Resin Fill Tank	*1*
	Boric Acid Tank	*2*
	Boric Acid Batching Tank	*1*
	Batching Tank Agitator	*1*
	Chillers	*3*
Boron Recycle System	*Recycle Evap. Feed Demin.*	*2*
	Recycle Evap. Feed Filters	*2*
	Recycle Holdup Tanks	*2*
	Recycle Evap. Feed Pumps	*2*
	Recycle Evap. Reagent Tank Unit Package	*1*
	Recycle Evaporator Package	*1*
	Recycle Evap. Cond. Demin.	*1*
	Recycle Evap. Cond. Filter	*1*
	Recycle Evap. Concentrates Filter	*1*
Ice Condenser Refrigeration	*Ice Condenser Glycol Mixing & Storage Tank*	*1*
	Ice Condenser Glycol Mixing & Storage Pump	*1*
	Ice Cendenser Glycol Pumps	*6*
	Ice Condenser Refrigeration Unit	*4*
	Ice Machine Unit	*3*
	Ice Solution Mixing Tank	*2*
	Ice Solution Pump	*2*
	Ice Bin Condensing Unit	*2*
	Ice Annex Condensing Unit	*1*
	Ice Bin Space Air Handler Unit	*1*

System	*Components Shared*	*Quantity Provided*
	Ice Bin Wall Air Handler Unit	*2*
	Ice Annex Space Air Handler Unit	*2*
Ice Condenser Refrigeration	*Ice Condenser Blower Unit*	*1*
	Ice Condenser Air Cooler	*1*
	Ice Condenser Air Chiller Condensing Unit	*2*
	Ice Condenser Air Chiller	*3*
	Ice Condenser Vacuum Receiver	*1*
	Ice Condenser Cyclone Receiver	*1*
Component Cooling System	*Component Cooling Drain Tank*	*1*
	Component Cooling Drain Tank Pump	*1*
Liquid Waste Recycle, Liquid Waste Monitor & Disposal, Waste Gas, and Nuclear Solid Waste Disposal Systems	*Common waste systems are used for the two units. Each Con- tainment structure has its own reactor coolant drain tank and Containment sump serviced by two reactor coolant drain tanks and four sump pumps. All other waste equipment is sized to adequately serve two units and common Auxiliary and Service Building.*	
Nuclear Service Water System	*Supply and Return Lines Control, Cable, and Equipment Room Air Conditioning Condenser*	*2*
Auxiliary Building Ventilation System	*Fuel Handling Area Filter Train*	*1*
	Fuel Handling Area Exhaust Fan	*2*
	Fuel Handling Area Supply Air Handling Unit	*1*
	Radiation Area Supply Filter	*1*
	Radiation Area Supply Fan	*1*
	Radiation Area Cooling Coil	*1*
Groundwater Drainage System	*Groundwater Sump Pump*	*6*
Conventional L. P. Service Water System	*Conventional Service Water Pump*	*3*
Control Area Ventilation System	*Ctrl Rm Outside Air Press. Filter Trn*	*2*
	Ctrl Rm Outside Air Press. Filter Trn Pressure Fan	*2*

System	Components Shared	Quantity Provided
	Control Room Air Handling Unit	*2*
	Control Room Chillers	*2*
	Equipment & Cable Room Filter Train	*2*
	Equipment & Cable Room Air Handling Unit	*2*
Fire Protection System	*Fire Pump*	*3*
	Jockey Pump	*2*
	Pump Fire Protection Pressurizer Tank	*1*
Recirculated Cooling Water System	*Recirculated Cooling Water Pumps*	*3*
	Recirculated Cooling Water HX	*4*
	Recirculated Cooling Water Storage Tank	*1*
Containment Ventilation Cooling Water System	*Containment Ventilation Cooling Water Pump*	*3*
	Containment Ventilation Cooling Water Strainer	*1*
Compressed Air System	*Air Compressors*	*3*
	Air Filters	*3*
	Air Aftercoolers	*2*
	Air Receivers	*3*
	Air Dryers	*4*
	Instrument Compressed Air Tanks	*2*
Radiation Monitoring System	*Control Room Monitoring Panels*	*2*
	For monitors, refer to Tables 11-27 and 11-28	

Table 1-2. Design Comparison

[HISTORICAL INFORMATION NOT REQUIRED TO BE REVISED]

Chapter Number	*Chapter Title System/Component*	*FSAR Reference*	*Significant Similarities*	*Significant Differences*
Chapter 4.0	*Reactor*			
	Fuel	*4.2.1*	*Trojan & Sequoyah*	*None*
	Reactor Vessel Internals	*4.2.2*	*Trojan & Sequoyah*	*Sequoyah and McGuire Incorporate Upper Head Injection (UHI) Systems. Trojan and McGuire have neutron pads.*
	Reactivity Control	*4.2.3*	*Trojan & Sequoyah*	*None*
	Nuclear Design	*4.3*	*Trojan & Sequoyah*	*None*
	Thermal-Hydraulic Design	*4.4*	*Trojan & Sequoyah*	*None*
Chapter 5.0	*Reactor Coolant System*	*5.1, 5.2*	*Trojan & Sequoyah*	*The following have been added or changed: Specific stress limits.*
	Reactor Vessel[1]	*5.4*	*Trojan & Sequoyah*	*Sequoyah and McGuire vessel heads incorporate UHI penetrations.*
	Reactor Coolant Pumps[1]	*5.5.1*	*Trojan & Sequoyah except as noted.*	*Higher flow due to changes to impeller, diffuser, and no motor HP.*
	Steam Generators[1]	*5.5.2*	*Millstone 2*	*Steam drums were not replaced at Millstone.*
	Piping[1]	*5.5.3*	*Trojan & Sequoyah*	*Sequoyah and McGuire incorporate UHI piping.*
	Residual Heat Removal System	*5.5.7*	*Trojan & Sequoyah*	*None*
	Pressurizer[1]	*5.5.10*	*Trojan & Sequoyah*	*None*
Chapter 6.0	*Engineered Safety Features*			
	Containment Systems	*6.2*	*Trojan & Sequoyah*	*Sequoyah and McGuire have Ice Condensers.*

Chapter Number	***Chapter Title System/Component***	***FSAR Reference***	***Significant Similarities***	***Significant Differences***
	Emergency Core Cooling System	6.3	*Trojan & Sequoyah except as noted.*	*Sequoyah and McGuire have Upper Head Injection Systems.*
Chapter 7.0	*Instrumentation and Controls*			
	Reactor Protection System	7.2	*System Functions are similar to Sequoyah & Trojan.*	*None*
	Engineered Safety Featured Systems	7.3	*Systems Functions are similar to Sequoyah & Trojan.*	*None*
	Systems required for safe shutdown	7.4	*System functions are similar to Sequoyah & Trojan.*	*None*
	Safety Related Display Instrumentation	7.5	*System functions are similar to Sequoyah & Trojan.*	*Actual physical configuration may differ due to design philosophy.*
	Other Safety Systems	7.6	*Operational functions are similar to Trojan & Sequoyah.*	*None*
	Control Systems	7.7	*Operation functions are similar to Trojan & Sequoyah except as noted.*	*Load rejection capability is an option.*
Chapter 8.0	*Electric Power*			
	Offsite Power System	8.2	*Similar to Trojan except as noted.*	*Trojan switchyard has two bus single breaker scheme, whereas McGuire has two bus breaker-and-a-half- scheme. McGuire has a 230 kV switchyard for Unit 1 and a 525 kV switchyard for Unit 2 with an auto-transformer connecting the 230 KV and 525 kV switch- yards.*

Chapter Number	*Chapter Title System/Component*	*FSAR Reference*	*Significant Similarities*	*Significant Differences*
				McGuire switchyard feeders to the main step-up trans-formers have two redundant primary relaying circuits with two independent channels per circuit, and two out of four tripping logic.
	Onsite Power System	8.3	*Similar to Trojan except as noted.*	*Trojan uses startup trans-formers for startup and shutdown power, whereas McGuire uses generator circuit breakers thereby allowing two full size auxiliary transformers (normally operated at half rated capacity) to supply startup and shutdown power.*
Chapter 9.0	*Auxiliary Systems*			
	Chemical and Volume Control System	9.3.4	*Trojan & Sequoyah except as noted.*	*Trojan and Sequoyah designs do not include the Boron Thermal Regeneration System whereas McGuire does.*
	Boron Recycle System	9.3.6	*Trojan and Sequoyah except as noted.*	*Trojan & Sequoyah CVCS designs include the BRS where McGuire has a separate system.*
Chapter 11.0	*Radioactive Waste Management*			
	Source Terms	11.1	*Joseph M. Farley, Watts Bar.*	*None*
	Liquid Waste	11.2	*Joseph M. Farley*	*None*
	Gaseous Waste Processing	11.3	*Joseph M. Farley*	*None*
	Process Radiation	11.4	*Functionally Similar*	*None*
Chapter 15.0	*Accident Analysis monitoring*	15.0	*Similar to Trojan & Sequoyah except as noted.*	*The Accident Analysis section have been updated per WCAP 8185.*

Chapter Number	*Chapter Title System/Component*	*FSAR Reference*	*Significant Similarities*	*Significant Differences*

Note:

1. All components designed and manufactured to Code edition in effect.

Table 1-3. Major Design Changes Since PSAR

Item	Change in Design	FSAR Reference	Reason for Change
1	Coarse aggregates for Category 1 structures conform to N. C. Highway Commission Specification No. 3 and 4 and fine aggregates conform to ASTM C33, while the PSAR commits concrete aggregates to meet ASTM C33.	3.8.1	Local quarries conform to N. C. Highway Commission's Specifi- cations as opposed to ASTM specifications.
2	Fuel assemblies have been changed from a 15 x 15 array to a 17 x 17 array.	Chapter 4.0	This new product line improves the core thermal margin.
3	Upper internals have been modified to account for the change to a 17 x 17 fuel and the addition of UHI.	4.2.2	Modifications were necessary to accommodate 17 x 17 fuel and upper head injection.
4	The thermal shield has been replaced by neutron pads.	4.2.2	This change simplies core support design and reduces flow pressure drop and velocity.
5	The refrigeration system for the ice condenser has eight, rather than six, 25 ton units.	6.2.2	This change provides for an increase in thermal loads over those originally assumed in the PSAR design stage.
6	The air handling system for the ice condenser has 30 units rather than 19.	6.2.2	See Item 5.
7	The glycol system for the ice condenser has six pumps rather than four.	6.2.2	See Item 5.
8	Ice baskets, ice basket supports and lattice frames for the ice condenser have been redesigned.	6.2.2	Ice condenser components were re-designed to accommodate design loading conditions beyond those committed in the PSAR.
9	The Annulus Ventilation System has been modified to provide a separate system with redundant trains for each unit.	6.2.3	This change improves the reliability of the system and prevents any postulated unfiltered discharge.
10	The Containment hydrogen purge discharges into the Annulus Ventilation System.	6.2.5	This feature has been added to satisfy the requirements of Regulatory Guide 1.7.
11	Deleted		

Item	Change in Design	FSAR Reference	Reason for Change
12	The Air Return Fan System now includes a Hydrogen Skimmer System.	6.6	The hydrogen skimmer eliminates postulated hydrogen pocketing at high points in the lower containment compartment.
13	On-line testing is provided for Engineered Safety Features.	7.3	This change implements a commitment made in the PSAR.
14	Unit 1 employs a 230 kV system rather than a 525 kV system.	8.2	This change better serves the needs and requirements of the transmission network.
15	The tie to the 44 kV system has been eliminated.	8.2	Use of generator PCB's pro- vides two independent circuits tied to the 230 kV Duke trans- mission system; therefore, no tie to the 44 kV system is necessary.
16	Unit 1 has two half-size, three-phase main step-up transformers rather than one full-size, three- phase transformer. Unit 2 has two half-size main step-up transformer systems instead of one main transformer system.	8.3	Two independent circuits from the transmission system require the use of two main transformers in lieu of only one.
17	Each unit has generator power circuit breakers on the low voltage side of each half-sized main step-up transformer.	8.3	Generator PCB's provide an isolating means to assure independence of the two incoming, off-site power sources.
18	A filter has been added in front of the demineralizer for the Spent Fuel Cooling System.	9.1.3	This filter protects the demineralizer.
19	Channels 1A and 2A of the Nuclear Service Water System are supplied by a header, and Channels 1B and 2B are supplied by a different header rather than each unit having its own header.	9.2.2	The system was revised to comply with the single failure criteria.
20	The refueling water transfer pump has been deleted, and two recirculation pumps have been added to the piping in the Auxiliary Building from the refueling water storage tank.	9.2.5	The residual heat removal pumps are used for the rapid transfer of refueling canal water. Transfer line tempera- ture will be kept above 70°F by recirculation pump operation.

Item	Change in Design	FSAR Reference	Reason for Change
21	The reactor makeup water tank and pump have been changed from ANS Safety Class 3 to NNS.	9.3.6	These components are not re- quired to be ANS Safety Class III.
22	The feed demineralizers and filters have been relocated from downstream to upstream of the recycle holdup tanks.	9.3.6	Demineralizers removed cations and antions and filters removed solids prior to liquid storage in the recycle holdup tanks.
23	A halon system, replacing the CO_2 and freon systems, has been added to the Fire Protection System.	9.5.1	The CO_2 system was redundant to the halon, i.e., freon system.
24	The four fire pumps have been reduced to three.	9.5.1	Three fire pumps satisfy the requirements of the fire protection system.
25	A supply to the auxiliary feedwater pumps from the Drinking and Filtered Water System has been added.	10.4.7	Filtered water is preferred due to the suspended solids in raw water.
26	The 100 percent capacity, turbine-driven auxiliary feedwater pump has been changed to 200 percent capacity, and the 50 percent capacity, motor-driven pumps have been changed to 100 percent capacity.	10.4.7	The capacity was incorrectly stated in the PSAR.
27	The reactor coolant drain tank heat exchanger has been moved to the inlet of the boron recycle holdup tank.	11.2	The liquid may now be cooled while pumping directly to the boron recycle holdup tank reactor coolant drain tank.
28	A waste drain tank has been added.	11.2	This tank serves to collect liquids with entrained fis- sion product gases for recycle.
29	The recycle monitor tank has been divided into two tanks.	11.2	Two 5,000 gallon tanks are used rather than one 10,000 gallon tank due to space limitations.
30	A waste evaporator condensate return unit has been added.	11.2	This unit serves to return condensate from the evap- orator package to the con- densate system.
31	(Deleted)		

Item	Change in Design	FSAR Reference	Reason for Change
32	Non-code pumps have been used for the residual heat removal and Containment spray pump room sumps, whereas the PSAR specified ASME code pumps.	11.2	Pumps for this service designed and manufactured in accordance with Section 3 of ASME Boiler and Pressure Vessel Code are either unavailable or not suitable for this service.
33	A new fuel storage vault has been added.	9.1.1	The vault provides dry storage for new fuel and increases the overall fuel storage capacity.
34	Steam Generator chemistry changed from phosphate to volatile amine treatment.	10.4.10.2	Problems associated with phosphate chemistry.
35	Condensate polishing demineralizers were added and steam generator blowdown system design modified.	10.4.10.2	Change to volatile amine chemistry control necessitate these modifications.
36	Compressed air systems modified so that service air, instrument air and breathing air each have their own compressors.	9.3.1	Operational experience and problems at Oconee Nuclear Station.
37	Conventional Waste Water Treatment System added.	9.2.9	Increase flexibility to main- tain station water releases within required limits.
38	Spacing on spent fuel storage racks decreased from 21" to 15 1/2".	9.1.2	Increase storage capacity of spent fuel pools.
39	Auxiliary feedwater lines changed to enter steam generators directly instead of tapping into main feedwater lines.	10.4.7.2	Preclude the possibility of water hammer in steam generator preheater.
40	Provided for semi-automatic switchover to recircula- tion mode.	6.3.2.2.2 7.3.1.1.2	Concerns an adequacy of operator action to accomplish switchover without some automatic action as a backup.
41	Enclosures around containment sump valve removed.	3.9.2.8.3	No practical enclosure could be developed due to conflicting design requirements.
42	Filter bypasses added to auxiliary building and fuel handling building filtered exhaust systems.	9.4.2	Increased flexibility in opera- tion and maintenance of filters.

Item	Change in Design	FSAR Reference	Reason for Change
43	Pipe whip restraint/energy absorber added to top of steam generator enclosures.	Q110.42 Response	New restraint design mitigates effects of a postulated steam line break in enclosure.
44	Groundwater monitoring system added.	2.4.13.14	System alerts operator to a rise in groundwater level in vicinity of reactor and auxiliary buildings.
45	Containment Air Release and Addition System added.	9.5.12	Provide for containment pres- sure control during operation.
46	Additional heat exchanger added to steam generator blowdown system.	10.4.8.2	Provides for additional sub- cooling of steam generator effluent to preclude flashing in blowdown piping.
47	Containment Pressure Control System added.	7.6.16	Prevents underpressurization of containment by air return fans and Containment Spray System.
48	Manually Actuated Sprinkler Systems were added in Cable Rooms.	9.5.1	These were added to upgrade the defense-in-depth concept for fire protection.
49	Automatic Sprinkler Systems were added in the AFW Pump Room.	9.5.1	See Item 48.
50	Manual Actuated Sprinkler Systems were added to the RCP.	9.5.1	See Item 48.
51	A missile wall protecting the Reactor Refueling Water Storage Tank has been added.	3.2.1 3.2.2	This structure has been added in order to provide a qualified source of makeup water. This satisfies the requirements of Regulatory Guide 1.117.
52	Installed automatic switchover of Auxiliary Feedwater Pump suction to safety grade source of water.	10.4.7	Prevents damage to pumps due to loss of normal suction source.
53	Revised Auxiliary Feedwater System pump suction piping and control valve throttle positions.	10.4.7	Prevents unacceptable pump runout and negative suction header pressure conditions which could result in air ingestion.

Item	Change in Design	FSAR Reference	Reason for Change
54	A standby Shutdown System was added to supplement normal shutdown system.	9.5.1	This system was added to provide an alternate means of shutdown that upgraded the defense-in-depth concept for fire protection.
55	High Point Vents added to the Reactor Coolant System.	5.2.2	Facilitates venting of combust- ible gas in accident situations NUREG 0737, Item II-B.1.
56	Inadequate Core Cooling Instruments and Control Room Indications added.		For determining margin to satur- ation of the Reactor Coolant NUREG 0737, Item II-F.2.
57	Post Accident Sampling System.		Deleted from Licensing Basis by Tech Spec Amendment 199/180 dated 9/17/01.
58	Provided Relief and Safety Valve Safety Grade Indication in the Control Room.	5.2	For determining inadvertent or or faulty actuation of Safety/ Relief valves NUREG 0737, Item II-D.3.
59	Deliberate Operator Action is required to reposition Containment Isolation valves following a reset of the Containment Isolation Signal.	6.2 7.2	Necessary to limit radioactivity escape due to inadvertent operator action NUREG 0737, Item II-E.4.2.
60	Provided Emergency Power for the Pressurized Equipment.	Chapter 8.0	To maintain Reactor Coolant System pressure with a loss of Off-Site power NUREG 0737, Item II-G.
61	Provided Following Additional Accident Monitoring/ documentation: 1. Containment High Range Radiation Monitors 2. Continuous Containment pressure indication exceeding 3. Containment Water level instrumentation 4. Containment Hydrogen Monitoring 5. Noble Gas Monitors for Unit vents	Chapter 7.0	To enhance diagnostic ability during accident conditions NUREG 0737, II-F.1.
62	Provided a Technical Support Center.		To provide technical support to the operators during accident conditions NUREG 0737, Item III-A.1.2a.

Item	Change in Design	FSAR Reference	Reason for Change
63	Provided a Hydrogen Recombine System.	Chapter 6.0	To mitigate possibility of Hydrogen explosion during severe accident conditions.
64	Added a new preheater manifold to the Steam Generators.		To alleviate tube damage due to vibrations and thermal stresses experienced with the previous design.

Table 1-4. Regulatory Guides

Document/Title	Regulatory Guide Disposition	Reference Section
Reg. Guide 1.1 - Net Positive Suction Head for Emergency Core Cooling and Containment Heat Removal (Rev. 0).	Adopted	6.3.2.14, 6.5.2
Reg. Guide 1.2 - Thermal Shock to Reactor Pressure Vessels (Rev. 0).	Adopted	5.2.4
Reg. Guide 1.3 -	Not Applicable (BWR)	
Reg. Guide 1.4 - Assumptions Used for Evaluating the Potential Radiological Consequences of a LOCA for Pressurized Water Reactors (Rev. 1).	Modified (on-site data added)	2.3.4.1, 12.1.6.3, Tables 15-21, -33, -34 and -37
Reg. Guide 1.5 -	Not Applicable (BWR)	
Reg. Guide 1.6 - Independence between Redundant Standby (On-site) Power Sources and between their Distribution Systems (Rev. 0).	Adopted	8.1.4, 8.3.1.2.3, 8.3.2.2.5, 8.3.1.1.7, TS B3.8.4
Reg. Guide 1.7 - Control of Combustible Gas Concentrations in Containment Following a Loss of Coolant Accident (Rev. 2).	Adopted With Comment	6.2.1.1.3.1, 6.2.5.1, 6.2.5.3, 6.2.6.1, 6.2.6.2.3, 12.1.6.3, TS B3.6.8
Reg. Guide 1.8 - Personnel election and Training (Rev. 1-R).	Adopted with comment	17.0, TS 5.3.1
Reg. Guide 1.9 - Selection of Diesel Generator Set Capacity for Standby Power Supplies (Rev. 3).	Adopted with exceptions noted in Table 8-17.	8.3.1.1.7, 8.3.1.2.4, 8.1.4, 8.3.1.1.10.1, TS B3.8.1, SLC B16.8.3, Table 8-17
Reg. Guide 1.10 - Mechanical (Cadweld) Splices in Rein- forcing Bars of Concrete Containments (Rev. 1).	Adopted	3.8.1.6, 3.8.3.6, 3.8.4.1.6, Table 3-31

Document/Title	Regulatory Guide Disposition	Reference Section
Reg. Guide 1.11 - Instrument Lines Penetrating Primary Reactor Containment (Rev. 0).	Adopted	6.2.4.1, 7.1.2, 7.3.1.1.2
Reg. Guide 1.12 - Instrumen-tation for Earthquakes (Rev. 2).	Adopted (Rev 2)	3.7.4.1, SLC B16.7.2
Reg. Guide 1.13 - Fuel Storage Facility Design Basis (Rev. 1).	Adopted	3.8.4.1.1, 9.1.2, 9.1.3.2
Reg. Guide 1.14 - Reactor Coolant Pump Flywheel Integrity (Rev. 1).	Exceptions listed in Section 5.2.6, 3.5.2.1.	5.2.6, TS 5.5.7, 3.5.2.1
Reg. Guide 1.15 - Testing of Reinforcing Bars for Concrete Structures (Rev. 1).	Adopted	Table 3-31
Reg. Guide 1.16 - Reporting of Operating Information (Rev. 4).	No longer used See TS 5.6	
Reg. Guide 1.17 - Protection Against Industrial Sabotage (Rev. 0).	Adopted	13.7
Reg. Guide 1.18 - Structural Acceptance Test for Concrete Primary Reactor Containments.	Not Applicable	
Reg. Guide 1.19 - Nondestruc- tive Examination of Primary Containment Welds (Rev. 1).	Exception listed in Section 3.8.2.	3.8.2.2
Reg. Guide 1.20 - Vibration Measurements on Reactor Internals (Rev. 1).	Adopted	3.9.1.3.1
Reg. Guide 1.21 - Measuring and Reporting of Effluents from Nuclear Power Plants (Rev. 1).	Adopted with exceptions to frequency and format in Appendix B.	11.4, 12.3.2.4 SLC 16.11—16.12
Reg. Guide 1.22 - Periodic Testing of Protection System Actuation Functions (Rev. 0).	Adopted	7.1.2.1, 7.3.2.2.5, 8.3.1.1.10.2

Document/Title	Regulatory Guide Disposition	Reference Section
Reg. Guide 1.23 - Onsite Meteorological Programs (Rev. 0).	Adopted	2.3.3.4, 2.3.6, SLC B16.7.3
Reg. Guide 1.24 - Assumptions Used for Evaluating the Potential Radiological Conse- quences of a Pressurized Water Reactor Radioactive Gas Storage Tank Failure (Rev. 0).	Modified (on-site data added).	
Reg. Guide 1.25 - Assumptions Used for Evaluating the Potential Radiological Consequences of a Fuel Handling Accident (Rev. 0).	Modified (on-site data added). Exceptions listed in Section 15.7.4.	15.10.3, Table 15–39
Reg. Guide 1.26 - Quality Group Classifications and Standards (Rev. 3).	Modified. Exceptions listed in Section 3.2.2.	3.2.2, 5.2.8.1, 11.2.3.1 and 17.0
Reg. Guide 1.27 - Ultimate Heat Sink (Rev. 1).	Adopted. Exceptions listed in Section 9.2.5	9.2.5.3.1
Reg. Guide 1.28 - Quality Assurance Program Requirements (Rev. 2).	See Quality Assurance Program Description Topical Report DUKE-QAPD-001	17.0
Reg. Guide 1.29 - Seismic Design Classification (Rev. 3).	Exceptions listed in Section 3.2.4.2.	3.2.4.2, 5.2.5.7, 9.1.1.1 and 17.0
Reg. Guide 1.30 - Quality Assurance Requirements for the Installation, Inspection and Testing of Instrumentation and Electrical Equipment (Rev. 0).	See DUKE-QAPD-001	3.11.2.1.4, 17.0
Reg. Guide 1.31 - Control of Stainless Steel Welding Rev. 3).	Exceptions listed in Section 5.2.5.7.	5.2.5.7
Reg. Guide 1.32 - Use of IEEE STD. 308-1971, “Criteria for Class IE Electric Systems for Nuclear Power Generating Stations” (Rev. 0).	Adopted	8.1.4, 8.2.2.1, 8.3.1.1.4 8.3.1.2.5, 8.3.2.2.2, , TS B3.4.11, TS B3.8.4

Document/Title	Regulatory Guide Disposition	Reference Section
Reg. Guide 1.33 - Quality Assurance Program Requirements (Operation) (Rev. 2).	See DUKE-QAPD-001	17.0, 13.5
Reg. Guide 1.34 - Control of Electroslag Weld Materials (Rev. 0).	Electroslag welding is not used on core support structures or Class 1 and Class 2 vessels and components.	
Reg. Guide 1.35 - Inservice Surveillance of Ungrouted Tendons in Prestressed Concrete Containment Structures.	Not Applicable	
Reg. Guide 1.36 - Nonmetallic Thermal Insulation for Austenitic Stainless Steel (Rev. 0).	Adopted	5.2.3.3, 17.0
Reg. Guide 1.37 - Quality Assurance Requirements for Cleaning of Fluid Systems and Associated Components of Water-Cooled Nuclear Power Plants (Rev. 0).	See DUKE-QAPD-001	5.2.5, 17.0
Reg. Guide 1.38 - Quality Assurance Requirements for Packaging, Shipping, Receiving, Storage, and Handling of Items for Water Cooled Nuclear Power Plants (Rev. 2).	See DUKE-QAPD-001	5.2.5, 17.0
Reg. Guide 1.39 - Housekeeping Requirements for Water Cooled Nuclear Power Plants (Rev. 2).	See DUKE-QAPD-001	17.0
Reg. Guide 1.40 - Qualification Tests of Continuous - Duty Motors Installed Inside the Containment of Water-Cooled Nuclear Power Plants (Rev. 0).	Adopted	3.11.2.1.4

Document/Title	Regulatory Guide Disposition	Reference Section
Reg. Guide 1.41 - Preoperational Testing of Redundant On-site Electric Power Systems to Verify Proper Load Group Assignments (Rev. 0).	Adopted	14.4.8
Reg. Guide 1.42 - Interim Licensing Policy on as low as practicable for Gaseous Radio- iodine Releases from Light Water-Cooled Nuclear Power Reactors (Rev. 1).	N/A	
Reg. Guide 1.43 - Control of Stainless Steel Weld Cladding of Low-Alloy Steel Components (Rev. 0).	Adopted	
Reg. Guide 1.44 - Control of the Use of Sensitized Stainless Steel (Rev. 0).	Exceptions listed in Section 5.2.5.5	5.2.5.5
Reg. Guide 1.45 - Reactor Coolant Pressure Boundary Leakage Detection Systems (Rev. 0).	Adopted With Comment	5.2.7.1, Table 5-30, Table 5-55, 11.4.2.2.4, TS B3.4.13, TS B3.4.15
Reg. Guide 1.46 - Protection Against Pipe Whip Inside Containment (Rev. 0).	Duke does not fully comply with Regulatory Guide 1.46. Westinghouse position given in WCAP 8082.	3.6.1.2, Table 3-20
Reg. Guide 1.47 - Bypassed and Inoperable Status Indication for Nuclear Power Plant Safety Systems (Rev. 0).	Adopted	7.2.2.3, 7.3.2.2, 7.6.2.2.11, 7.6.4.2.11, 7.8.2
Reg. Guide 1.48 - Design Limits and Loading Combinations for Seismic Category 1 Fluid System Components (Rev. 0).	Adopted With Comment	3.9.2.4
Reg. Guide 1.49 - Power Levels of Water-Cooled Nuclear Power Plants (Rev. 1).	Adopted	

Document/Title	Regulatory Guide Disposition	Reference Section
Reg. Guide 1.50 - Control of Preheat Temperature for Welding of Low-Alloy Steel (Rev. 0).	Exceptions listed in Section 5.2.3.5.	5.2.3.5
Reg. Guide 1.51 - Inservice Inspection of ASME Code Class 2 of 3 Nuclear Power Plant Components (Rev. 0).	N/A	
Reg. Guide 1.52 - Design, Testing, and Maintenance Criteria for Atmosphere Cleanup System Air Filtration and Absorption Units of Light-Water Cooled Nuclear Power Plants (Rev. 0). (Rev. 2 adopted for testing purposes only)	Adopted With Comment	6.2.3.2, 9.4.2.3, Table 6-110, 9-37, -38, and –40, TS B3.6.10, TS B3.7.9, TS B3.7.11, TS B3.7.12, TS B3.9.4, TS 5.5.11
Reg. Guide 1.53 - Application of the Single-Failure Criterion to Nuclear Power Plant Protection System (Rev. 0).	Adopted	
Reg. Guide 1.54 - Quality Assurance Requirements for Protective Coatings Applied to Water-Cooled Nuclear Power Plants (Rev. 0).	Adopted for civil work except that the provisions of ANSI N45.2-1971 are not applied. Mechanical and electrical equipment does not comply since material was ordered prior to issuance of the guide.	3.8.2.4, 17.0
Reg. Guide 1.55 - Concrete Placement in Category 1 Structures (Rev. 0).	Adopted	
Reg. Guide 1.56 - Maintenance of Water Purity in Boiling Water Reactors.	Not Applicable (BWR)	
Reg. Guide 1.57 - Design Limits and Loading Combinations for Metal Primary Reactor Containment System Components (Rev. 0).	Duke does not comply	3.8.2.4

Document/Title	Regulatory Guide Disposition	Reference Section
Reg. Guide 1.58 - Qualifications of Nuclear Power Plant Inspection, Examination, and Testing Personnel (Rev. 1).	See DUKE-QAPD-001	17.0
Reg. Guide 1.59 - Design Basis Floods for Nuclear Power Plants (Rev. 2).	Exceptions listed in Section 3.4.	3.4
Reg. Guide 1.60 - Design Response Spectra for Seismic Design of Nuclear Power Plants (Rev. 1).	Duke does not comply.	
Reg. Guide 1.61 - Damping Values for Seismic Design of Nuclear Power Plants (Rev. 0).	Exceptions listed in Section 3.7.1.3.	3.7.1.3, 5.2.1.10
Reg. Guide 1.62 - Manual Initia- tion of Protective Actions (Rev. 0).	Adopted	
Reg. Guide 1.63 - Electric Penetration Assemblies in Containment Structures for Water-Cooled Nuclear Power Plants (Rev. 3).	Exceptions listed in Section 8.3.1.2.	3.8.2.1, 8.3.1.2.7.7, 3.11.2.1.4
Reg. Guide 1.64 - Quality Assurance Requirements for the Design of Nuclear Power Plants (Rev. 2).	See DUKE-QAPD-001	17.0
Reg. Guide 1.65 - Materials and Inspections for Reactor Vessel Closure Studs (Rev. 1).	Exceptions listed in Section 5.4.2.2.	5.4.2.2
Reg. Guide 1.66 - Nondestruc- tive Examination of Tubular Products (Rev. 0).	Duke complies with the ASME Code Governing purchase of the materials.	
Reg. Guide 1.67 - Installation of Overpressure Protection Devices (Rev. 0).	Exceptions listed in Section 3.9.2.5.	3.9.2.5.1

Document/Title	Regulatory Guide Disposition	Reference Section
Reg. Guide 1.68 - Preoperational and Initial Startup Test Programs for Water-Cooled Power Reactors (Rev. 0).	Adopted	14.0, TS B3.1.8
Reg. Guide 1.68.2 – Initial Startup Test Program to Demonstrate Remote Shutdown Capability for Water-Cooled Nuclear Power Plants (Rev. 1)	Partial compliance	4/6/79 letter to NRC
Reg. Guide 1.68.2 – Initial Startup Test Program to Demonstrate Remote Shutdown Capability for Water-Cooled Nuclear Power Plants (Rev. 1)	Partial compliance	4/6/79 letter to NRC
Reg. Guide 1.69 - Concrete Radiation Shields for Nuclear Power Plants (Rev. 0).	Adopted	
Reg. Guide 1.70 - Standard Format and Content of Safety Analysis Reports of Nuclear Power Plants (Rev. 1 and 3).	Adopted (Rev 1) Partial (Rev 3); Exceptions listed in Section 5.2.1.5	15.0 5.2.1.5
Reg. Guide 1.71 - Welder Qualification for Areas of Limited Accessibility (Rev. 0).	Exceptions listed in Section 5.2.3.6	5.2.3.6
Reg. Guide 1.72 - Spray Pond Plastic Piping (Rev. 0).	Not Applicable.	
Reg. Guide 1.73 - Qualification Tests of Electric Valve Operators Installed inside the Containment of Nuclear Power Plants (Rev. 0).	Adopted With Comment	3.11.2.1.4
Reg. Guide 1.74 - Quality Assurance Terms and Definitions (Rev. 0).	See DUKE-QAPD-001	17.0
Reg. Guide 1.75 - Physical Inde- pendence of Electric Systems (Rev. 1).	Not applicable to McGuire. Safety Evaluation Report for CP issued prior to 2/1/74.	1.8.27, 8.3.1.2.7.5

Document/Title	Regulatory Guide Disposition	Reference Section
Reg. Guide 1.76 - Design Basis Tornado for Nuclear Power Plants (Rev. 0).	Exceptions listed in Section 3.3.2.1.	3.3.2.1
Reg. Guide 1.82 - Water Sources For Long Term Recirculation Cooling Following A Loss-of-Coolant Accident (Rev. 0).	Exceptions listed in Section 6.5.2.	6.5.2
Reg. Guide 1.83 - Inservice Inspection of Pressurized Water Reactor Steam Generator Tubes (Rev. 1).	Adopted With Comment	TS 5.5.9
Reg. Guide 1.84 – Design and Fabrication Code Case Acceptability – ASME Section III, Division 1	Adopted With Comment	5.2.1.4
Reg. Guide 1.85 – Materials Code Case Acceptability – ASME Section III, Division 1	Adopted With Comment	5.2.1.4
Reg. Guide 1.88 – Collection, Storage, and Maintenance of Nuclear Power Plant Quality Assurance Records, Rev. 2 (Withdrawn)	See DUKE-QAPD-001	17.0
Reg. Guide 1.89 – Environmental Qualification of Certain Electric Equipment Important to Safety for Nuclear Power Plants. (Rev. 1)	Adopted for replacement equipment	3.11.2.1.4
Reg. Guide 1.91 – Evaluations of Explosions Postualted To Occur on Transportation Routes Near Nuclear Power Plants (Rev. 1)	Adopted	
Reg. Guide 1.92 – Combining Modal Responses and Spatial Components in Seismic Response Analysis	Partial compliance	3.7.3.4.2
Reg, Guide 1.93 – Availability of Electric Power Sources (Rev.0)	Adopted	TS B3.8.1, TS B3.8.4, TS B3.8.9

Document/Title	Regulatory Guide Disposition	Reference Section
Reg. Guide 1.94 – Quality Assurance Requirements for Installation, Inspection, and Testing of Structural Concrete and Structural Steel During the Construction Phase of Nuclear Power Plants (Rev. 1)	See DUKE-QAPD-001	17.0
Reg. Guide 1.97 – Instrumentation for Light-Water-Cooled Nuclear Power Plants To Assess Plant and Environs Conditions During and Following an Accident (Rev. 2)	Adopted With Comment	1.8.27, 1.11, 7.5.4.2, 17.1.3.1, TS B3.3.3
Reg. Guide 1.99 – Radiation Embrittlement of Reactor Vessel Materials (Rev. 2)	Adopted With Comment	5.2.4.3, TS 3.4.3
Reg. Guide 1.101 – Emergency Planning and Preparedness for Nuclear Power Reactors (Rev. 3)	Adopted	Emergency Plan
Reg. Guide 1.102 – Flood Protection for Nuclear Power Plants (Rev. 1)	Conforms	8/31/79 letter to NRC
Reg. Guide 1.108 – Periodic Testing of Diesel Generators Used as Onsite Electric Power Systems at Nuclear Power Plants, Rev. 1 (Withdrawn)	Partial compliance	SLC B16.8.3
Reg. Guide 1.109 – Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10 CFR Part 50, Appendix I (Rev. 1)	Adopted	11.2.9, 11.3.9, 11.6.2, 15.9.4, Table 15-17, SLC B16.11
Reg. Guide 1.111 – Cost-Benefit Analysis for Radwaste Systems for Light-Water-Cooled Nuclear	Adopted	SLC B16.11

Document/Title	Regulatory Guide Disposition	Reference Section
Power Reactors, Rev. 1 (for Comment)		
Reg. Guide 1.112 – Calculation of Releases of Radioactive Materials in Gaseous and Liquid Effluents from Light-Water-Cooled Power Reactors (Rev 0-R)	Adopted With Comment	11.3.6
Reg. Guide 1.113 – Estimating Aquatic Dispersion of Effluents from Accidental and Routine Reactor Releases for the Purpose of Implementing Appendix I, (Rev. 1)	Adopted With Comment	SLC B16.11.3
Reg. Guide 1.114 – Guidance to Operators at the Controls and to Senior Operators in the Control Room of a Nuclear Power Unit (Rev. 2)	Adopted	4/6/79 letter to NRC
Reg. Guide 1.115 - Rev 1 Protection Against Low-Trajectory Turbine Missiles	Adopted	4/6/79 letter to NRC, 3.5.1.2, 3.5.2.7, 10.2.3
Reg. Guide 1.116 – Quality Assurance Requirements for Installation, Inspection, and Testing of Mechanical Equipment and Systems (Rev. 0-R)	See DUKE-QAPD-001	17.0
Reg. Guide 1.118 – Periodic Testing of Electric Power and Protection Systems (Rev. 2)	Adopted	1.8.27
Reg. Guide 1.121 – Bases for Plugging Degraded PWR Steam Generator Tubes (for Comment)		5.2.1.10
Reg. Guide 1.122 – Development of Floor Design Response Spectra for Seismic Design of Floor – Supported Equipment or Components	Partial use	3/2/81 letter to NRC

Document/Title	Regulatory Guide Disposition	Reference Section
Reg. Guide 1.123 – Quality Assurance Requirements for Conrol of Procurement of Items and Services for Nuclear Power Plants, Rev. 1 (Withdrawn)	See DUKE-QAPD-001	17.0
Reg. Guide 1.127 – Inspection of Water-Control Structures Associated with Nuclear Power Plants (Rev.1)	Adopted With Comment	4/06/79 letter to NRC
	Deleted Per 2005 Update	Deleted Per 2005 Update
Reg. Guide 1.131 – Qualification Tests of Electric Cables, Field Splices, and Connections for Light-Water-Cooled Nuclear Power Plants (for Comment)	N/A	3.11.2.1.4
Reg. Guide 1.133 – Loose-Part Detection Program for the Primary System of Light-Water-Cooled Reactors (Rev. 1)	Adopted With Comment	7.7.1.12, SLC B16.7.4
Reg. Guide 1.137 – Fuel-Oil Systems for Standby Diesel Generators (Rev. 1)	Adopted With Exceptions Noted in Table 8-18	Table 8-18
Reg. Guide 1.143 – Design Guidance for Radioactive Waste Management Systems, Structures, and Components Installed in Light-Water-Cooled Nuclear Power Plants (Rev. 1)	Adopted	17.0
Reg. Guide 1.144 – Auditing of Quality Assurance Programs for Nuclear Power Plants, Rev. 1 (Withdrawn)	See DUKE-QAPD-001	17.0
Reg. Guide 1.146 – Qualification of Quality Assurance Program Audit Personnel for Nuclear Power Plants (Rev. 0)	See DUKE-QAPD-001	17.0

Document/Title	Regulatory Guide Disposition	Reference Section
Reg. Guide 1.147 – Inservice Inspection Code Case Acceptability – ASME Section XI, Division 1	Adopted	
Reg. Guide 1.149 –Nuclear Power Plant Simulation Facilitites for Use in Operator License Examinations (Rev. 1)	Adopted	1/4/91 letter to NRC
Reg. Guide 1.150 – Ultrasonic Testing of Reactor Vessel Welds During Preservice and Inservice Examinations (Rev. 1)	Adopted With Comment	ISI Program
Reg. Guide 1.152 – Criteria for Digital Computers in Safety Systems of Nuclear Power Plants (Rev. 0)	See DUKE-QAPD-001	17.0
Reg. Guide 1.155 - Station Blackout (Rev. 0)	Adopted	4/17/89 letter to NRC
Reg. Guide 1.163 – Performance Based Containment Leak – Test Program	Adopted With Comment	TS 5.5.2, 1/13/97 letter to NRC
Reg. Guide 1.181 - Content of the Updated Final Safety Analysis Report in accordance with 10 CFR 50.71(e) (September 1999)	Adopted	NA
Reg. Guide 1.183 - Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors (Rev. 0)	Adopted for FHA (except tornado missile accident)	15.7.4.1.2, 15.7.4.2.2, 15.7.4.3.2, Tables 15-35, TS B3.7.13 and TS B3.9.7
Reg. Guide 1.205 Risk-Informed Performance-Based Fire Protection for Existing Light-Water Nuclear Power Plants (December 2009)	Adopted	9.5.1

Table 1-5. Piping and Instrumentation Diagrams

System	Flow Diagram	Figure	Rev. No.
Reactor Coolant System	MCSF-1553.NC-01	5-1	2
Residual Heat Removal System	MCSF-1561.ND-01	5-28	4
Symbols for Flow Diagrams	MCFD-1550-01.00	6-1 (1)	9
Symbols for Flow Diagrams	MCFD-1550-01.01	6-1 (2)	1
Symbols for Flow Diagrams	MCFD-1550-02.00	6-1 (3)	3
Symbols and System Abbreviations for Flow Diagrams	MCFD-1550-03.00	6-2	4
Index for Flow Diagrams	MCFD-1550-04.00	6-3	19
Cont. Air Return Exchange and Hydrogen Skimmer	MCSF-1557.VX-01	6-107	2
Annulus Ventilation System	MCSF-1564.VE-01	6-169	1
Safety Injection System	MCSF-1562.NI-01	6-176	4
Safety Injection System	MCSF-1562.NI-02	6-177	1
Control Area Chilled Water System	MCSF-1618.YC-01	6-188	2
Control Area Chilled Water System	MCSF-1618.YC-02	6-189	2
Control Area Chilled Water System	MCFD-1618-03.00	6-190	9
Control Area Ventilation System	MCSF-1578.VC-01	6-191	4
Containment Spray System	MCSF-1563.NS-01	6-194	5
Spent Fuel Cooling System	MCSF-1570.KF-01	9-13	2
Recirculated Cooling Water System	MCFD-1600-01.00	9-25	3
Recirculated Cooling Water System	MCFD-1600-01.01	9-26	6
Recirculated Cooling Water System	MCFD-1600-02.00	9-27	4
Recirculated Cooling Water System	MCFD-1600-02.01	9-28	8
	MCFD-2600-02.01	9-28	7
Recirculated Cooling Water System	MCFD-1600-02.02	9-29	2
Recirculated Cooling Water System	MCFD-1600-03.00	9-30	4
Nuclear Service Water System	MCSF-1574.RN-01	9-31	8
Conventional Low Pressure Service Water System	MCFD-1575-01.00	9-54	28
Conventional Low Pressure Service Water System	MCFD-1575-02.00	9-55	3

System	Flow Diagram	Figure	Rev. No.
Conventional Low Pressure Service Water System	MCFD-1575-03.00	9-56	16
Component Cooling System	MCSF-1573.KC-01	9-57	2
Refueling Water System	MCSF-1571.FW-01	9-65	5
Filtered Water System	MCFD-1601-01.00	9-66	9
Filtered Water System	MCFD-1601-01.01	9-67	5
Filtered Water System	MCFD-1601-01.02	9-68	7
Makeup Demineralized Water System	MCFD-1601-02.00	9-69	11
Makeup Demineralized Water System	MCFD-1601-02.01	9-70	7
Makeup Demineralized Water System	MCFD-1601-02.02	9-71	9
Makeup Demineralized Water System	MCFD-1601-02.03	9-72	14
Makeup Demineralized Water System	MCFD-1601-02.04	9-73	8
Makeup Demineralized Water System	MCFD-1601-02.05	9-74	15
Makeup Demineralized Water System	MCFD-1601-02.06	9-75 (1 of 2)	11
Makeup Demineralized Water System	MCFD-1601-02-07	9-75 (2 of 2)	5
Drinking Water System	MCFD-1601-03.00	9-76	6
Conventional Waste Water Treatment System	MCSF-1583.WC-01	9-77	8
Instrument Air System	MCSF-1605.VI-01	9-79	10
Station Air System	MCSF-1605.VS-01	9-83	0
Nuclear Sampling System	MCSF-1572.NM-01	9-90	3
Nuclear Sampling System	MCSF-1572.NM-02	9-91	1
Nuclear Sampling System	MCSF-1572-NM-03	9-92	2
Chemical and Volume Control System	MCSF-1554.NV-02	9-96	1
Chemical and Volume Control System	MCSF-1554.NV-01	9-98	8
Boron Thermal Regeneration System	MCSF-1555.NR-01	9-107	0
Boron Thermal Regeneration System	MCSF-1555.NR.02	9-108	0
Deleted Per 2012 Update			
Boron Recycle System	MCSF-1556.NB-01	9-110	1
Auxiliary Building Ventilation System	MCSF-1577.VA-01	9-117	3
Auxiliary Building Ventilation System	MCSF-1577.VA-02	9-118	1

System	Flow Diagram	Figure	Rev. No.
Auxiliary Building Ventilation System	MCSF-1577.VA-03	9-119 (1)	2
Auxiliary Building Ventilation System	MCSF-1577.VA-04	9-119 (2)	0
Turbine Building Ventilation System	MC-1614-01.00	9-120	5
Conventional Purge and Ventilation System	MCSF-1576.VP-01	9-121	2
Diesel Building Ventilation System	MCSF-1579.VD-01	9-123	1
Fire Protection System	MCSF-1599.RF-01	9-124	5
Fire Protection System	MCSF-1599.RF-02	9-125	0
Diesel Generator Engine “1A” Fuel Oil System	MCSF-1609.FD-01	9-139	1
Diesel Generator Engine Cooling Water System	MCSF-1609.KD-01	9-141	1
Diesel Generator Engine Starting Air System	MCSF-1609.VG-01	9-143	4
Diesel Generator Engine Lube Oil System	MCSF-1609.LD-01	9-144	1
Groundwater Drainage System	MCSF-1581.WZ-01	9-146	1
Diesel Generator Engine Crankcase Vacuum System	MCSF-1609.ZD-01	9-147	1
Diesel Generator Room Sump Pump System	MCSF-1609.WN-01	9-148	2
Diesel Generator Engine Air Intake & Exhaust System	MCSF-1609-VN.01	9-149	1
Containment Air Release and Addition System	MCSF-1585.VQ-01	9-150	2
Moisture Separator Reheater Bleed System	MCFD-1594-01.00	10-3	18
Moisture Separator Reheater Bleed System	MCFD-1594-01.01	10-4	12
Heater Bleed Steam System	MCFD-1594-02.00	10-5	9
Heater Bleed Steam System	MCFD-1594-02.01	10-6	3
Heater Bleed Steam System	MCFD-1594-02.02	10-7	2
Heater Bleed Steam System	MCFD-1594-02.03	10-8	3
Heater Bleed Steam System	MCFD-1594-02.04	10-9	3
Main Steam System Main Steam Vent to Atmosphere System	MCSF-1593.SM-01	10-11	4
Main Steam Supply to Aux. Equip. System Turbine Exhaust System	MCSF-1593.SA-01	10-13	1

System	Flow Diagram	Figure	Rev. No.
Steam Supply to FDWP Turbine System Turbine Exhaust System	MCFD-1593-02.00	10-16	9
Main Steam Bypass to Condenser System	MCFD-1593-02.01	10-17	6
Main Condenser 1A Connections Condensate System	MCFD-1612-01.00	10-18	5
Main Condenser 1B Connections Condensate System	MCFD-1612-02.00	10-19	2
Main Condenser 1C Connections Condensate System	MCFD-1612-03.00	10-20	4
FDW Pump Turbine Condenser 1A & 1B Connections	MCFD-1612-04.00	10-21	2
Main Vacuum System	MCFD-1598-01.00	10-22	4
Vacuum Priming System	MCFD-1598-01.01	10-23	7
Condenser Steam Air Ejector System	MCFD-1598-01.02	10-24	7
Condenser Steam Air Ejector System	MCFD-1598-01.03	10-25	10
Main Turbine Leakoff and Steam Seal System	MCFD-1608-01.00	10-26	12
FDW Pump Turbine Steam Seal System	MCFD-1608-02.00	10-27	3
Condenser Circulating Water System	MCFD-1604-01.00	10-28	15
Containment Ventilation Cooling Water System	MCSF-1604.RV-01	10-29	4
Condensate System	MCFD-1590-01.00	10-37	9
Condensate System	MCFD-1590-01.01	10-38	6
Condensate System	MCFD-1590-01.02	10-39	4
Condensate System	MCFD-1590-01.03	10-40	5
Condensate System	MCFD-1590-01.04	10-41	6
Condensate System	MCFD-1590-01.05	10-42	9
Condensate System	MCFD-1590-01.06	10-43(1)	4
Condensate System	MCFD-1590-01.07	10-43(2)	0
Condensate Storage System	MCFD-1590-02.00	10-44	12
Feedwater System	MCSF-1591.CF-01	10-45	2
Auxiliary Feedwater System	MCSF-1592.CA-01	10-47	9
System Generator Blowdown System	MCSF-1580.BB-01	10-51	4

System	Flow Diagram	Figure	Rev. No.
Deleted Per 2002 Update			
Deleted Per 2002 Update			
Heater Drain System	MCFD-1596-01.00	10-54	5
Heater Drain System	MCFD-1596-01-01	10-55	9
Heater Drain System	MCFD-1596-02.00	10-56	3
Heater Drain System	MCFD-1596-02.01	10-57	7
Moisture Separator Reheater Drain System	MCFD-1596-03.00	10-58	5
Moisture Separator Reheater Drain System	MCFD-1596-03.01	10-59	5
Moisture Separator Reheater Drain System	MCFD-1596-04.00	10-60	7
Moisture Separator Reheater Drain System	MCFD-1596-04.01	10-61	3
Moisture Separator Reheater Drain System	MCFD-1596-05.00	10-62	6
Moisture Separator Reheater Drain System	MCFD-1596-05.01	10-63	3
Liquid Waste Recycle System	MCSF-1565.WL-01	11-1	2
Equipment Decontamination System	MCFD-1568-01.00	11-11	5
Waste Gas System	MCSF-1567.WG-01	11-15	2
Waste Gas System	MCSF-1567.WG-02	11-18	1
Nuclear Solid Waste Disposal System	MCSF-1566.WS-01	11-22	2

Table 1-6. Regulatory Guide 1.97, Rev. 2 Review

Format for Comparison Table		
B-16 C-15	Variable:	This is the variable as listed in Table 2 of RG 1.97, Rev. 2. (The Duke variable name may be shown parenthetically.) This gives the Table 2 of RG 1.97, Rev. 2 variable type and sequence number. Type A variables are those listed in Section 1.11.5.1.1 of the UFSAR.
	Range:	This is the Table 2 of RG 1.97, Rev. 2 listed range.
	RG1.97 Recommended Category:	This is the Table 2 of RG 1.97, Rev. 2 listed category.
	DPC Category:	This is the Duke Energy position for the variable's category for McGuire Nuclear Station.
	Existing Design:	This a description of the present McGuire design for the instrumentation.
	Compliance:	This a statement concerning compliance to Duke's interpretation of the recommendations of RG 1.97, Rev. 2.
	Display:	This lists the Control Room indications available to the operator that Duke Power takes credit for in meeting the recommendations of RG 1.97, Rev. 2. Other control room indications may exist for the recommendations of RG 1.97, Rev. 2.
	Position:	This is a statement regarding the instruments' adequacy for the intended monitoring function and lists any necessary changes to the existing design.
A-1, B-7, B-11, C-4, C-9	Variable:	RCS Pressure
	Range:	0 to 3000 psig
	RG1.97 Recommended Category:	1
	DPC Category:	1

	Existing Design:	McGuire has two redundant, QA Condition 1 channels of Wide Range RCS pressure instrumentation. Each transmitter feeds a different channel of the PCS and is powered by that channel's associated Class 1E buss. QA Condition 1 indication is provided by two qualified redundant displays in the Control Room. The indicated range is 0 to 3000 psig. The two redundant QA1 channels of Wide Range RCS Pressure instrumentation also provide inputs to two additional indicators on the Main Control Board. These two indicators do not meet all of the Design and Qualification Criteria for Category 1 instrumentation. Redundant/Diverse indication is provided by control grade RCS pressure instrumentation provided for the standby shutdown facility, as well as the QA Condition 1 pressurizer pressure instrumentation. Environmental qualification is described in the McGuire Nuclear Station FSAR, Section 3.11 and the NUREG 0588 submittal. Seismic qualification is described in the McGuire FSAR, Section 3.10 and Section 1.11.5.1.3.11.
	Compliance:	This instrumentation is in compliance with Duke's interpretation of RG 1.97, Rev. 2 as clarified in McGuire FSAR Section 1.11.5.
	Display:	Two qualified redundant displays in the Control Room (ICCM only). One channel recorded.
	Position:	The recorded channel was isolated from the plant computer by NSM MG-12349 and MG-22349. The instrumentation is adequate for the intended monitoring function.
A-2, B-8, C-1	Variable:	Core Exit Temperature
	Range:	32°F to 2300°F
	RG1.97 Recommended Category:	1
	DPC Category:	1

	Existing Design:	The QA Condition 1 Core-Exit Thermocouple System for accident monitoring consists of two qualified redundant channels of 20 thermocouples each. The primary displays associated with the thermocouples consist of two qualified redundant plasma graphic displays. The backup display is from the plant computer work station. Inputs to the plant computer are through qualified Class 1E isolation devices. Power for the Class 1E portion of the system is from Class 1E buses, and power for the non-safety portion is from a highly reliable regulated control bus. Redundancy/diversity is provided by the Hot and Cold Leg RCS temperature instrumentation. Environmental qualification for the Class 1E portion is per the McGuire Nuclear Station FSAR, Section 3.11 and the NUREG-0588 submittal. Seismic qualification is described in the McGuire FSAR, Section 3.10 The existing incore thermocouples are environmentally and seismically qualified as allowed by NUREG 0737 II.F.2 Attachment 1. The plasma displays and the plant computer are installed in a mild environment. The range of the system is 32°F to 2300°F.
	Compliance:	This instrumentation is in compliance with Duke's interpretation of RG 1.97, Rev. 2 as clarified in McGuire FSAR Section 1.11.5.
	Display:	Primary displays are the two qualified redundant plasma graphic displays in the Control Room. Backup display is from the plant computer CRTs in the Control Room.
	Position:	The instrumentation is adequate for the intended monitoring function.
A-3, B-5	Variable:	RCS Hot Leg Water Temperature
	Range:	50°F to 750°F
	RG1.97 Recommended Category:	1
	DPC Category:	1

	Existing Design:	Each of the four reactor coolant loops employs a QA Condition 1 Hot Leg Water Temperature measurement (T_h). Two of the T_h instruments feed into one RVLIS channel and are powered from the associated Class 1E buss. The other two T_h instruments feed into a redundant PCS channel and are powered by that channel's Class 1E buss. The control board display devices (recorders) have dedicated output isolation devices. The indicated range is 0°F to 700°F. The environmental qualification of this instrumentation is described in the McGuire Nuclear Station FSAR, Section 3.11 and the NUREG 0588 submittal. The seismic qualification is described in the McGuire FSAR, Section 3.10 and Section 1.11.5.1.3.11 Redundancy/diversity is provided by monitoring T_h on all four loops along with monitoring of T_c on all four loops and monitoring of incore thermocouples.
	Compliance:	The existing design does not fully comply with the recommendation of RG 1.97, Rev. 2 because the range does not conform to RG 1.97, Rev. 2 range of 50°F to 750°F.
	Display:	Two Control Room Indicators (ICCM) Four loops recorded
	Position:	The range of the installed instrumentation is adequate for the intended monitoring function. No range change is required as the installed range is adequate for a Westinghouse NSSS System. Also note, the present range meets the recommendation of RG 1.97, Rev. 3. The recorders for this variable were isolated from the plant computer by NSM MG-12349 and MG-22349.
A-4, B-4, B-6	Variable:	RCS Cold Leg Water Temperature
	Range:	50°F to 750°F
	RG1.97 Recommended Category:	1
	DPC Category:	1

	Existing Design:	Each of the four reactor coolant loops employs a QA Condition 1 Cold Leg Water Temperature measurement (T_c). All four T_c's feed into the same qualified channel of the PCS and are powered by that channel's Class 1E buss. The indicated range is 0°F to 700°F. Environmental qualification is described in the McGuire Nuclear Station FSAR, Section 3.11 and the NUREG 0588 submittal. Seismic qualification is described in the McGuire FSAR, Section 3.10 and Section 1.11.5.1.3.11. Additional redundancy/diversity is provided by the Hot Leg Water Temperature (T_h) instruments, the incore thermocouples, and steam pressure indication.
	Compliance:	The existing design is not in full compliance with RG 1.97, Rev. 2 in the following areas: 1) the instrumentation is not totally redundant, and 2) the range does not conform to RG 1.97, Rev. 2 recommendations.
	Display:	Four loops recorded on two recorders
	Position:	Redundancy/diversity is provided by the Hot Leg RTDs, the incore thermocouples and steam pressure instrumentation. No range change is required as the installed range is adequate for Westinghouse NSSS Systems. Also note, the present range meets the recommendation of RG 1.97, Rev. 3.
A-5, D-11	Variable:	Pressurizer Level
	Range:	Bottom to Top
	RG1.97 Recommended Category:	1
	DPC Category:	1
	Existing Design:	This station has three redundant, QA Condition 1 channels of pressurizer level instrumentation. Each transmitter feeds a different channel of the PCS and is powered by that channel's associated Class 1E buss. Each indicator channel and associated input to the recorder have PCS output isolation devices. The indicated range is 0% to 100% corresponding to an approximate volume of 5% to 95%. Environmental qualification is described in the McGuire Nuclear Station FSAR, Section 3.11 and in the NUREG 0588 submittal. Seismic qualification is described in the McGuire FSAR, Section 3.10 and Section 1.11.5.1.3.11.
	Compliance:	The range of the instrumentation is slightly less than the recommendation of RG 1.97, Rev. 2.
	Display:	Three Control Room indicators (one per channel) One channel recorded

	Position:	The installed range of the instrumentation is consistent with Westinghouse NSSS requirements and Duke considers this instrumentation range to be adequate for the intended monitoring function.
A-6, B-10	Variable:	Degrees of Subcooling
	Range:	200°F Subcooling to 35°F Superheat
	RG1.97 Recommended Category:	2
	DPC Category:	2
	Existing Design:	This variable is a computer (ICCM and plant computer) calculated value using various inputs from the Primary System. A graphic display over the required range gives the operator a representation of primary system conditions compared to various curves of importance (saturation, NDT, etc.). The ICCM is a fully qualified, redundant, Class 1E display. The plant computer is powered by highly reliable battery backed control power. The computer processing and display are located in a mild environment. Primary inputs to this graphic display are provided from QA Condition 1 instruments which have been isolated for input to the plant computer. Additional inputs of lesser qualification are used, when available and within valid ranges, to provide additional accuracy. A procedure to manually calculate sub-cooling margin, using these instruments for information, exists as a backup to the graphic displays.
	Compliance:	This instrumentation is in compliance with Duke's interpretation of RG 1.97, Rev. 2 as clarified in McGuire FSAR Section 1.11.5.
	Display:	Inadequate Core Cooling Monitor (ICCM) Control Room - Computer graphic on demand
	Position:	The installed instrumentation is adequate for the intended monitoring function.
A-7	Variable:	Steam Generator Narrow Range Level
	Range:	0-100%
	RG1.97 Recommended Category:	1
	DPC Category:	1

	Existing Design:	The station has four redundant, QA Condition 1 channels of Steam Generator Narrow Range Level per Steam Generator. Instrumentation is powered by Class 1E busses. Each indicator channel and associated input to the recorder have PCS output isolation devices. The indicated range is 0 to 100% corresponding to 427 " above the tube-sheet to the separators (or, approximately 70 to 100% of the wide range scale). Environmental qualification is described in the McGuire Nuclear Station FSAR, Section 3.11 and the NUREG 0588 submittal. Seismic qualification is described in the McGuire FSAR, Section 3.10 and Section 1.11.5.1.3.11.
	Compliance:	The instrumentation is in compliance with Duke's interpretation of RG 1.97, Rev.2 as clarified in McGuire FSAR Section 1.11.5.
	Display:	All channels are indicated in the Control Room (16 indicators) Four channels recorded (one per Steam Generator).
	Position:	The recorder and unisolated indicator channels were isolated from the plant computer by NSM MG-12349 and MG-22349.
A-8, D-17	Variable:	Steam Line Pressure
	Range:	Atmospheric pressure to 20% above lowest safety valve setting.
	RG.197 Recommended Category:	1
	DPC Category:	1
	Existing Design:	Each steam generator has two redundant, QA Condition 1 channels of steam generator pressure instrumentation. Each transmitter feeds a different channel of the PCS and is powered by that channel's Class 1E buss. The indicated range is 0 to 1300 psig corresponding to 11% above the lowest safety valve setting and 6% above the highest safety valve setting. The instrumentation is located in a mild environment. Seismic qualification is described in the McGuire FSAR, Section 3.10 and Section 1.11.5.1.3.11.
	Compliance:	The range is not in compliance with the recommendation of RG 1.97 Rev. 2.
	Display:	Per Steam Generator: Two Control Room indicators One channel recorded
	Position:	Maximum system pressure during the worst postulated loss of heat sink accident is 1304 psig. Thus the range of the installed instrumentation is adequate for the McGuire design.

A-9, D-8	Variable:	Refueling Water Storage Tank Level
	Range:	Top to Bottom
	RG 1.97 Recommended Category:	1
	DPC Category:	1
	Existing Design:	The instrumentation for this variable provides continuous display of refueling water storage tank level. Three separate, QA Condition 1 channels provide redundant indication of tank level from 0 to 500 inches. Each channel is powered by a separate Class 1E bus. These instruments are located in a mild environment. The QA1 instruments are seismically qualified in accordance with the criteria of the McGuire FSAR Section 3.10
	Compliance:	This instrumentation is in compliance with Duke's interpretation of RG 1.97, Rev. 2 as clarified in McGuire FSAR Section 1.11.5.
	Display:	QA1: Three Control Room indicators One channel recorded 2/3 Control Room Annunciator alarm
	Position:	The installed instrumentation is adequate for the intended monitoring function.
A-10	Variable:	Containment Spray HX RN Flow
	Range:	0 to 5000 GPM
	RG 1.97 Recommended Category:	1
	DPC Category:	1

	Existing Design:	QA Condition 1 instrumentation is provided in each of two redundant trains of Nuclear Service Water to indicate cooling water flow through the respective train's Containment Spray Heat Exchanger. The receiver gauge's indicated range is 0 to 5000 gpm. Required minimum flows are listed in Table 9-8. Each train of instrumentation is powered by a separate Class 1E buss. Each train of instrumentation also provides flow signal inputs to the plant computer through qualified Class 1E isolation devices. The computer performs a periodic logging function. The plant computer is powered by highly reliable battery backed control power. The instrumentation is located in a mild environment with the exception of a pipe rupture. However, the instrumentation is not required to mitigate the consequences of the pipe rupture. Seismic qualification is described in the McGuire UFSAR, Section 3.10 and Section 1.11.5.1.3.1.
	Compliance:	This instrumentation is in compliance with Duke's interpretation of RG 1.97, Rev. 2 as clarified in McGuire UFSAR Section 1.11.5.
	Display:	Two Control Room indicators Two channels periodically logged on computer
	Position:	The installed instrumentation is adequate for the intended monitoring function.
A-11	Variable:	Diesel Generator Cooling Water HX RN Flow
	Range:	0 to 1500 GPM
	RG 1.97 Recommended Category:	1
	DPC Category:	1
	Existing Design:	QA Condition 1 instrumentation is provided in each of two redundant trains of Nuclear Service Water to indicate cooling water flow through the respective train's Diesel Generator Cooling Water Heat Exchanger. The receiver gauge's indicated range is 0 to 1500 gpm. Required minimum flows are listed in Table 9-8. Each train of instrumentation is powered by a separate Class 1E buss. Each train of instrumentation also provides flow signal inputs to the plant computer through qualified Class 1E isolation devices. The computer performs a periodic logging function. The plant computer is powered by highly reliable battery backed control power. The instrumentation is located in a mild environment. Seismic qualification is described in the McGuire UFSAR, Section 3.10 and Section 1.11.5.1.3.1.

	Compliance:	This instrumentation is in compliance with Duke's interpretation of RG 1.97, Rev. 2 as clarified in McGuire UFSAR Section 1.11.5.
	Display:	Two Control Room indicators Two channels periodically logged on computer
	Position:	The installed instrumentation is adequate for the intended monitoring function.
B-1	Variable:	Neutron Flux
	Range:	10^{-8} to 200% Full Power
	RG 1.97 Recommended Category:	1
	DPC Category:	1
	Existing Design:	There are two complete channels of full range neutron flux instrumentation that are QA Condition 1 Class 1E and fully qualified environmentally and seismically for post-accident monitoring. Each loop consists of a detector, signal processor, control room receiver gauge and a computer point. One channel also includes a control room recorder. Inputs to the plant computer are provided with qualified Class 1E isolation. The instrumentation is powered by Class 1E buses. The receiver gauges, the recorders and the plant computer are installed in a mild environment. The range of the system is 10^{-8}% to 200% power.
	Compliance:	The instrumentation is in compliance with Duke's interpretation of RG 1.97, Rev. as clarified in McGuire FSAR Section 1.11.5.
	Display:	Two Control Room meters One channel recorded
	Position:	The instrumentation is adequate for the intended monitoring function.
B-2	Variable:	Control Rod Position
	Range:	Full in or not full in
	RG 1.97 Recommended Category:	3
	DPC Category:	3
	Existing Design:	Each control rod's position is indicated on a digital display. The indicated range is Full In to Full Out in 42 increments.

	Compliance:	This instrumentation is in compliance with Duke's interpretation of RG 1.97, Rev. 2 as clarified in McGuire FSAR Section 1.11.5.
	Display:	A Control Room digital display indicating all control rods
	Position:	The installed instrumentation is adequate for the intended monitoring function.
B-3	Variable:	RCS Soluble Boron Concentration
	Range:	0 to 6000 ppm
	RG 1.97 Recommended Category:	3
	DPC Category:	3
	Existing Design	This variable is monitored by sampling and laboratory analysis. Sampling frequency is determined by plant conditions and operating procedures.
	Compliance	The existing design is in compliance with Duke's interpretation of Regulatory Guide 1.97, Revision 2 as clarified by letter Duke Power to NRC, November 18, 1993.
	Display	Not Applicable
	Position:	Evaluation of available equipment and the use of sampling and laboratory analysis has been determined to be adequate for the intended function as clarified by letter Duke Energy to NRC, November 18, 1993.
B-9	Variable:	Coolant Level in Reactor
	Range:	Core bottom to vessel top
	RG1.97 Recommended Category:	1
	DPC Category:	1

	Existing Design:	This system consists of two redundant QA Condition 1 channels powered from Class 1E busses. Each channel contains the necessary equipment to calculate vessel level or relative void content of the primary coolant. Instrument taps will be located at the head vent, hot legs and the seal table for narrow and wide range level transmitters. RTDs on the impulse lines for these transmitters are used to compensate for temperature variations between these impulse lines in containment. This instrumentation will be used to detect the presence of a gas bubble or void in the reactor vessel, detect the approach to inadequate core cooling (ICC) and indicate void formation in the RCS during forced flow conditions. Environmental qualification is described in the McGuire Nuclear Station NUREG 0588 submittal. The instrumentation is seismically qualified in accordance with the the criteria of the McGuire FSAR Section 3.10
	Compliance:	This instrumentation is in compliance with Duke's interpretation of RG 1.97, Rev. 2 as clarified in McGuire FSAR Section 1.11.5.
	Display:	One Control Board Indicator (ICCM) per channel: 1. Upper head level (64 to 120%) 2. Narrow range level (0 to 70%) 3. Wide range level (0 to 120%) One channel recorded
	Position:	The installed instrumentation is adequate for the intended monitoring function.
B-12, C-6	Variable:	Containment Sump Water Level Narrow Range (Containment Floor and Equipment Sumps)
	Range:	Narrow Range Level
	RG 1.97 Recommended Category:	2
	DPC Category:	3
	Existing Design:	Two instruments monitor the containment sump water level from 5 to 23 inches depth in the sump. The instrumentation is powered from an auxiliary buss. Qualified backup indication is provided by the Wide Range Sump Level Instrumentation.
	Compliance:	This instrumentation is not in compliance with the RG 1.97, Rev. 2 recommendations for environmental qualification.
	Display:	Two indicators in the Control Room

	Position:	Instrumentation is adequate for the intended monitoring function. The wide range sump level instruments provide primary indication of post accident containment sump level. The level of environmental qualification provided for the narrow range sump level instrumentation is consistent with performance expectations and meets the recommendations of Category 3 in Duke's interpretation of RG 1.97, Rev. 2 as clarified in McGuire FSAR Section 1.11.5.
B-12, C-6	Variable:	Containment Sump Water Level
	Range:	Wide Range (bottom of containment to 600,000 gal. level)
	RG1.97 Recommended Category:	1
	DPC Category:	1
	Existing Design:	Two redundant, QA Condition 1 level transmitters measure containment sump water level from the bottom of containment to approximately the 1,000,000 gal. level. The indicated range is 0 to 20 feet. Also, two redundant, QA Condition 1 level switches are provided for both ECCS and containment spray swap to sump. Redundancy/diversity is provided by the Refueling Water Storage Tank Level instrumentation and the narrow range sump level instrumentation. The instruments are powered by Class 1E busses. Environmental qualification is described in the McGuire Nuclear Station FSAR, Section 3.11 and the NUREG 0588 submittal. The instrumentation is seismically qualified in accordance with the criteria of the McGuire FSAR Section 3.10
	Compliance:	This instrumentation is in compliance with Duke's interpretation of RG 1.97, Rev. 2 as clarified in McGuire FSAR Section 1.11.5.
	Display:	Two Control Room indicators for wide range level indication, plus two Control Room annunciators for both ECCS and NS swap to sump. One channel recorded for wide range level.
	Position:	The installed instrumentation is adequate for the intended monitoring function.
B-13, B-15, C-5, C-11	Variable:	Containment Pressure
	Range:	-5 to 60 psig
	RG1.97 Recommended Category:	1

	DPC Category:	1
	Existing Design:	This station has two redundant QA Condition 1 wide range channels and two intermediate range channels of instrumentation for monitoring containment pressure. This instrumentation is powered by Class 1E busses. The wide range indication is -5 to 60 psig, the intermediate range -5 to 20 psig. Environmental qualification is described in the NUREG0588 submittal. The instrumentation is seismically qualified in accordance with the criteria of the McGuire UFSAR Section 3.10.
	Compliance:	This instrumentation is in compliance with Duke's interpretation of RG 1.97, Rev. 2 as clarified in McGuire FSAR Section 1.11.5.
	Display:	Two wide range Control Room indicators, two intermediate range indicators. One wide range channel recorded, one intermediate range recorded.
	Position:	The installed instrumentation is adequate for the intended monitoring function.
B-14	Variable:	Containment Isolation Valve Position
	Range:	Closed - Not Closed
	RG1.97 Recommended Category:	1
	DPC Category:	1
	Existing Design:	All remote operated, active containment isolation valves provided with control switches on the main control boards have actual valve position provided by QA Condition 1 limit switches on the valves which operate both Closed-Not Closed, and Open-Not Open control switch indicating lights. These valves and their control switch indicating lights are powered by Class 1E busses. Redundancy is not necessary on a per valve basis since redundant barriers are provided for all fluid penetrations as discussed in the McGuire FSAR, Section 6.2.4. Environmental qualification of the limit and reed switches is described in the FSAR, Section 3.11 and the NUREG 0588 submittal. Seismic qualification of the limit and reed switches is described in the McGuire FSAR, Section 3.10
	Compliance:	This instrumentation is in compliance with Duke's interpretation of RG 1.97, Rev. 2 as described in McGuire FSAR Section 1.11.5.
	Position:	The installed instrumentation is adequate for the intended monitoring function

	Display:	Control Room control switch indicating lights Computer points
C-2	Variable:	Radiation Level in Primary Coolant
	Range:	1/2 Tech Spec limit to 100 times Tech Spec limit.
	RG1.97 Recommended Category:	1
	DPC Category:	Not Applicable
	Existing Design:	McGuire has one channel of primary coolant radiation level instrumentation. This channel is powered from a highly reliable battery backed buss. The indicated range is 10^1 to 10^7 counts per minute corresponding to 10^{-2} to 10^3 μCi/ml Ba-133.
	Compliance:	This monitor was not installed as a Category 1 (QA Condition 1) instrument. RG 1.97, Rev. 2 range is not met.
	Display:	One Control Room indicator One channel recorded
	Position:	This monitor was not installed to quantify accident conditions and cannot be assured flow following an accident. Information for this variable is obtained by sampling and analysis which is considered adequate for the intended monitoring function.
C-3, E-18, E-19	Variable:	Analysis of Primary Coolant Accident Sampling Capability, Primary Coolant and Sump, Containment Air
	Range:	10 μCi/gm to 10 Ci/gm or TID 14844 source term in coolant volume Grab Sample
	RG 1.97 Recommended Category:	3
	DPC Category:	3
	Existing Design:	The existing design of the sampling system for the primary coolant, the containment sump (sample taken from RHR pump discharge) and containment air allows samples to be taken for laboratory analysis. Capabilities for making the recommended measurements are provided. Information concerning the laboratory equipment available for radiological analysis is contained in the McGuire FSAR, Section 12.3.2.

	Compliance:	This instrumentation is in compliance with Duke's interpretation of RG 1.97, Rev. 2 as clarified in McGuire FSAR Section 1.11.5.
	Display:	Not Applicable.
	Position:	Available equipment is adequate for the intended analyses.
C-7, E-1	Variable:	Containment Area Radiation - High Range
	Range:	1 to 10^8 R/hr
	RG 1.97 Recommended Category:	1
	DPC Category:	1
	Existing Design:	McGuire has two redundant QA Condition 1 channels of containment high range radiation instrumentation. Each channel is powered by a Class 1E Bus. The indicated range is 1 to 10^8 R/hr. Diversity is provided by portable instrumentation or sampling and analysis. Environmental qualification is described in the McGuire Nuclear Station UFSAR, Section 3.11 and in the NUREG 0588 Submittal. The instrumentation is seismically qualified in accordance with the criteria of the McGuire UFSAR Section 3.10
	Compliance:	Duke procured and installed seismically and environmentally qualified radiation monitors. Duke considers all aspects of this instrumentation to be in compliance with the recommendations of RG 1.97 Rev. 2 as clarified in McGuire UFSAR Section 1.11.5.
	Display:	Two Control Room indicators (one per channel) One channel recorded
	Position:	The qualification aspect of this installed monitoring system has been thoroughly evaluated and has been found to be in full compliance with the requirements of RG1.97 Rev. 2. The bullets below are for system clarification and completed evaluation of IN 97-45, Thermally Induced Current (TIC), effects. • System Clarification: Radiation instrumentation indication level consists of the instrument's keep alive source and actual containment radiation level measured. • IN 97-45: TIC effects on the radiation instrumentations were evaluated to have minimal impact at the lower reading for a limited amount of time, and do not affect the instrumentations ability to perform RG 1.97 Rev. 2 functions.

C-8, E-6, C-12, C-14, E-3, E-4, E-5, E-9	Variable:	Condenser Air Ejector Effluent Radioactivity Containment Effluent Radioactivity Effluent Radioactivity (from buildings in contact with the containment) Containment Purge Effluent Radioactivity Annulus Effluent Radioactivity Auxiliary Building Effluent Radioactivity Other Identified Release Point
Effluent Radioactivity		
	Range:	Various - from 10^{-6} to 10^{-2} µCi/cc to 10^{-6} to 10^{5} µCi/cc
	RG 1.97 Recommended Category:	2
	DPC Category:	Not Applicable
	Existing Design:	Airborne process radiation monitors exist for monitoring ventilation exhausts and the condenser air ejector exhaust (see the McGuire FSAR, Section 11.4 and Table 11-28). However, in accordance with RG 1.97. Rev. 2 these monitors are not required for accident monitoring due to the fact that ventilation systems and the condenser air ejector exhaust to the common unit vent (see variable sheet E-7 on the unit vent radiation monitor).
	Compliance:	Not Applicable.
	Display:	Not Applicable.
	Position:	Individual radiation monitors are not needed for compliance to the recommendations of RG 1.97, Rev. 2 due to effluents exhausting to the common unit vent.
C-10	Variable:	Containment Hydrogen Concentration
	Range:	0 to 30% Hydrogen
	RG 1.97 Recommended Category:	1
	DPC Category:	3

	Existing Design:	Two redundant channels of QA Condition 1 instrumentation monitor containment hydrogen concentration. The indicated range is from 0 to 30% concentration. Both channels are powered by Class 1E busses. These instruments are installed in a mild environment. The instrumentation is seismically qualified in accordance with the criteria of McGuire FSAR Section 3.10 Diversity and backup is provided by manual sampling and analysis. The instrumentation is no longer required to be safety-related.
	Compliance:	The revised 10 CFR 50.44 no longer defines a design-basis LOCA hydrogen release. Hydrogen monitors are no longer required to support mitigation of design-basis accidents, and therefore, no longer meet the definition of Category 1 in RG 1.97. NRC concluded that Category 3, as defined in RG 1.97, is an appropriate categorization for the hydrogen monitors since they are required to diagnose the course of beyond design-basis accidents.
	Display:	Two Control Room indicators One channel recorded
	Position:	The installed instrumentation is adequate for the intended monitoring function.
C-13, E-2	Variable:	Area Radiation
	Range:	10^{-1} mR/hr to 10^{4} mR/hr
	RG1.97 Recommended Category:	2
	DPC Category:	3

	Existing Design:	McGuire has an extensive Area Radiation Monitoring System installed for personnel protection. Channel detector locations were selected based on areas normally having free access and low radiation dose rates with the potential of becoming high radiation areas. Range selections were based on normal background radiation levels to allow reasonable monitoring and alarm settings for keeping personnel exposures ALARA. All of these channels, with the exception of the monitors adjacent to the Reactor Coolant filters, have an indicated range of 10^{-1} to 10^{4} mR/hr. The indicated range of the Reactor Coolant filter area monitors is 10^{-1} to 10^{4} R/hr. Redundant indication is provided by portable instrumentation. The channels are powered by a highly reliable regulated control bus. The instrumentation is rated to withstand the temperatures and radiation doses for normal and accident conditions, except for those monitors in areas where access is permitted only during normal plant shutdown (e.g., the containment refueling bridge monitor was installed for personnel protection during refueling operations and is not required to be operational during a DBA). See the McGuire FSAR, Section 12.1 for additional information concerning the Area Radiation Monitoring System.
	Compliance:	The range of most of the instrumentation, and the absence of recording is not in compliance with the recommendations of RG 1.97, Rev. 2.
	Display:	One Control Room indicator per channel.
	Position:	The installed range of the instrumentation is acceptable for the intended function of personnel protection. The functions of detection of releases, release assessment and surveillance are performed through Health Physics Procedures with supplemental information provided by the effluent process Radiation Monitoring System. The qualification is within the guidance provided for Category 3 instrumentation which Duke considers adequate for the intended monitoring function. Also note, this is in compliance with the recommendations of R.G. 1.97 Rev 3. Recording is not required for the intended monitoring function.
D-1, D-7	Variable:	Flow in Low Pressure Injection System (RHR System Flow)
	Range:	0 to 110% Design Flow
	RG1.97 Recommended Category:	2
	DPC Category:	2

	Existing Design:	The existing design provides a separate display for each of the two RHR trains. The power is provided by highly reliable battery backed busses. Indicated range is 0 to 5000 GPM with a design flow of 3000 GPM. This instrumentation is installed in a mild environment.
	Compliance:	This instrumentation is in compliance with Duke's interpretation of RG 1.97, Rev. 2 as clarified in McGuire FSAR Section 1.11.5.
	Display:	Two Control Room indicators
	Position:	The installed instrumentation is adequate for the intended monitoring function.
D-2	Variable:	RHR Heat Exchanger Outlet Temperature
	Range:	32°F to 350°F
	RG1.97 Recommended Category:	2
	DPC Category:	2
	Existing Design:	Each train of the McGuire Residual Heat Removal System contains instrumentation to monitor RHR return temperature. The range for this instrumentation is 50°F to 400°F and the power supply is a highly reliable battery backed control buss. The RHR instrumentation is located in a mild temperature environment but is subject to post accident radiation. Environmental qualification is described in the McGuire FSAR Section 3.11 and the NUREG-0588 submittal. The instrumentation is seismically qualified in accordance with the criteria of the McGuire FSAR Section 3.10
	Compliance:	The Duke range is 50°F - 400°F, whereas the recommended range is 32°F - 350°F.
	Display:	Two channels recorded in the Control Room
	Position:	The Duke range for this instrumentation is suited to the operating and accident temperature expected in the Residual Heat Removal System and is therefore considered acceptable.
D-3	Variable:	Accumulator Tank Pressure (Cold Leg Accumulator)
	Range:	0 to 750 psig
	RG1.97 Recommended Category:	2
	DPC Category:	3

	Existing Design:	McGuire has two channels of accumulator tank pressure instrumentation on each of four accumulator tanks. Power for these channels is provided by two different highly reliable battery backed busses. The indicated range is 0 to 700 psig. The rating of the instrument is not adequate to prove survivability for the in containment accident environment or post accident radiation exposure.
	Compliance:	The range of this instrumentation is not in total compliance with the recommendations of RG 1.97, Rev. 2. The equipment is not rated to assure survivability for the in containment accident environment or post accident radiation exposure, however, this instrumentation does not perform a safety function during or in a post-accident environment and operator actions to mitigate the effects of an accident do not depend on the information provided by this instrumentation. Per NRC letter dated April 3, 1992, Category 3 qualification of this instrumentation is acceptable.
	Display:	Eight Control Room indicators (2 indicators per accumulator tank)
	Position:	A design and qualification Category of 3 is adequate for this function. The installed system meets the Duke interpretation of Category 3 recommendations as clarified in McGuire UFSAR Section 1.11.5. Duke considers the rating and environmental and radiation withstand capability adequate to meet the intended monitoring function.
D-3	Variable:	Accumulator Tank Level (Cold Leg Accumulator)
	Range:	10% to 90% volume
	RG 1.97 Recommended Category:	2
	DPC Category:	3
	Existing Design:	McGuire has two channels of accumulator tank level instrumentation on each of the four accumulator tanks. Power for these channels is provided by two different highly reliable battery backed busses. The indicated range is 0% to 100% which corresponds to approximately 68% to 83% of the accumulator tank volume which is appropriate to perform Technical Specification Monitoring. The rating of the instrument is not adequate to prove survivability for the in containment accident environment or post accident radiation exposure.

	Compliance:	The range of this instrumentation is not in compliance with the recommendations of RG 1.97, Rev. 2. The equipment is not rated to assure survivability for the in containment accident environment or post accident radiation exposure, however, this instrumentation does not perform a safety function during or in a post-accident environment and operator actions to mitigate the effects of an accident do not depend on the information provided by this instrumentation. Per NRC letter dated April 13, 1992, Category 3 qualification of this instrumentation is acceptable.
	Display:	Eight Control Room indicators (2 indicators per accumulator tank)
	Position:	A design and qualification Category of 3 is adequate for this function. The installed system meets the Duke interpretation of Category 3 recommendations as clarified in McGuire UFSAR Section 1.11.5. Duke considers the range and environmental and radiation withstand capability adequate to meet the intended monitoring function.
D-3	Variable:	Accumulator Level (UHI Accumulator) This variable does not apply to McGuire Nuclear Station design. Function was deleted per NSM MG-11768 and NSM MG-20598.
D-3	Variable:	Accumulator Pressure (UHI Accumulator) This variable does not apply to McGuire Nuclear Station design. Function was deleted per NSM MG-11768 and NSM MG-20598.
D-4	Variable:	Cold Leg Accumulator Isolation Valve Position
	Range:	Closed or Open
	RG 1.97 Recommended Category:	2
	DPC Category:	2
	Existing Design:	The cold leg accumulator isolation valves are provided with control switches on the main control boards. Actual valve position is provided by QA Condition 1 limit switches on the valves to operate both Closed-Not Closed, and Open-Not Open control switch indicating lights. These valves and their control switch indicating lights are powered by Class 1E busses. Additional indications are provided by monitor lights and by the computer. Environmental qualification of the limit switches is described in the McGuire Nuclear Station UFSAR, Section 3.11 and the NUREG 0588 submittal. Seismic qualification of the limit switches is described in the McGuire UFSAR, Section 3.10

	Compliance:	This instrumentation is in compliance with Duke's interpretation of RG 1.97, Rev. 2 as clarified in McGuire UFSAR Section 1.11.5.
	Display:	Control Room control switch indicating lights Monitor lights.
	Position:	The installed instrumentation is adequate for the intended monitoring function.
D-4	Variable:	UHI Accumulator Isolation Valve Position This variable does not apply to McGuire Nuclear Station design. Function was deleted per NSM MG-11768 and NSM MG-20598.
D-5	Variable:	Boric Acid Charging Flow
	Range:	0 to 110% Design Flow
	RG1.97 Recommended Category:	2
	DPC Category:	2
	Existing Design:	The existing instrumentation provides continuous monitoring of centrifugal charging pump flow through the NI System directly into the reactor coolant cold legs. The loop range is 0 - 1000 gallons per minute with a design flow of approximately 750 GPM. This instrument loop is powered by a highly reliable battery backed control buss and is installed in a mild environment.
	Compliance:	This instrumentation is in compliance with Duke's interpretation of RG 1.97, Rev. 2 as clarified in McGuire UFSAR Section 1.11.5.
	Display:	One Control Room indicator.
	Position:	The installed instrumentation is adequate for the intended monitoring function.
D-6	Variable:	Flow in HPI System (Safety Injection System Flow)
	Range:	0 to 110% of Design Flow
	RG1.97 Recommended Category:	2
	DPC Category:	2
	Existing Design:	One set of instrumentation per train measures the flow from 0 - 800 GPM with a design flow of 650 GPM. Power is provided by highly reliable battery backed busses. This instrumentation is installed in a harsh environment due to radiation as defined by Duke.

	Compliance:	This instrumentation is in compliance with Duke's interpretation of RG 1.97, Rev. 2 as clarified in McGuire UFSAR Section 1.11.5.
	Display:	Two Control Room indicators (one per train)
	Position:	Non QA condition 1 category 2 instrumentation must have reasonable assurance that it will be operable for accident monitoring. The installed instrumentation is subject to a total radiation dose that is slightly larger than the threshold for a harsh environment definition as defined by Duke (1.0E3 Rads). The installed transmitters have not been formally environmentally qualified. However, the limiting subcomponents due to radiation within the insalled transmitters are bipolar devies. The installed transmitters are similar in construction to other transmitters that are fully qualified for harsh environment radiation exposure levels. NUREG/CR-9156 documented results of tests that have been performed to show that typical bipolar devices remain functional when subjected to radiation doses which exceed that experienced by these installed transmitters. Therefore, the installed instrumentation is adaquate for the intended monitoring function.
D-9	Variable:	Reactor Coolant Pump Status
	Range:	Motor Current
	RG 1.97 Recommended Category:	3
	DPC Category:	3
	Existing Design:	The indicated range for RCP motor current is from 0 to 800 amps. The instrumentation derives power from the monitored source.
	Compliance:	This instrumentation is in compliance with Duke's interpretation of RG 1.97, Rev. 2 as clarified in McGuire FSAR Section 1.11.5.
	Display:	Four Control Room ammeters
	Position:	The installed instrumentation is adequate for the intended monitoring function.
D-10	Variable:	Primary System Safety Relief Valve Positions (Power Operated Relief Valves)
	Range:	Closed - Not Closed
	RG1.97 Recommended Category:	2

	DPC Category:	2
	Existing Design:	The Power Operated Relief Valves are provided with control switches on the main control boards. Actual valve position is provided by QA Condition 1 limit switches on the valves which operate both Closed-Not Closed, and Open-Not Open control switch indicating lights. These valves and their control switch indicating lights are powered by Class 1E busses. Additional indications are provided by the computer. Environmental qualification of the limit switches is described in the McGuire NUREG 0588 submittal. The limit switches are seismically qualified in accordance with the criteria of the McGuire FSAR Section 3.10
	Compliance:	This instrumentation is in compliance with Duke's interpretation of RG 1.97, Rev. 2 as clarified in McGuire FSAR Section 1.11.5.
	Display:	Control Room control switch indicating lights
	Position:	The installed instrumentation is adequate for the intended monitoring function.
D-10	Variable:	Primary System Safety Relief Valve Positions (Code Valves)
	Range:	Closed - Not Closed
	RG1.97 Recommended Category:	2
	DPC Category:	2
	Existing Design:	A QA Condition 1 Acoustic Leak Detection System is provided to monitor the position of these valves. Indicator lights indicate valve (closed - not closed) position. The McGuire Nuclear Station FSAR, Section 3.11 and the NUREG 0588 submittal contain information on the environmental qualification of the Acoustic Leak Detection System. The instrumentation is seismically qualified in accordance with the criteria of the McGuire FSAR Section 3.10 The instrumentation is powered by a Class 1E buss.
	Compliance:	This instrumentation is in compliance with Duke's interpretation of RG 1.97, Rev. 2 as clarified in McGuire FSAR Section 1.11.5.
	Display:	Control Room indicating lights
	Position:	The installed instrumentation is adequate for the intended monitoring function.
D-12	Variable:	Pressurizer Heater Status
	Range:	Electric Current

	RG1.97 Recommended Category:	2
	DPC Category:	2
	Existing Design:	Each of the four pressurizer heater groups have instrumentation for monitoring current. The range is 0 to 600 amps. Power for the transducers is derived from the sources they monitor. The computer readout is powered by highly reliable battery backed busses. This instrumentation is installed in a mild environment.
	Compliance:	This instrumentation is in compliance with Duke's interpretation of RG 1.97, Rev. 2 as clarified in McGuire FSAR Section 1.11.5.
	Display:	On demand display by the plant computer. Control Room monitor lights to indicate heater operation.
	Position:	The installed instrumentation is adequate for the intended monitoring function.
D-13	Variable:	Quench Tank (Pressurizer Relief Tank) Level
	Range:	Top to Bottom
	RG1.97 Recommended Category:	3
	DPC Category:	3
	Existing Design:	The indicated range of Pressurizer Relief Tank Level is from 0 to 100% corresponding to tank volume of approximately 3% to 97%.
	Compliance:	The range is not in complete compliance with RG 1.97 recommendations.
	Display:	One Control Room indicator
	Position:	The range of the installed instrumentation is adequate for the intended monitoring function.
D-14	Variable:	Quench Tank (Pressurizer Relief Tank) Temperature
	Range:	50°F to 750°F
	RG1.97 Recommended Category:	3
	DPC Category:	3
	Existing Design:	The indicated range of Pressurizer Relief Tank temperature is from 50°F to 350°F.

	Compliance:	The range is not in compliance with the RG 1.97, Rev. 2 recommendation.
	Display:	One Control Room indicator
	Position:	The instrument range is 50°F to 350°F, to cover the range of saturation temperatures up to the tank rupture disc pressure of 100 psig. This range is adequate for the intended monitoring function.
D-15	Variable:	Quench Tank (Pressurizer Relief Tank) Pressure
	Range:	0 to design pressure
	RG1.97 Recommended Category:	3
	DPC Category:	3
	Existing Design:	The indicated range of the Pressurizer Relief Tank pressure is from 0 to 100 psig. The tank rupture disc pressure is 100 psig.
	Compliance:	This instrumentation is in compliance with Duke's interpretation of RG 1.97, Rev. 2 as clarified in McGuire FSAR Section 1.11.5.
	Display:	One Control Room indicator
	Position:	The installed instrumentation is adequate for the intended monitoring function.
D-16	Variable:	Wide Range Steam Generator Level
	Range:	From tube-sheet to separators
	RG1.97 Recommended: Category:	1
	DPC Category:	3
	Existing Design:	McGuire has four (one per steam generator) channels of wide range steam generator level instrumentation. Each transmitter feeds the PCS and is powered by a battery backed Class 1E buss (moved to PCS Protection Cabinets by EC 78241 and EC 78243). The indicated range is 0 to 100% corresponding to 6.6 " above the tube-sheet, to the separators. Upgraded Level Transmitters were installed environmentally and seismically qualified per NRC correspondence to H.B. Tucker dated 03/17/1988.
	Compliance:	The range of the instrumentation does not meet the recommendations of RG 1.97, Rev. 2.

	Display:	Four channels recorded. Control room display via seismically mounted indicating recorders. The recorders are made by the same manufacturer as those used in safety-related applications.
	Position:	Primary indication of S/G level is provided by the Narrow Range S/G Level indicator (see variable A-7). The level of environmental qualification provided is consistent with the performance expectations of the instrumentation and exceeds the recommendations of Category 3 in Duke's interpretation of RG 1.97 Rev. 2 as clarified in McGuire FSAR Section 1.11.5. The installed range is adequate for measuring wide range steam generator level and Duke considers the installed instrumentation adequate for the intended monitoring function.
D-18	Variable:	Main Steam Flow (or, Safety Relief Valve Position)
	Range:	No range listed in RG 1.97, Rev. 2
	RG1.97 Recommended Category:	2
	DPC Category:	2
	Existing Design:	This station has two channels of main steam flow instrumentation on each of four steam generators. Each (of two per steam generator) transmitter feeds a different channel of the PCS and is powered by that channel's associated battery backed buss. The indicated range is 0 to 117% with 100% flow corresponding to normal 100% power maximum flow. The instrumentation is environmentally rated for the installed location. Environmental qualification of this instrumentation is described in the McGuire Environmental Qualification Maintenance Manual (EQMM) and Environmental Qualification Master List (EQML).
	Compliance:	The instrumentation is in compliance with Duke's interpretation of RG 1.97, Rev. 2 as declared in McGuire FSAR Section 1.11.5.
	Display:	Eight Control Room indicators Four channels recorded (one of two per steam line)
	Position:	The installed instrumentation is adequate for the intended monitoring function.
D-19	Variable:	Main Feedwater Flow
	Range:	0 - 110% Design Flow
	RG1.97 Recommended Category:	3

	DPC Category:	3
	Existing Design:	McGuire has twelve main feedwater flow channels, of which eight (two channels per steam generator feedline) are used in post-accident monitoring. The indicated range for this variable is 0 to 120%. This corresponds to 4.65×10^6 lbs/hr which is 120% of design flow.
	Compliance:	This instrumentation is in compliance with Duke's interpretation of RG 1.97, Rev. 2 as clarified in McGuire FSAR Section 1.11.5.
	Display:	Eight Control Room indicators Four channels recorded (one per feedline)
	Position:	The installed instrumentation is adequate for the intended monitoring function.
D-20	Variable:	Auxiliary Feedwater Flow
	Range:	0 - 110% Design Flow
	RG1.97 Recommended Category:	2
	DPC Category:	2
	Existing Design:	McGuire has four QA Condition 1 and four non-QA condition auxiliary feedwater flow transmitters, one each steam generator, monitoring flow from all auxiliary feedwater pumps to each steam generator. The indicated range is 0-600 GPM for a system design flow of 350 GPM. The QA condition 1 instrumentation is powered by Class 1E busses. Environmental qualification is described in the McGuire NUREG 0588 submittal. This instrumentation is seismically qualified in accordance with the criteria of the McGuire FSAR Section 3.10. The Non-QA instrumentation is powered by a highly reliable battery backed buss. This instrumentation is seismically mounted. Pressure boundary intergrity has been documented in a calculation. Additional indication is provided on the operator aided computer.
	Compliance:	This instrumentation is in compliance with Duke's interpretation of RG 1.97, Rev. 2 as clarified in McGuire FSAR Section 1.11.5.
	Display:	QA Condition 1 - four Control Room Indicators. Non-QA condition – four indicators, two on each Motor Driven Auxiliary Feedwater Pump Panel.
	Position:	The installed instrumentation is adequate for the intended monitoring function.

D-21	Variable:	Auxiliary Feedwater Condensate Storage Tank Level, Auxiliary Feedwater Storage Tank Level, Or Auxiliary Feedwater Assured Source
	Range:	Plant Specific
	RG1.97 Recommended Category:	1
	DPC Category:	1
	Existing Design:	McGuire's Auxiliary Feedwater System (CA) draws Condensate grade suction from the following source: 1. CA Storage Tank The safety related source for CA System suction is the Nuclear Service Water (RN) System. This system is QA Condition 1 and is the assured source of secondary side inventory. It is automatically aligned to the suction of the CA pumps by QA Condition 1 pressure switches which monitor suction pressure. When the pressure switches detect low suction pressure, the affected CA pump will align to the Nuclear Service Water System. Operator confirmation of the supply or availability of RN as the assured safety source of water to the CA pumps is provided by: 1. QA Condition 1 indication of RN pump operational status. This instrumentation is seismically qualified and located in a mild environment. 2. QA Condition 1 indication of the RN & CA suction supply source isolation valves. Valve operators, limit switches, indicating lights are seismically and environmentally qualified. 3. QA Condition 1 indication of CA pumps flow to the steam generators. (See variable D-20).
		Additional Category 3 indication is available for further confirmation of transfer of the CA pump suction to the assured source. This indication includes: 1. RN pump header discharge flow. 2. CA pumps suction pressure. 3. CA pumps discharge pressure.
		These monitoring instruments are located in a mild environment.
	Compliance:	This instrumentation is in compliance with Duke's interpretation of RG 1.97, Rev. 2 as clarified in McGuire FSAR Section 1.11.5.

	Display:	1. RN Pump Status: Two operational status indicating lights per pump 2. RN & CA Suction Supply Valves' Positions: Two valve position indicating lights per valve. 3. CA Pumps Flow to the Steam Generators: (see variable D-20): Four Control Room indicators (1 per S/G). 4. RN Pump header discharge flow (Category 3): Two Control Room indicators (1 per pump) 5. CA Pumps Suction Pressure (Category 3): Three Control Room indicators (1 per pump) 6. CA Pumps Discharge Pressure (Category 3): Three Control Room indicators (1 per pump)
	Position:	The installed instrumentation is adequate for the intended monitoring function.
D-22	Variable:	Containment Spray Flow
	Range:	0 to 110% Design Flow
	RG1.97 Recommended Category	2
	DPC Category:	2
	Existing Design:	The containment spray instrumentation provides an indicated range of 0 to 4000 gpm for containment spray flow. Design flow is approximately 3400 gpm, and the power supply is a highly reliable battery backed control buss. One channel is provided for each of two containment spray pumps. The containment spray flow instrumentation is installed in a mild temperature environment. Environmental qualification of this instrumentation is described in the McGuire Environmental Qualification Maintenance Manual (EQMM) and Environmental Qualification Master List (EQML).
	Compliance:	The transmitters for this variable are rated to withstand the anticipated maximum design basis accident radiation dose for the installed location.
	Display:	Two Control Room indicators (one per pump)
	Position:	The installed instrumentation is adequate for the intended monitoring function.

D-23	Variable:	Heat Removal by the Containment Fan Heat Removal System This variable does not apply to McGuire Nuclear Station design.
D-24	Variable:	Containment Atmosphere Temperature
	Range:	40°F to 400°F
	RG 1.97 Recommended Category:	2
	DPC:	2
	Existing Design:	Four RTD's are provided to monitor upper containment temperature and four RTD's are provided to monitor lower containment temperature. The range of the lower containment instrumentation is 32 to 400°F and the upper containment instrumentation is 32 to 212°F. Environmental Qualification of the RTD's is described in the McGuire FSAR, Section 3.11 and the NUREG-0588 submittal. Seismic qualification is described in the McGuire FSAR, Section 3.10 The instrumentation loops are powered by a highly reliable battery backed buss.
	Compliance:	The range of the upper containment instrumentation is not in compliance with the recommendations of R.G. 1.97 Rev. 2.
	Display:	Eight analog computer points (four upper and four lower containment).
	Position:	The installed installation is adequate for the intended monitoring function. The worst case upper containment post accident temperature is 190°F and is within the range of installed instrumentation.
D-25	Variable:	Containment Sump Water Temperature For the McGuire design, this variable is not utilized in the management of a design basis accident and therefore is not provided.
D-26	Variable:	CVCS Makeup Flow
	Range:	0 to 110% Design Flow
	RG1.97 Recommended Category:	2
	DPC Category:	3

	Existing Design:	The existing instrumentation for this variable provides continuous monitoring of reactor coolant charging flow. The loop range is 0 to 200 gallons per minute. Design flow is 120 GPM. This instrument loop is powered from a highly reliable battery-backed buss. The instrumentation is located in a mild temperature environment.
	Compliance:	The transmitter for this variable is not rated to withstand the anticipated maximum design basis accident radiation dose for the installed location.
	Display:	One Control Room indicator
	Position:	The installed instrumentation is adequate for the intended monitoring function. For accidents in which harsh environments are a result, the system containing this instrumentation (letdown and charging portion of the CVCS) is not required in the mitigation of these accidents and is automatically isolated upon an ESF Actuation. The level of environmental qualification provided for the instrumentation in this system is consistent with the performance expectations of the system and meets the recommendations of Category 3 in Duke's interpretation of RG 1.97, Rev. 2 as clarified in McGuire FSAR Section 1.11.5.
D-27	Variable:	CVCS Letdown Flow
	Range:	0 to 110% Design Flow
	RG1.97 Recommended Category:	2
	DPC Category:	2
	Existing Design:	The existing instrumentation for this variable provides continuous monitoring of reactor coolant letdown flow. The loop range is 0 to 200 gallons per minute with a design flow of approximately 120 GPM. This instrument loop is powered from a highly reliable battery-backed buss. The instrumentation is located in a mild environment.
	Compliance:	This instrumentation is in compliance with Duke's interpretation of RG 1.97, Rev. 2 as clarified in McGuire FSAR Section 1.11.5.
	Display:	One Control Room indicator
	Position:	The installed instrumentation is adequate for the intended monitoring function.
D-28	Variable:	Volume Control Tank Level
	Range:	Top to Bottom

	RG.1.97 Recommended Category:	2
	DPC Category:	3
	Existing Design:	The existing instrumentation for this variable provides continuous monitoring of volume control tank level. The loop range is 0 to 100% of tank level which covers the linear portion of the tank (approximately 18 to 82% of tank volume). This instrument loop is powered from a highly reliable battery backed buss. This instrumentation is located in a mild temperature environment.
	Compliance:	The range and radiation withstand capability of the instrumentation are not in compliance with the RG 1.97, Rev. 2 recommendations.
	Display:	One Control Room indicator
	Position:	The installed instrumentation is adequate for the intended monitoring function. Minimum and maximum tank levels are maintained within the range of the instrument. Extending the range into the domed portions of this tank would result in nonlinear readings at each extreme of the scale. For accidents in which harsh environments are a result, the system containing this instrumentation (letdown and charging portion of the CVCS) is not required in the mitigation of these accidents and is automatically isolated upon an ESF Actuation. The level of environmental qualification provided for the instrumentation in this system is consistent with the performance expectations of the system and meets the recommendations of Category 3 in Duke's interpretation of RG 1.97, Rev. 2 as clarified in McGuire FSAR Section 1.11.5.
D-29	Variable:	Component Cooling Water Temperature to ESF System
	Range:	32°F to 200°F
	RG 1.97 Recommended Category:	2
	DPC:	2
	Existing Design:	The water temperature to the ESF Systems is monitored at the outlet of each train of the Component Cooling Water Heat Exchangers. The power for this instrumentation is a highly reliable battery backed buss. Range for the read-out is 50 ºF to 150 ºF. This instrumentation is installed in a mild environment.
	Compliance:	This instrumentation is not in full compliance with RG 1.97, Rev. 2 because the range of the instrumentation is slightly less than the recommendation of RG 1.97, Rev 2.

	Display:	Two computer points (one per Component Cooling train)
	Position:	The installed instrumentation is adequate for the intended monitoring function. The monitored range is 50 ºF to 150 ºF, which is adequate for the design ratings of the component cooling system piping. This range is suitable for normal KC operating conditions as well as post accident monitoring.
D-30	Variable:	Component Cooling Water Flow to ESF Systems
	Range:	0 to 110% Design Flow
	RG 1.97 Recommended Category:	2
	DPC Category:	2
	Existing Design:	The installed instrumentation indicates flow in each of two redundant Component Cooling headers. Indicated range is 0 to 10,000 GPM for a system design flow of 8700 GPM. The instrumentation is powered by a highly reliable auxiliary buss and is located in a mild environment.
	Compliance:	This instrumentation is in compliance with Duke's interpretation of RG 1.97, Rev. 2 as clarified in McGuire FSAR Section 1.11.5.
	Display:	Two Control Room indicators.
	Position:	The installed instrumentation is adequate for the intended monitoring function.
D-31	Variable:	High Level Radioactive Liquid Tank Level
	Range:	Top to Bottom
	RG 1.97 Recommended Category:	3
	DPC Category:	3
	Existing Design:	The indicated range for this variable is 0 to 100% for each of three tanks. There are two Recycle Holdup Tanks which are shared by Units 1 & 2. The indication corresponds to the tank volume of approximately 2 to 91%. There is one Waste Drain Tank shared by Units 1 & 2. The indication corresponds to the tank volume of approximately 9 to 91%
	Compliance:	The range is not in complete compliance with the recommendation of R.G. 1.97, Rev. 2.
	Display:	1 Computer point per tank.
	Position:	The tap to tap range of the installed instruments is adequate to provide tank level information.
D-32	Variable:	Radioactive Gas Holdup Tank Pressure

	Range:	0 to 150% Design Pressure
	RG 1.97 Recommended Category:	3
	DPC Category:	3
	Existing Design:	McGuire utilizes six tanks for radioactive waste gas storage. The maximum operating pressure for these tanks is approximately 100 psig (per the McGuire FSAR, Section 11.3). The indicated range is 0 to 150 psig for each tank.
	Compliance:	This instrumentation is in compliance with Duke's interpretation of R.G. 1.97, Rev. 2 as clarified in McGuire FSAR Section 1.11.5.
	Display:	Six computer points (one per tank).
	Position:	The installed instrumentation is adequate for the intended monitoring function.
D-33	Variable:	Emergency Ventilation Damper Position
	Range:	Open-Closed Status
	RG 1.97 Recommended Category:	2
	DPC Category:	2
	Existing Design:	All active emergency ventilation dampers which are actuated under design-basis accident conditions and whose failure could result in a radioactive release to atmosphere have position indication or indication that the required emergency system alignment has been achieved in the Control Room. At least one channel per damper is provided, and this instrumentation is powered from Class 1E busses. Environmental qualification of the position indication limit switches is described in the McGuire FSAR, Section 3.11 and the NUREG-0588 submittal. Seismic qualification is described in the McGuire FSAR, Section 3.10
	Compliance:	Some emergency ventilation dampers do not meet the range recommendations of RG 1.97, Rev 2. Those dampers not in compliance have positive indication that the required emergency system alignment has been achieved but no individual Open-Closed status. Positive indication may be provided by system flows, pressures, etc.
	Display:	Control Room control switch indicating lights Analog indicators

	Position:	The installed instrumentation is adequate for the intended monitoring function since the operator is always provided with positive indication that emergency dampers have achieved their safety mode alignment during and after an accident.
D-34	Variable:	Status of Standby Power and Other Energy Sources Important to Safety
	Range:	Voltages, currents, pressures
	RG 1.97 Recommended Category:	2
	DPC Category:	2
	Existing Design:	All QA Condition 1 (Class 1E) or battery backed control busses have undervoltage alarms in the Control Room with local diagnostic capabilities to enable an expedient assessment of abnormal situations. In addition, the 125 VDC distribution centers have analog indicators of voltage level in the Control Room. All of the Control Room alarms are on highly reliable battery backed busses. All of the sensing relays and alarm electronics are located in a mild temperature and radiation environment.
	Compliance:	This instrumentation is in compliance with Duke's interpretation of RG 1.97, Rev. 2 as clarified in McGuire FSAR Section 1.11.5.
	Display:	Control Room annunciators Control Room analog indicators. Computer digital points
	Position:	The installed instrumentation is adequate for the intended monitoring function.
D-35	Variable	RN Strainer Differential Pressure
	Range	0 - 10 psid
	RG 1.97 Recommended Category:	2
	DPC Category:	2
	Existing Design:	The instrument provides local and OAC indication for strainer D/P. This instrument loop also supplies a control room annuniciator. The instrument loop will automatically backwash the strainer on high D/P. This loop is supplied by a QA condition 1 power source. All impulse tubing associated with this loop is QA condition 1. All loop components are QA condition 1. This instrument is located in a mild environment. This instrument is seismically qualified in accordance with the criteria of the McGuire FSAR section 3.10.

	Compliance:	This instrumentation is in compliance with Duke's interpretation of RG 1.97, Rev. 2 as clarified in McGuire FSAR Section 1.11.5.
	Display:	Control Room annunciators, Computer analog points, local indication.
	Position:	The installed instrumentation is adequate for the intended monitoring function.
E-7	Variable:	Common Plant Vent Radioactive Discharge
	Range:	10^{-6} μCi/cc to 10^{4} μCi/cc 0 to 110% vent design flow (where design flow is the maximum flow anticipated in normal operation)
	RG1.97 Recommended Category:	2
	DPC Category:	2
	Existing Design:	McGuire has a high range, mid-range and low range channel of unit vent radioactivity instrumentation. These channels are powered from a highly reliable battery backed buss. The indicated range is 1 to 10^{8} R/hr gross gamma for the high range and 10 to 10^{7} cpm and 10 to 10^{6} cpm corresponding to 10^{-6} to 5 x 10^{3} μCi/ml Kr-85 for the low and mid-range monitors. The instrumentation is installed in a mild temperature environment. The instrumentation is rated to withstand the environmental conditions that would exist during accidents in which it is intended to operate. Detection, release assessment and long-term surveillance is assisted with unit vent flow instrumentation whose range is enveloped by at least 0 to 110% vent design flow at McGuire. The instrumentation displays this flow in the control room and plant computer. The instrumentation is installed in a mild temperature environment.
	Compliance:	Duke considers all aspects of this instrumentation to be in compliance with the recommendations of RG 1.97, Rev. 2 as clarified in McGuire FSAR Section 1.11.5.
	Display:	Three control room indicators and three channels recorded for the unit vent radioactivity. One channel to control room indicator and the plant computer for the unit vent flow.
	Position:	The instruments are adequate for their intended monitoring function.
E-8	Variable:	Radiation Monitoring for the main steam lines.
	Range:	10^{-1} μCi/cc to 10^{3} μCi/cc Mass of Steam Released

	RG 1.97 Recommended Category:	2
	DPC Category:	2
	Existing Design:	Area radiation monitors are located in the doghouses adjacent to the main steam lines and upstream of the main steam isolation valves. These monitors are capable of monitoring radiation in the steam supply to the SG PORVs, SG safety relief valves, and airborne activity in the doghouses. Correlation curves will allow conversion of the monitor readings in mR/hr to μCi/cc. The indicated range is 0.1 to 10^4 mR/hr. Steam releases are calculated on the plant computer with the information being printed on the alarm typer. This instrumentation is powered from a highly reliable battery backed bus. This instrumentation is rated to withstand the environmental conditions that would exist during accidents in which it is intended to operate. A steam line break in the vicinity of this instrumentation may cause the environment to exceed the rated temperature, however, the instrument is not required to remain functional for this event.
	Compliance:	This instrumentation is in compliance with Duke's interpretation of RG 1.97, Rev. 2 as clarified in McGuire FSAR Section 1.11.5.
	Display:	Four Control Room indicators Four channels monitored by OAC.
	Position:	The installed instrumentation is adequate for the intended monitoring function.
E-10 E-12 E-13 E-14	Variable:	Plant Airborne and Area Radiation (sampling with onsite analysis, portable instrumentation)
	Range:	Various ranges as listed in RG 1.97, Rev. 2
	RG 1.97 Recommended Category:	3
	DPC Category:	3
	Existing Design:	Equipment and facilities exist at McGuire for making the measurements and analyses recommended by RG 1.97, Rev. 2. Information concerning these capabilities is in the McGuire FSAR, Section 12.3.
	Compliance:	Some instrumentation may have ranges which differ from the recommendations of RG 1.97, Rev. 2.
	Display:	Not Applicable.

	Position:	The instrumentation has been selected using the considerations shown in the McGuire FSAR, Section 12.3. Evaluation of the equipment has determined it to be adequate for the intended functions.
E-11	Variable:	Radiation Exposure Meters This variable is not required based on information given in Supplement 1 to NUREG 0737 Section 6.1-b and the Errata sheet to RG 1.97, Rev. 2 dated May, 1981.
E-15	Variable:	Wind Direction
	Range:	0° to 360°
	RG 1.97 Recommended Category:	3
	DPC Category:	3
	Existing Design:	McGuire has two channels of wind direction instrumentation at two elevations. The indicated range is 0° to 540°.
	Compliance:	This instrumentation is in compliance with Duke's interpretation of RG 1.97, Rev 2 as clarified in McGuire FSAR Section 1.11.5. Accuracy is not in compliance with RG 1.97 Rev. 2 recommendation.
	Display:	Two channels on the computer Two channels recorded.
	Position:	The instruments are adequate for the intended monitoring function as follows: RG 1.97 Rev. 2 recommended range is 0-360º and McGuire meets this recommendation with a 0-540º range. The recommended accuracy is +/-5º (with a deflection of 15º) and McGuire meets this recommendation with a direction sensor having a +/-2.7º accuracy. However, when the total loop uncertainty considers all components connected to the wind direction sensor, a resulting accuracy of +/-7º is calculated. For conservatism, this will be denoted as not in compliance with the RG 1.97 Rev. 2 recommendation. The recommended starting speed is 1.0 mph and McGuire meets this recommendation with a threshold velocity of 0.7 mph. Finally, the recommendation is for a damping ratio between 0.4 and 0.6, distance constant less than or equal to 2 meters. McGuire meets this recommendation with a damping ratio of 0.4 and a distance constant of 1.1 meters.
E-16	Variable:	Wind Speed

	Range:	0 - 67 mph
	RG 1.97 Recommended Category:	3
	DPC Category:	
	Existing Design:	McGuire has two channels of wind speed instrumentation. The indicated range is 0 - 90 mph.
	Compliance:	Accuracy is not in compliance with RG 1.97, Rev. 2 recommendations. This instrumentation is in compliance with Duke's interpretation of RG 1.97, Rev. 2 as clarified in McGuire FSAR, Section 1.11.5
	Display:	Two channels on the computer Two channels recorded
	Position:	The instruments are adequate for the intended monitoring function as follows. RG 1.97 Rev. 2 recommended range is 0-67 mph and McGuire meets this recommendation with a 0-90 mph range. The recommended accuracy is +/-0.5 mph (for winds speeds less than 25 mph) and McGuire meets this recommendation with a +/-0.25 mph speed sensor. However, when the total loop uncertainty considers all components connected to the wind speed sensor, a resulting accuracy of +/- 1.12 mph (for wind speeds less than or equal to 25 mph) is calculated. For conversatism, this will be denoted as not in compliance with the RG 1.97 Rev. 2 recommendation. The recommended starting threshold is less than 1.0 mph and McGuire meets this recommendation with a 1.0 mph starting threshold speed sensor.
E-17	Variable:	Atmospheric Stability
	Range:	-5° to 10°C
	RG 1.97 Recommended Category:	3
	DPC Category:	3
	Existing Design:	The indicated range for atmospheric stability is -4° to 8°C for a 50 meter interval.

Compliance:	This instrumentation is in compliance with Duke's interpretation of RG 1.97, Rev. 2 as clarified in McGuire FSAR Section 1.11.5. Range and accuracy are not in compliance with RG 1.97, Rev. 2 recommendations.
Display:	One computer point One channel recorded
Position:	The instruments are adequate for the intended monitoring function as follows. RG 1.97 Rev. 2 recommended range is -5ºC to 10ºC. McGuire does not meet this recommendation and has a -4ºC to 8ºC range. The recommended accuracy is +/- 0.15ºC per 50 meter intervals. The McGuire atmospheric stability interval is 50 meters and this recommendation is met with a temperature sensor accuracy of 0.05ºC. However, when the total loop uncertainty considers all components connected to both atmospheric stability sensors, a resulting accuracy of +/- 0.19ºC is calculated. For conservatism, this will be denoted as not in compliance with the RG 1.97 Rev. 2 recommendation.

Table 1-7. Deleted Per 2002 Update