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MANGAN,C.V. Niagara Mohawk Power Corp.
RECIP.NAME RECIPIENT AFFILIATION
SCHWENCER,A. Licensing Branch 2

SUBJECT: Forwards responses to FSAR questions.Info submitted to aid review of license application for resolution of Questions 260.51,410.34,410.37,421.10,421.43 & 430.23 will be included in next FSAR amend.

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	NRR/DHFS/LQB	32	1	1	NRR/DHFS/PSRB		1	1
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	NRR/DSI/CSB	09	1	1	NRR/DSI/ICSB	16	1	1
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NIAGARA MOHAWK

NIAGARA MOHAWK POWER CORPORATION/300 ERIE BOULEVARD WEST, SYRACUSE, N.Y. 13202/TELEPHONE (315) 474-1511

September 21, 1984
(NMP2L 0166)

Mr. A. Schwencer, Chief
Licensing Branch No. 2
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Re: Nine Mile Point Unit 2
Docket No. 50-410

Dear Mr. Schwencer:

Enclosed for your use and information are the Nine Mile Point Unit 2 responses to several Nuclear Regulatory Commission's Final Safety Analysis Report questions. This information has been previously discussed with your staff and is submitted to aid your review of the Unit 2 license application for the resolution of these questions. This information includes responses to questions 260.51, 410.34, 410.37, 421.10, 421.43, 430.23.

The enclosed will be included in the next Final Safety Analysis Report Amendment.

Very truly yours,

C. V. Mangan
Vice President
Nuclear Engineering & Licensing

NLR:ja
Enclosure
xc: Project File (2)

B001
1/1

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of	)	
Niagara Mohawk Power Corporation	)	Docket No. 50-410
(Nine Mile Point Unit 2)	)	

AFFIDAVIT

C. V. Mangan, being duly sworn, states that he is Vice President of Niagara Mohawk Power Corporation; that he is authorized on the part of said Corporation to sign and file with the Nuclear Regulatory Commission the documents attached hereto; and that all such documents are true and correct to the best of his knowledge, information and belief.

C V Mangan

Subscribed and sworn to before me, a Notary Public in and for the State of New York and County of Onondaga, this 21st day of September 1984.

Christine Austin
Notary Public in and for
Onondaga County, New York

My Commission expires:

CHRISTINE AUSTIN
Notary Public in the State of New York
Qualified in Onondaga Co. No. 4787687
My Commission Expires March 30, 1985

CHRISTINE AUSTIN
Notary Public in the State of New York
Qualified in Onondaga Co. No. 4787627
My Commission Expires March 30, 19—

A part of the RCIC system (page 7 of 26), the return test line piping to the condensate storage tank beyond the second isolation valve, is shown as "QA requirements N/A." This is a potential secondary containment bypass leak path and should be subject to the pertinent QA requirements of 10 CFR 50 Appendix B during the operations phase. Similarly, 2 parts of the reactor system (page 1 of 26) are shown as QA requirements N/A. The other reactor internal structures whose failure could reduce the functioning of the reactor system to an unacceptable safety level should have the pertinent QA requirements of 10 CFR 50 Appendix B applied per Regulatory Position 4 of Regulatory Guide 1.29. The reactor insulation should not be capable of excessive debris formation and should also have the pertinent QA requirements of 10 CFR 50 Appendix B applied during the operation phase. On page 16 of 26 the radwaste building, the standby gas treatment building, and the PMP exterior flood protection berms are shown as "QA requirement N/A." These items should also have the pertinent QA requirements of 10 CFR 50 Appendix B applied during the operations phase.

	NUREG-0737 Enclosure 2 Clarification Item
11. Challenges to and failure of relief valves	II.K.3(16)
12. ADS actuation	II.K.3(18)
13. Restart of core spray and LPCI	II.K.3(21)
14. RCIC suction	II.K.3(22)
15. Space cooling for HPCI and RCIC	II.K.3(24)
16. Power on pump seals	II.K.3(25)
17. Common reference level	II.K.3(27)
18. ADS valve, accumulators, and associated equipment and instrumentation	II.K.3(28)
19. Emergency plans (and related equipment)	III.A.1.1/ III.A.2
20. Equipment and other items associated with the emergency support facilities	III.A.1.2
21. Inplant I_2 radiation monitoring	III.D.3.3
22. Control-room habitability	III.D.3.4

RESPONSE

The response to each request is listed as follows:

a1. See revised Table 3.2-1 (Note 28). pg 16

a2. Table 3.5-22 provides the details of the barriers to withstand tornado-generated missiles. No other interior structural components are listed as barriers since they have not been used. (SEE Note 29) (pg 17)

a3. See revised Table 3.2-1 and Note 29.

a4. See revised Table 3.2-1. (pg 13 and 13a)

a5. See revised Table 3.2-1. (pg 3)

a6. See revised Table 3.2-1, For applicable Systems and Note 32.

a7. There are numerous structures, systems, and components which are within the scope of Regulatory Positions C2 and C3 of Regulatory Guide 1.29.

These items are discussed in Sections 3.5.1.1.4, 3.7, and 3.8. (SEE Note 32)

a8. See revised Table 3.2-1. (Note 33)

a9. See revised Table 3.2-1. (pg 5a)

a10. See revised Table 3.2-1. (pg 5a)

a11. The Digital Radiation Monitoring System (DRMS) is included in Table 3.2-1 in the Process Radiation Monitors section. There is no portable safety-related radioactivity monitoring equipment used at Unit 2. (SEE Footnote 34)

a12. Fixed radioactivity sampling equipment is part of the DRMS (which is already included in FSAR Table 3.2-1). For clarification of instrument sampling lines, see revised Table 3.2-1. There is no portable safety-related air or liquid radioactivity sampling equipment used at Unit 2. (SEE Footnote 34)

a13. Portable equipment which is not safety related is used to perform radioactivity contamination measurement and analysis, and therefore is not included in Table 3.2-1. (SEE Footnote 34)

a14. See response to Item 13.

a15. There are no portable safety-related instruments used at Unit 2. The instrument storage, calibration, and maintenance program is not related to the classification of equipment and structures, and therefore is not included in Table 3.2-1. Equipment and structure classification site administrative procedures are used to ensure the proper storage, calibration, and maintenance of portable instruments. (SEE Footnote 34)

a16. Personnel decontamination facilities are not safety related, since they are not associated with systems used to prevent or mitigate the consequences of an offsite radiation release, and therefore are not included in Table 3.2-1. (See Footnote 34) | 9

a17. Respiratory protection equipment is not safety related. Any testing equipment will be portable and not be safety related. (See Footnote 34)

a18. Contamination control is provided for in administrative procedures. The equipment used to perform radioactivity contamination measurement and analysis is portable and is not safety related. (SEE NOTE 34)

a19. See revised Table 3.2-1 (Note 34)

a20. See revised Table 3.2-1 (Note 29). (pg. 3a and 13)

b1. See revised Table 3.2-1

Auxiliary AC Power System

a) See revised Table 3.2-1 (pg 15)

b) See revised Table 3.2-1 (pg 15)

c) See revised Table 3.2-1 (pg 15a)

d) See revised Table 3.2-1 (pg 15a) INSERT A

e) See revised Table 3.2-1 (pg 15a) INSERT B

f) See revised Table 3.2-1 (pg 15a) INSERT C

g) See revised Table 3.2-1 (pg 10)

h) See revised Table 3.2-1 (pg 15a)

i) See revised Table 3.2-1 (pg 15a)

j) See revised Table 3.2-1 (pg, 5a, 6 for examples) INSERT D

k) See revised Table 3.2-1 (pg 10) INSERT E

DC Power System

a) See revised Table 3.2-1 (pg 16)

b) See revised Table 3.2-1 (pg 16) SEE footnote 31

c) See revised Table 3.2-1 and (b 1 f) response above)

d) See revised Table 3.2-1 and b 1 g) response Above

e) See revised Table 3.2-1 (pg 16)

f) See revised Table 3.2-1 (pg 7) INSERT F

INSERT A

The voltage rectifiers and static switches are part of the uninterruptable power supplies.

INSERT B

Cable splices are not used (except the containment penetrations which are QA Category I). Connectors and terminal blocks are QA Category I and are considered part of emergency cables listed on Table 3.2.-1. The only underground safety related cabling is HPCS and the bar rack heater cables which are QA Category I.

INSERT C

Conduit and cable tray which are not Class IE but whose failure could affect safety related equipment are seismically supported (See Note 34).

INSERT D

Safety related protective relays are part of electrical panels listed in Table 3.2.-1.

INSERT E

Safety related load sequencing logic and relays are part of electric panels listed in table 3.2.-1.

INSERT F

Safety related DC motors are listed with the system in which the valves are located.

b2. a) The control room HVAC system components are included under HVAC Systems. (pg 15) | 9

b) See revised Table 3.2-1. (pg 5)

c) See revised Table 3.2-1. Control room habitability system dampers are included as a part of Ductwork and Accessories, Essential under the HVAC Systems heading. (pg 15)

b3. RCIC test line bypass leakage will not occur; therefore, this has been categorized QA non-applicable. (pg 7) | 9

RPV insulation, reflective and encapsulated, is not capable of excessive debris formation; ~~therefore, 10CFR50, Appendix B does not apply.~~ (SEE NOTE 34) | 9

See revised Table 3.2-1.

b4. All safety-related instrumentation and controls (I&C) described in FSAR Sections 7.1 through 7.6 and other safety-related I&C for safety-related systems meet the quality assurance requirements of 10CFR50, Appendix B. These safety-related I&C are listed in FSAR Table 3.2-1, as, for example, "electrical modules with safety function," or "instrument modules with safety function." In Table 3.2-1, the designation "I" indicates that these safety-related I&C meet the quality assurance requirements of 10CFR50, Appendix B, as described in FSAR Chapter 17 (see Note 31). | 9

The General Electric quality assurance program is described in NEDO-11209-04A, Nuclear Energy Business Operations BWR Quality Assurance Program Description, dated December 31, 1982. This program has been accepted by the NRC as meeting the quality assurance requirements of 10CFR50, Appendix B.

c1. The safety relief valves (SRVs) perform the function of reactor coolant system vents and are identified in Table 3.2-1 under Nuclear Boiler System.

c2. See revised Table 3.2-1. (Note 28)

c3. See revised Table 3.2-1. (Note 34)

10 | c4. See revised Table 3.2-1 (Note 31)

c5. See revised Table 3.2-1. (pg 14)

c6. The containment isolation study is in Section 1.10, Item II.E.4.2, ~~and the operational QA program does not apply~~. Changes to containment isolation logic will be in accordance with 10CFR50 Appendix B Operational QA Program

c7. See revised Table 3.2-1 (pg 5)

c8. The equipment and instrumentation changes, if any, made to comply with this item are contained in Table 3.2-1 under line items as "Electrical Modules with Safety Function" or "Instrumentation Modules with Safety Function."

c9. The equipment and instrumentation changes, if any, made to comply with this item are contained in Table 3.2-1 under line items as "Electrical Modules with Safety Function" or "Instrumentation Modules with Safety Function."

c10. The equipment and instrumentation changes, if any, made to comply with this item are contained in Table 3.2-1 under line items as "Electrical Modules with Safety Function" or "Instrumentation Modules with Safety Function."

c11. The equipment and instrumentation changes, if any, made to comply with this item are contained in Table 3.2-1 under line items as "Electrical Modules with Safety Function" or "Instrumentation Modules with Safety Function."

c12. The equipment and instrumentation changes, if any, made to comply with this item are contained in Table 3.2-1 under line items as "Electrical Modules with Safety Function" or "Instrumentation Modules with Safety Function."

c13. The equipment and instrumentation changes, if any, made to comply with this item are contained in Table 3.2-1 under line items as "Electrical Modules with Safety Function" or "Instrumentation Modules with Safety Function."

c14. The equipment and instrumentation changes, if any, made to comply with this item are contained in Table 3.2-1 under line items as "Electrical Modules

with Safety Function" or "Instrumentation Modules with Safety Function."

c15. The equipment and instrumentation changes, if any, made to comply with this item are contained in Table 3.2-1 under HVAC System. | 9

c16. The equipment and instrumentation changes, if any, made to comply with this item are contained in Table 3.2-1 under line items as "Electrical Modules with Safety Function" or "Instrumentation Modules with Safety Function."

c17. The equipment and instrumentation changes, if any, made to comply with this item are contained in Table 3.2-1 under line items as "Electrical Modules with Safety Function" or "Instrumentation Modules with Safety Function."

c18. The equipment and instrumentation changes, if any, made to comply with this item are contained in Table 3.2-1 under line items as "Electrical Modules with Safety Function" or "Instrumentation Modules with Safety Function." See revised Table 3.2-1.

c19. Emergency plans (and related equipment) are not safety related. Administrative procedures ensure the proper storage, calibration, and maintenance of emergency plans (and related equipment) (See Note 34) | 9

c20. Equipment and other items associated with the emergency support facilities are not safety related. Administrative procedures ensure the proper storage, calibration, and maintenance of emergency support facility. (See Note 34)

c21. See revised Table 3.2-1. (See Note 34)

c22. Required items are included under the HVAC Systems heading and are defined further in Section 6.4, Habitability. (pg 15).

3.2 CLASSIFICATION OF STRUCTURES, SYSTEMS, AND COMPONENTS

3.2.1 Seismic Classification

The seismic classification for Unit 2 structures, systems, and components is listed in Table 3.2-1. The classification meets the intent of Regulatory Guide 1.29, except as otherwise noted in the table.

Seismic Category I structures, systems, and components are those necessary to ensure:

1. The integrity of the reactor coolant pressure boundary (RCPB).

2. The capability to shut down the reactor and maintain it in a safe shutdown condition.

3. The capability to prevent or mitigate the consequences of accidents that could result in potential offsite exposures comparable to the guideline exposures of 10CFR100.

Seismic Category I structures, systems, and components, including their foundations and supports, are designed to withstand the effects of a safe shutdown earthquake (SSE) and remain functional. The term Category I Structures used elsewhere in this section means Seismic Category I Structures as defined herein.

All Seismic Category I structures, systems, and components are analyzed for the loading conditions of the SSE and the operating basis earthquake (OBE). Since the two earthquakes have different intensities, the design of Seismic Category I structures, components, equipment, and systems to resist each earthquake and other loads is based on levels of material stress or load factors, whichever are applicable, and provides margins of safety appropriate for each earthquake. The margin of safety provided for structures, components, and systems important to safety for the SSE is sufficiently large to assure that their design functions are not jeopardized. 9

For further details of seismic design criteria, refer to the following sections:

Seismic Design	3.7

Seismic Design	3.7
Design of Category I Structures	3.8
Mechanical Systems and Components	3.9
Seismic Qualification of Category I Instrumentation and Electrical Equipment	3.10
Design Assessment Report for Hydrodynamic Loads	Appendix 6A

3.2.2 System Quality Group Classifications

System quality group classifications, as defined in Regulatory Guide 1.26, have been determined for each water, steam, or radioactive waste containing component of those applicable fluid systems relied upon to:

1. Prevent or mitigate the consequence of accidents and malfunctions originating within the RCPB.

2. Permit shutdown of the reactor and maintain it in the safe shutdown condition.

3. Contain radioactive material.

A tabulation of quality group classifications for each component so defined is shown in Table 3.2-1 under the heading Quality Group Classification. Corresponding design and fabrication requirements are provided in Table 3.2-2. Figure 3.2-1 depicts the relative locations of these components along with their quality group classifications. For a more detailed guide to ~~safety-related~~ quality group boundaries for each safety-related system, refer to the system diagram given in the applicable system section of this FSAR.

Table 3.2-4 identifies the code, code edition, and addenda used in the construction of each Quality Group A (ASME Section III, Class I) component in the reactor coolant pressure boundary. 9

3.2.3 Quality Assurance

Structures, systems, and components whose safety functions require conformance to the quality assurance requirement of 10CFR50, Appendix B, are summarized in Table 3.2-1 under the

heading Quality Assurance Requirement. The quality assurance program is described in Chapter 17.

3.2.4 Correlation of Safety Classes with Industry Codes

The design of plant equipment is commensurate with the safety importance of the equipment. Hence, the various safety classes have a gradation of design requirements. The correlation of safety classes with other design requirements is summarized in Tables 3.2-2 and 3.2-3.

TABLE 3.2-1

EQUIPMENT AND STRUCTURE CLASSIFICATION

32,33,34

	Scope of Supply	Location	Electrical Classification	Seismic Category	Quality Group Classification	Quality Assurance Requirement(31)	Tornado Protection	Notes	
Reactor System									
Reactor vessel	GE	PC	NA	I	A	I	P		
Reactor vessel support skirt	GE	PC	NA	I	NA	I	P		
Reactor vessel appurtenances, pressure retaining portions	GE	PC	NA	I	A	I	P		
CRD housing supports	GE	PC	NA	I	NA	I	P		
Reactor internal structures, engineering safety features	GE	PC	NA	I	NA	I	P	(1)	
Reactor internal structures, other	GE	PC	NA	NA	NA	NA	P	(2) (34)	
Control rods	GE	PC	NA	I	NA	I	P		
Control rod drives	GE	PC	NA	I	NA	I	P		
Core support structure	GE	PC	NA	I	NA	I	P		
Fuel assemblies	GE	PC	NA	I	NA	I	P		
Reactor vessel stabilizer	GE	PC	NA	I	NA	I	P	(30)	9
Reactor vessel insulation	P	PC	NA	NA	NA	NA	P	(34)	
Nuclear Boiler System									
Instrumentation condensing chambers	GE	PC	NA	I	A	I	P		
SRV air accumulators	P	PC	NA	I	B	I	P		
Piping, SRV discharge	P	PC	NA	I	C	I	P		
Piping, main steam within outermost isolation valve	P	PC	NA	I	A	I	P	(3)	
Pipe supports, main steam within outermost isolation valve	P	PC	NA	I	A	I	P		
Pipe whip restraints, main steam, and feedwater	P	PC,RB	NA	I	NA	I	P		
Piping, feedwater within outermost isolation valve	P	PC	NA	I	A	I	P		
Piping, other RCPB piping within outermost isolation valve	P	PC	NA	I	A	I	P	(3)	
Piping, instrumentation beyond outermost isolation valve	P	RB,TB	NA	I or NA	B or D	I or NA	P	(3)	9
Safety/relief valves	GE	PC	1E	I	A	I	P		

TABLE 3.2-1

EQUIPMENT AND STRUCTURE CLASSIFICATION

	Scope of Supply	Location	Electrical Classification	Seismic Category	Quality Group Classification	Quality Assurance Requirement (31,32,33,34)	Tornado Protection	Notes	
Valves, main steam isolation valves (MSIV)	P	PC,RB	1E	I	A	I	P		
Valves, feedwater isolation valves	P	PC,RB	1E	I	A	I	P		
Valves, other isolation valves and within outermost isolation valve	P	PC,RB	1E	I	A	I	P		
Valves, instrumentation beyond outermost isolation valve	P	RB	NA	I or NA	B or D	I or NA	P	(3)	
Instrumentation modules with safety function	GE	RB	1E	I	NA	I	P		
Electrical modules with safety function	GE	RB	1E	I	NA	I	P		9
Cable, cable trays, and fabricated supports with safety function	P	C,RB,H	1E	I	NA	I	P		
T-Quenchers	P	PC	NA	I	C	I	P		
Recirculation System									
Piping, essential	GE,P	PC,RB	NA	I	A,B	I	P	(3)	
Pipe suspension, recirculation line	GE	PC	NA	I	NA	I	P		
Pipe restraints, recirculation line	GE	PC	NA	I	NA	I	P	(4)	
Pumps	GE	PC	NA	I	A	I	P		
Valves, essential, including containment isolation	GE,P	PC,RB	1E	I	A,B,C	I	P	(24)	9
Piping and valves, other	P	RB	NA	NA	D	NA	P	(25)	(move up one line)
Pump motors	GE	PC	Non-1E	I	NA	I	P		
Electrical modules with safety function	GE	RB	1E	I	NA	I	P		
Cable, cable trays, and fabricated supports with safety function	P	C,RB,H	1E	I	NA	I	P		9
LMFG set	GE	H	Non-1E	NA	NA	NA	NB		
Piping, hydraulic lines	P	PC,RB	NA	I	D	NA	P		

TABLE 3.2-1

EQUIPMENT AND STRUCTURE CLASSIFICATION

	Scope of Supply	Location	Electrical Classification	Seismic Category	Quality Group Classification	Quality Assurance Requirement (31) (32,33,34)	Tornado Protection	Notes	
CRD Hydraulic System									
Valves, scram discharge volume lines	GE	PB	1E	I	B	I	P		
Valves, insert and withdraw lines	P	RB	NA	I	B	I	P	(5)	
Valves, other	GE,P	RB	Non-1E	NA	D	NA	P		
Piping, scram discharge volume lines	P	RB	NA	I	B	I	P		
Piping, insert and withdraw lines	P	PC,RB	NA	I	B	I	P	(5)	
Piping, other	P	RB	NA	NA	D	NA	P		
Hydraulic control unit	GE	RB	NA	I	Special	I	P	(6)	
CRD pumps, filters and strainers	GE	RB	Non-1E	NA	D	NA	P		
Electric modules with safety function	GE	RB	1E	I	NA	I	P		
Cable, cable trays, and fabricated supports with safety function	P	C,RB,M	1E	I	NA	I	P		9
Scram discharge volume header	P	RB	NA	I	B	I	P		
Standby Liquid Control System									
Standby liquid control storage tank	GE	RB	NA	I	B	I	P		
Pumps	GE	RB	NA	I	B	I	P		
Pump motors	GE	RB	1E	I	NA	I	P		
Valves, explosive	GE	RB	1E	I	A	I	P		
Valves, isolation and within primary containment	P	PC,RB	NA	I	A	I	P		
Valves, beyond isolation valves	P	RB	1E	I	B	I	P		
Piping, downstream of explosive valves	P	PC,RB	NA	I	A	I	P		
Piping, upstream of explosive valves	P	RB	NA	I	B	I	P		
Electrical modules with safety function	GE	RB	1E	I	NA	I	P		

TABLE 3.2-1 (Cont)

32,33,34

	Scope of Supply	Location	Electrical Classification	Seismic Category	Quality Group Classification	Quality Assurance Requirement (31)	Tornado Protection	Notes	
Cable, cable trays, and fabricated supports with safety function	P	C,RB,M	1E	I	NA	I	P		9
Test tank	P	RB	NA	NA	D	NA	P		
Piping and valves, other	P	RB	NA	NA	D	NA	P		

TABLE 3.2-1 (Cont)

(31, 32, 33, 34)

	Scope of Supply	Location	Electrical Classification	Seismic Category	Quality Group Classification	Quality Assurance Requirement	Tornado Protection	Notes
Neutron Monitoring System								
Piping, TIP	P,GE	PC,RB	NA	I	B	I	P	
Valves, isolation, TIP subsystem	GE	RB	Non-1E	I	B	I	P	
Electrical modules, IRM, SRM, and APRM	GE	RB	1E	I	NA	I	P	
Cable, IRM, SRM, and APRM	P	PC,RB	1E	NA	NA	I	P	
Reactor Protection System								
Electrical modules	GE	C,PC,RB,T	1E	I	NA	I	P	
Cable	P	C,PC,RB,T	1E	I	NA	I	P	
Leak Detection System								
Temperature elements (sensors)	GE	PC,RB,M	1E	I	NA	I	P	
Temperature switches	GE	C	1E	I	NA	I	P	
Pressure transmitters	GE	C	1E	I	NA	I	P	
Pressure switches	GE	C	1E	I	NA	I	P	
Differential temperature switches	GE	C	1E	I	NA	I	P	
Differential pressure switches	GE	C	1E	I	NA	I	P	
Differential pressure transmitters	GE	C	1E	I	NA	I	P	
Flow transmitters	GE	RB	1E	I	NA	I	P	
Differential flow switches	GE	C	1E	I	NA	I	P	
Primary containment radiation monitors (containment atmosphere monitoring system)	P	RB	1E	I	NA	I	P	
Drywell floor and equipment drain tank level transmitters	P	RB	Non-1E	NA	NA	NA	P	
Reactor building floor drain sump level switches	P	RB	Non-1E	NA	NA	NA	P	
Reactor building equipment drain tank level switches	P	RB	Non-1E	NA	NA	NA	P	
Differential flow summers	GE	M	1E	I	NA	I	P	
Timer switches	GE	M	1E	I	NA	I	P	

TABLE 3.2-1 (Cont)

	Scope of Supply	Location	Electrical Classification	Seismic Category	Quality Group Classification	Quality Assurance Requirement (31) (32,33,34)	Tornado Protection	Notes	
ECCS pump room flood level switches	P	RB	1E	I	NA	I	P		
Power Supplies	GE	M	1E	I	NA	I	P		
Area, Process, and Effluent Radiation Monitors									
Nonsafety plant area monitors	P	RB,M,T,W	Non-1E	NA	NA	NA	P,NR		
Main steam line monitors	GE	M	1E	I	NA	I	P		
Process ventilation monitors for control room and reactor building with isolation signals	P	RB,C	1E	I	NA	I	P		
Process and effluent liquid monitors on service water system	P	M	1E	I	NA	I	P		
High-range containment area monitors (NUREG-0737, Item II.F.1)	P	PC	1E	I	NA	I	P		9
Effluent monitors with high-range capabilities (NUREG-0737, Item II.F.1)	P	T,M	Non-1E	NA	NA	NA	P,NR	(27)	
Nonsafety process and effluent monitors on liquid and gaseous radwaste, reactor and turbine water, circulating water, spent fuel cooling and cleanup, and standby gas treatment (normal drywell purge) systems	P	RB,M,T,W	Non-1E	NA	NA	NA	P,NR		
Cable, cable trays, and fabricated supports with safety function	P	C,RB	1E	I	NA	I	P		
Residual Heat Removal (RHR) System									
Heat exchangers, primary side	GE	RB	NA	I	B	I	P		
Heat exchangers, secondary side	GE	RB	NA	I	C	I	P		

TABLE 3.2-1 (Cont)

	Scope of Supply	Location	Electrical Classification	Seismic Category	Quality Group Classification	Quality Assurance Requirement (31) (32,33,34)	Tornado Protection	Notes
Piping, connected to RCPB within outermost isolation valves	P	PC,RB	NA	I	A	I	P	(3)
Piping, other	P	PC,RB	NA	I	B	I	P	12
Pumps	GE,P	RB	NA	I	B	I	P	
Pump motors	GE,P	RB	1E	I	NA	I	P	
Pump suction strainers in suppression pool	P	PC	NA	I	B	I	P	
Containment spray nozzles	P	PC	NA	I	B	I	P	
Valves, isolation, RCPB	P	PC,RB	1E	I	A	I	P	
Valves, other	P	PC,RB	1E	I	B	I	P	
Electrical modules with safety function	GE	RB	1E	I	NA	I	P	
Cable, cable trays, and fabricated supports with safety function	P	C,RB,M	1E	I	NA	I	P	
Pipe whip restraints	P	PC	NA	I	NA	I	P	

TABLE 3.2-1 (Cont)

32,33,34

	Scope of Supply	Location	Electrical Classification	Seismic Category	Quality Group Classification	Quality Assurance Requirement (31)	Tornado Protection	Notes
Low-Pressure Core Spray (LPCS) System								
Piping, connected to RCPB within outermost isolation valves	P	PC,RB	NA	I	A	I	P	(3)
Piping, other	P	RB	NA	I	B	I	P	
Pumps	GE,P	RB	NA	I	B	I	P	
Pump motors	GE,P	RB	1E	I	NA	I	P	
Valves, isolation, RCPB	P	PC,RB	1E	I	A	I	P	
Valves, other	P	RB	1E	I	B	I	P	
Electrical modules with safety function	P	RB	1E	I	NA	I	P	
Cable, cable trays, and fabricated supports with safety function	P	C,RB,M	1E	I	NA	I	P	
Pipe whip restraints	P	PC	NA	I	NA	I	P	
High-Pressure Core Spray (HPCS) System								
Piping, connected to RCPB within outermost isolation valves	P	PC,RB	NA	I	A	I	P	(3)
Piping, other	P	RB	NA	I	B	I	P	
Piping, return test line to condensate storage tank beyond second isolation valve	P	RB,M	NA	NA	D	NA	P	
Pumps	GE,P	RB	NA	I	B	I	P	
Pump motors	GE,P	RB	1E	I	NA	I	P	
Valves, isolation, RCBP	P	PC,RB	1E	I	A	I	P	
Valves, other	P	RB	1E	I	B	I	P	
Electrical modules with safety function	GE	RB	1E	I	NA			
Cable, cable trays, and fabricated supports with safety function	P	C,RB,M	1P					

TABLE 3.2-1 (Cont)

32,33,34

	Scope of Supply	Location	Electrical Classification	Seismic Category	Quality Group Classification	Quality Assurance Requirement (31)	Tornado Protection	Notes	
Reactor Core Isolation Cooling (RCIC) System									13
Piping, connected to RCPB within outermost isolation valves	P	PC,RB	NA	I	A	I	P	(3)	13
Piping, other	P	RB	NA	I	B	I	P		
Piping, return test line to condensate storage tank beyond second isolation valve	P	RB,M	NA	NA	D	NA	P,NR		
Pumps, RCIC and system pressure	GE,P	RB	NA	I	B	I	P		
System pressure pump motor	P	RB	1E	I	NA	I	P		
Turbine	GE	RB	NA	I	NA	I	P	(7)	13
Valves, isolation, RCPB	P	PC,RB	1E	I	A	I	P		
Valves, other	P	BB	1E	I	B	I	P		
Electrical modules with safety function	GE	RB	1E	I	NA	I	P		
Cable, cable trays, and fabricated supports with safety function	P	C,RB,M	1E	I	NA	I	P		
Pipe whip restraints	P	PC,RB	NA	I	NA	I	P		
Fuel Service Equipment									
Fuel preparation machine	GE	RB	NA	I	NA	I	P		
General purpose grapple	GE	RB	NA	NA	NA	I	P	(8)	
Reactor Vessel Service Equipment									
Steam line plugs	GE	RB	NA	NA	NA	NA	P		
Dryer and separator sling and head strongback	GE	RB	NA	NA	NA	I	P	(8)	
Invessel Service Equipment									
Control rod grapple	GE	RB	NA	NA	NA	I	P	(8)	

(valve motors)

TABLE 3.2-1 (Cont)

	Scope of Supply	Location	Electrical Classification	Seismic Category	Quality Group Classification	Quality Assurance Requirement (31) (32,33,34)	Tornado Protection	Notes
Refueling Equipment								
Refueling equipment platform assembly	GE	RB	NA	I	NA	I	P	
Refueling bellows	P	RB	NA	NA	NA	NA	P	13
Spent fuel pool liner	P	RB	NA	I	NA	I	P	
Storage Equipment								
Fuel storage racks	GE,P	RB	NA	I	NA	I	P	
Fuel storage container	GE	RB	NA	NA	NA	I	P	(9)
Radwaste Management Systems								
Liquid Radwaste System								
Tanks and vessels	P	RB,W	NA	NA	D	NA	P,NR	(10,11)
Heat exchangers	P	W	NA	NA	D	NA	NR	(11)
Piping	P	RB,W	NA	NA	D	NA	P,NR	(11)
Valves	P	RB,W	Non-1E	NA	D	NA	P,NR	(11)
Pumps	P	RB,W	Non-1E	NA	D	NA	P,NR	(11)
Solid Radwaste System								
Tanks and vessels	P	W	NA	NA	D	NA	NR	(11,12)
Heat exchangers	P	W	NA	NA	D	NA	NR	(11,12)
Piping	P	W	NA	NA	D	NA	NR	(11,12)
Valves	P	W	Non-1E	NA	D	NA	NR	(11,12)
Pumps	P	W	Non-1E	NA	D	NA	NR	(11,12)
Off-gas System								
Tanks and vessels	P	T	NA	NA	D	NA	NR	(11)
Heat exchangers	P	T	NA	NA	D	NA	NR	(11)
Piping	P	T	NA	NA	D	NA	NR	(11)
Valves	P	T	Non-1E	NA	D	NA	NR	(11)
Pumps	P	T	Non-1E	NA	D	NA	NR	(11)
Mechanical modules	P	T	NA	NA	D	NA	NR	(11)

TABLE 3.2-1 (Cont)

	Scope of Supply	Location	Electrical Classification	Seismic Category	Quality Group Classification	Quality Assurance Requirement (31) (32,33,34)	Tornado Protection	Notes
Reactor Water Cleanup System								
Vessels, filter/demineralizers	GE	RB	NA	NA	C	NA	P	
Heat exchangers, reactor water sides	GE	RB	NA	NA	C	NA	P	
Heat exchanger, cooling water side	GE	RB	NA	NA	D	NA	P	
Piping, within outermost isolation valves	P	PC,RB	NA	I	A	I	P	(3)
Piping, beyond outermost isolation valves	P	RB	NA	I	C	I	P	
Piping, auxiliary	P	M,RB,T,W	NA	NA	D	NA	P,NR	
Pumps	GE	RB	NA	NA	C	NA	P	
Pump motors	GE	RB	Non-1E	NA	NA	NA	P	
Valves, isolation and within outermost isolation valves	P	PC,RB	1E	I	A	I	P	
Valves, beyond outermost isolation valves	a) GE b) P	RB RB	Non-1E Non-1E	NA NA	C C	NA I	P P	(35)
Valves, auxiliary	GE	RB	Non-1E	NA	D	NA	P	
Electrical modules with safety function	P	RB	1E	I	NA	I	P	
Cable, cable trays, and fabricated supports with safety function	P	C,RB,M	1E	I	NA	I	P	
Pipe whip restraints	P	PC,RB	NA	I	NA	I	P	
Post-Accident Sampling System								
Sample panel piping station and control panel	GE	T	Non-1E	NA	D	NA	NR	(34)
Other piping tubing, valves, and components	P	RB,T	Non-1E	NA	D	NA	NR	
Fuel Pool Cooling and Cleanup System								
Fuel Pool Cleanup Subsystem								
Vessels, filter demineralizers	P	RB	NA	NA	D	NA	P	

TABLE 3.2-1 (Cont)

32,33,34

	Scope of Supply	Location	Electrical Classification	Seismic Category	Quality Group Classification	Quality Assurance Requirement(31)	Tornado Protection	Notes
Piping	P	RB	NA	NA	D	NA	P	
Valves	P	RB	Non-1E	NA	D	NA	P	
Pumps, holding and mixing	P	RB	Non-1E	NA	D	NA	P	
Fuel Pool Cooling Subsystem								
Tanks, skimmer surge	P	RB	NA	I	C	I	P	
Heat exchangers	P	RB	NA	I	C	I	P	
Pumps, cooling	P	RB	NA	I	C	I	P	

TABLE 3.2-1 (Cont)

	Scope of Supply	Location	Electrical Classification	Seismic Category	Quality Group Classification	Quality Assurance Requirement(31)	Tornado Protection	Notes
Pump motors	P	RB	1E	I	NA	I	P	
Piping, safety-related	P	PC,RB	NA	I	B,C	I	P	
Piping, nonsafety-related	P	PC,RB	NA	NA	D	NA	P	
Valves, safety-related	P	PC,BB	1E	I	B,C	I	P	
Valves, nonsafety-related	P	PC,BB	Non-1E	NA	D	NA	P	
Valves, containment isolation	P	PC,RB	NA	I	B	I	P	
Control Room Panels								
Electrical modules with safety function	GE	C	1E	I	NA	I	P	
Cable, cable trays, and fabricated supports with safety function	P	C	1E	I	NA	I	P	
Local Control Panels and Racks								
Electrical modules with safety function	GE,P	RB	1E	I	NA	I	P	
Cable, cable trays, and fabricated supports with safety function	P	C,RB	1E	I	NA	I	P	
Remote shutdown panel	P	C	1E	I	NA	I	P	
Controls/instruments with safety function	GE,P	C,RB	1E	I	NA	I	P	10
Instruments nonessential	P	C	Non-1E	I	NA	NA	P	
Instrument Air System								
ADS accumulators	P	PC,RB	NA	I	G	I	P	
ADS piping lines between accumulators and safety-related equipment	P	PC	NA	I	C	I	P	
ADS valves in lines between accumulators and safety-related equipment	P	PC	1E	I	C	I	P	
ADS piping lines for long-term makeup from outside the standby gas treatment building (nitrogen system)	P	RB,O	NA	I	C	I	P	

TABLE 3.2-1 (Cont)

32,33,34

	Scope of Supply	Location	Electrical Classification	Seismic Category	Quality Group Classification	Quality Assurance Requirement(31)	Tornado Protection	Notes
ADS valves for long-term makeup from outside the standby gas treatment building (nitrogen system)	P	RB,O	NA	I	C	I	P	
ADS piping containment isolation	P	PC,RB	NA	I	B	I	P	
ADS valves containment isolation	P	PC,RB	1E	I	B	I	P	
ADS instrumentation	P	PC,RB	1E	I	C,NA	I,NA	P	
Vessels, accumulators, supporting safety-related equipment	P	PC,RB	NA	I	C	I	P	
Piping in lines between accumulators and safety-related equipment	P	PC,RB	NA	I	C	I	P	
Valves in lines between accumulators and safety-related equipment	P	PC,RB	1E	I	C	I	P	
Piping containment isolation	P	PC,RB	NA	I	B	I	P	
Valves containment isolation	P	PC,RB	1E	I	B	I	P	
Electrical modules with safety function	P	PC	1E	I	NA	I	P	
Cables, cable trays, and fabricated supports with safety function	P	PC,RB	1E	I	NA	I	P	
Piping, nonessential	P	C,PC,RB,M,T,P,S,W	NA	NA	D	NA	P,NP	
Valves, nonessential	P	C,PC,RB,M,T,P,S,W	Non-1E	NA	D	NA	P,NP	

TABLE 3.2-1 (Cont)

	Scope of Supply	Location	Electrical Classification	Seismic Category	Quality Group Classification	Quality Assurance Requirement(31) (32,33,34)	Tornado Protection	Notes
Other equipment	P	RB,T	NA	NA	D	NA	P,NR	
Service and Breathing Air Systems								
Piping, containment isolation	P	PC,RB	NA	I	B	I	P	
Valves, containment isolation	P	PC,RB	1E	I	B	I	P	
Electric modules with safety function	P	PC,RB	1E	I	NA	I	P	9
Cables, cable trays, and fabricated supports with safety function	P	PC,RB	1E	I	NA	I	P	
Piping, other	P	C,PC,RB,M,T,P,S,W	NA	NA	D	NA	P,NR	
Valves, other	P	C,PC,RB,M,T,P,S,W	Non-1E	NA	D	NA	P,NR	
Other equipment	P	T	NA	NA	D	NA	NR	
Service Water System								
Piping, for essential components	P	C,M,P,RB,S	NA	I	C	I	P	
Piping, for nonessential components	P	M,P,RB,T	NA	NA	D	NA	P,NR	
Valves, for essential components	P	C,M,P,RB,S	1E	I	C	I	P	
Valves, for nonessential components	P	M,P,RB,T	Non-1E	NA	D	NA	P,NR	
Pumps	P	P	NA	I	C	I	P	
Pump motors	P	P	1E	I	C	I	P	
Strainers, self-cleaning	P	P	1E	I	C	I	P	
Electrical modules with safety function	P	C,M,P,RB,S	1E	I	NA	I	P	
Cable, cable trays, and fabricated supports with safety function	P	C,M,P,RB,S	1E	I	NA	I	P	9
Reactor Building Closed Loop Cooling Water System								
Piping, between containment isolation valves	P	PC,RB	NA	I	B	I	P	
Piping, for essential components	P	PC,RB	NA	I	C	I	P	

TABLE 3.2-1 (Cont)

32,33,34

	Scope of Supply	Location	Electrical Classification	Seismic Category	Quality Group Classification	Quality Assurance Requirement(31)	Tornado Protection	Notes	9
Piping, for nonessential components	P	PC,RB,T	NA	NA	D	NA	P,NR		

TABLE 3.2-1 (Cont)

	Scope of Supply	Location	Electrical Classification	Seismic Category	Quality Group Classification	Quality Assurance Requirement (31,32,33,34)	Tornado Protection	Notes
Valves, isolation	P	PC,RB	1E	I	B	I	P	
Valves, for essential components	P	RB	1E	I	C	I	P	
Valves, for nonessential components	P	PC,RB,T	Non-1E	NA	D	NA	P,NR	
Pumps	P	RB	Non-1E	NA	D	NA	P	
Heat exchangers	P	RB	NA	NA	D	NA	P	
Expansion tank and strainers	P	RB	NA	NA	D	NA	P	
Turbine Building Closed Loop Cooling Water System								
Piping	P	T,W	NA	NA	D	NA	NR	
Valves	P	T,W	Non-1E	NA	D	NA	NR	
Heat exchangers	P	T	NA	NA	D	NA	NR	
Pumps	P	T	Non-1E	NA	D	NA	NR	
Power Conversion System								
Main steam piping between outermost isolation valves up to but not including turbine stop valves	P	RB,T,M	NA	I	D	I	P	(13,14)
Main steam branch piping to first valve capable of timely actuation	P	T	NA	I	D	I	NR	(13)
Main turbine bypass piping up to bypass valve	P	T	NA	I	D	I	NR	(13)
First valve that is normally closed or capable of automatic closure in branch piping connected to main steam and turbine bypass piping	P	T	Non-1E	I	D	I	NR	(14)
Turbine stop valves, turbine control valves, and turbine bypass valves	P	T	Non-1E	NA	D	NA	NR	(15-17)
Main steam leads from turbine control valve to turbine casing	P	T	NA	NA	D	NA	NR	(15,17)
Feedwater and condensate system beyond long-term isolation valve	P	RB,T	NA	NA	D	NA	NR	(18)

TABLE 3.2-1 (Cont)

	Scope of Supply	Location	Electrical Classification	Seismic Category	Quality Group Classification	Quality Assurance Requirement (31)	Tornado Protection	Notes
Condensate Storage and Transfer System								
Condensate storage tank	P	H	NA	NA	D	NA	NR	(19)
Piping	P	H,P,RB,T,W	NA	NA	D	NA	NR	
Valves and other components	P	H,P,RB,T,W	Non-1E	NA	D	NA	NR	
Standby Gas Treatment System								
Filter units, including electrical heating coils	P	H	1E	I	NA	I	P	
Automatic valves	P	H,RB	1E	I	B	I	P	
Piping and manual valves, essential	P	H,RB	NA	I	B	I	P	
Piping and manual valves, nonessential	P	H,RB	NA	NA	D	NA	P	
All other components, essential	P	H	1E	I	NA	I	P	
All other components, nonessential	P	H,RB	Non-1E	NA	NA	NA	P	
Primary Containment Purge System								
Automatic isolation valves	P	RB	1E	I	C	I	P	
Piping and manual valves, essential	P	RB	NA	I	C	I	P	
All other components, essential	P	RB	Non-1E	I	C	I	P	
All other components, nonessential	P	RB	NA	NA	D	NA	P	
Diesel Generator Systems								
Piping, fuel oil	P	O,S	NA	I	C	I	P	
Valves, fuel oil	P	O,S	1E	I	C	I	P	
Pumps, fuel oil	P	S	NA	I	C	I	P	
Pump motors, fuel oil system	P	S	1E	I	NA	I	P	
Day tanks	P	S	NA	I	C	I	P	
Diesel fuel storage tanks	P	S	NA	I	C	I	P	
Piping, air startup, essential	P	S	NA	I	C	I	P	
Valves, air startup, essential	P	S	1E	I	C	I	P	
Piping, air startup, nonessential	P	S	NA	NA	D	NA	P	

TABLE 3.2-1 (Cont)

32,33,34

	Scope of Supply	Location	Electrical Classification	Seismic Category	Quality Group Classification	Quality Assurance Requirement (31)	Tornado Protection	Notes	
Compressors, air startup	P	S	Non-1E	NA	D	NA	P		
Receivers, air startup	P	S	NA	I	C	I	P		
Standby diesel-generators	P,GE	S	1E	I	B	I	P		
HPCS diesel-generator	GE	S	1E	I	B	I	P		
HPCS Diesel Generator Cooling Water System									
Heat exchanger	GE	S	NA	I	C	I	P		
Piping and valves, engine mounted	GE	S	NA	I	(25)	I	P	(26)	9
Piping and valves, other	P	S	NA	I	C	I	P		9
HPCS Diesel Generator Lube Oil System									
Heat exchanger	GE	S	NA	I	(25)	I	P	(26)	
Piping and valves	GE	S	NA	I	(25)	I	P	(26)	9
Pumps, motors	GE	S	1E	I	(25)	I	P	(26)	
HPCS Diesel Generator Combustion Air Intake and Exhaust System									
Silencers	GE	S	NA	I	NA	I	P		9
Piping	P	S	NA	I	C	I	P		
Filter	GE	S	NA	I	(25)	I	P	(26)	9

TABLE 3.2-1 (Cont)

Diesel Generator Systems	Scope of Supply	Location	Electrical Classification	Seismic Category	Quality Group Classification	Quality Assurance Requirement (31) (32, 33, 34)	Tornado Protection	Notes
Electrical modules with safety function	P	S,M	1E	I	C	I	P	
Cable, cable trays, and fabricated supports with safety function	P	S,M	1E	I	C	I	P	
Floor and Equipment Drainage Systems								
Sumps	P	RB,C,T,W, P,S,M	NA	NA	D	NA	P,NR	
Pumps	P	RB,C,T,W, P,S,M	Non-1E	NA	D	NA	P,NR	
Piping, containment isolation	P	PC,RB	NA	I	B	I	P	
Piping, other	P	RB,C,T,W, P,S,M,M	NA	NA	D	NA	P,NR	
Valves, containment isolation	P	PC,RB	1E	I	B	I	P	
Valves, other	P	RB,C,T,W, P,S,M	Non-1E	NA	D	NA	P,NR	
Tanks	P	RB	NA	NA	D	NA	P	
Hydrogen Recombiner System								
Recombiners	P	RB	1E	I	B	I	P	
Piping, essential	P	PC,RB	NA	I	B	I	P	
Valves, essential	P	PC,RB	1E	I	B	I	P	
Piping, containment isolation	P	PC,RB	NA	I	B	I	P	
Valves, containment isolation	P	PC,RB	1E	I	B	I	P	
Fire Protection Systems								
Water spray deluge systems	P	PC,RB,C,T, W,M,O	Non-1E	NA	D	NA	P,NR	13
Sprinkler systems	P	RB,C,T,W, P,S,M	Non-1E	NA	D	NA	P,NR	
Carbon dioxide systems	P	C,T,W,RB	Non-1E	NA	D	NA	P,NR	13
Halon systems	P	C,W	Non-1E	NA	D	NA	P,NR	
Portable and wheeled extinguishers	P	RB,C,T,W, P,M,S	NA	NA	D	NA	P,NR	

TABLE 3.2-1 (Cont)

32,33,34

	Scope of Supply	Location	Electrical Classification	Seismic Category	Quality Group Classification	Quality Assurance Requirement(31)	Tornado Protection	Notes	
Foam systems	P	T	Non-1E	NA	D	NA	NR		
Piping and valves, containment isolation	P	PC,RB	1E	I	B	I	P		9

TABLE 3.2-1 (Cont)

	Scope of Supply	Location	Electrical Classification	Seismic Category	Quality Group Classification	Quality Assurance Requirement (31) 32,33,34	Tornado Protection	Notes	
HVAC Systems									
Liquid chillers, essential	P	C	1E	I	C	I	P		
Liquid chillers, nonessential	P	M	Non-1E	NA	D	NA	NR		
Chilled water pumps, piping and accessories, essential	P	C	1E	I	C	I	P		
Chilled water pumps, piping and accessories, nonessential	P	M	Non-1E	NA	D	NA	NR		
Air conditioning units, essential	P	C	1E	I	C	I	P		
Air conditioning units, nonessential	P	C,T,M	Non-1E	NA	D	NA	P,NR		
Unit coolers, essential	P	C,RB,P,S	1E	I	C	I	P		
Unit coolers, nonessential	P	PC,T,P	Non-1E	NA	D	NA	P,NR		
Cooling coils	P	RB,T,W	Non-1E	NA	D	NA	P,NR		
Unit heaters, electric	P	RB,C,T,W P,S,N,M	Non-1E	NA	D	NA	P,NR		
Hot water heating/glycol piping and specialties	P	RB,T,W	Non-1E	NA	D	NA	P,NR		
Heat exchangers, steam to water	P	T	NA	NA	D	NA	NR		
Heating coils, essential	P	C	1E	I	NA	I	P		
Heating coils, nonessential	P	C,RB,N,M	Non-1E	NA	D	NA	P,NR		
Air filters, essential	P	C,M	NA	I	C	I	P		
Air filters, nonessential	P	RB,N,T,W, M,P,S	NA	NA	D	NA	P,NR		
Fans and motors, essential	P	C,S,M	1E	I	C	I	P		
Fans and motors, nonessential	P	C,N,RB,T,P, W,M,S	Non-1E	NA	D	NA	P,NR		
Ductwork and accessories, essential	P	C,RB,PC,P,S	1E	I	C	I	P		
Ductwork and accessories, nonessential	P	C,RB,PC,P, S,N,T,W,M,O	Non-1E	NA	D	NA	P,NR		
Auxiliary AC Power System									
13.8 kV emergency switchgear	P	M,C,RB	1E	I	NA	I	T,P		9
4.16 kV emergency switchgear	P	M,C,RB	1E	I	NA	I	T,P		
600 V emergency ~~load~~ load centers	P	M,C,RB	1E	I	NA	I	T,P		

TABLE 3.2-1 (Cont)

32,33,34

	Scope of Supply	Location	Electrical Classification	Seismic Category	Quality Group Classification	Quality Assurance Requirement(31)	Tornado Protection	Notes
600 V emergency motor control centers	P	M,C,RB	1E	I	NA	I	T,P	
600 V emergency distribution panels	P	M,C,RB	1E	I	NA	I	T,P	
120 V, 208/120 V and 120/240 V emergency distribution panels	P	M,C,RB	1E	I	NA	I	T,P	
Emergency distribution transformers	P	M,C,RB	1E	I	NA	I	T,P	
Containment electrical penetrations	P	M,C,RB	1E	I	NA	I	T,P	9
120 V ac emergency uninterruptible power supply systems	P	M,C,RB	1E	I	NA	I	T,P	
Emergency cables	P	M,C,RB	1E	I	NA	I	T,P	
Emergency cable trays, conduits, and fabricated supports	P		1E	I	NA	I	T,P	

TABLE 3.2-1 (Cont)

	Scope of Supply	Location	Electrical Classification	Seismic Category	Quality Group Classification	Quality Assurance Requirement (31) (32,33,34)	Tornado Protection	Notes
125-V DC Power System and racks								
125-V dc emergency batteries	P	R,C,RB	1E	I	NA	I	P	
125-V dc emergency battery chargers	P	R,C,RB	1E	I	NA	I	P	
125-V dc emergency switchgear	P	R,C,RB	1E	I	NA	I	P	
125-V dc motor control centers	P	R,C,RB	1E	I	NA	I	P	
125-V dc emergency distribution panels	P	R,C,RB	1E	I	NA	I	P	
Emergency cables	P	R,C,RB	1E	I	NA	I	P	
Emergency cable trays, conduits, and fabricated supports	P	R,C,RB	1E	I	NA	I	P	
DC Containment Penetrations	P	RB	1E	I	NA	I	P	
Miscellaneous Components								
Reactor building polar crane	P	RB	Non-1E	I	NA	I	(22)	
Civil Structures								(29)
Primary containment	NA	RB	NA	I	NA	I	P	(28)
Reactor building, including fuel storage facilities and auxiliary bays	NA	RB	NA	I	NA	I	T	(28)(36) | 11
Radwaste building	NA	W	NA	I	NA	NA	NR	(20)
Control building	NA	C	NA	I	NA	I	T	
Diesel generator building	NA	S	NA	I	NA	I	T	
Turbine building, including heater bay	NA	T	NA	NA	NA	NA	NR	
Main steam tunnel portion of turbine building	NA	T	NA	I	NA	I	T	
Service building, including foam room	NA	S	NA	NA	NA	NA	NR	
Screenwell service water pumphouse	NA	P	NA	I	NA	I	T	
Screenwell building, superstructure	NA	M	NA	NA	NA	NA	NR	
Intake structures and tunnels	NA	O	NA	I	NA	I	T	

TABLE 3.2-1 (Cont)

	Scope of Supply	Location	Electrical Classification	Seismic Category	Quality Group Classification	Quality Assurance Requirement (31)	Tornado Protection (32,33,34)	Notes	
Discharge tunnel and diffuser	NA	O	NA	NA	NA	NA	NR		
Main stack	NA	O	NA	I	NA	I	NR		
Off-gas room	NA	M	NA	I	NA	NA	NR		
Electrical tunnels, with safety-related cable	NA	M	NA	I	NA	I	T		
Normal switchgear building	NA	M	NA	NA	NA	NA	NR		
Auxiliary boiler building	NA	M	NA	NA	NA	NA	NR		
Standby gas treatment building	NA	M	NA	I	NA	I	T	(21)	9
Transformer foundations and fire walls	NA	M	NA	NA	NA	NA	NR		

TABLE 3.2-1 (Cont)

	Scope of Supply	Location	Electrical Classification	Seismic Category	Quality Group Classification	Quality Assurance Requirement (31) (32,33,34)	Tornado Protection	Notes
Railroad access lock	NA	M	NA	I	NA	I	T	
Railroad passage to turbine building	NA	M	NA	NA	NA	NA	NR	
Electrical bay	NA	M	NA	NA	NA	NA	NR	
Condensate storage tank building	NA	M	NA	NA	NA	NA	NR	
Access passageway, Unit 2 turbine building to administration building	NA	M	NA	NA	NA	NA	NR	
Cooling tower and flume	NA	O	NA	NA	NA	NA	NR	
Regeneration and condensate demineralizer rooms	NA	M	NA	NA	NA	NA	NR	
Auxiliary service building, substructure	NA	M	NA	I	NA	I	T	
Auxiliary service building, superstructure	NA	M	NA	NA	NA	NA	NR	
Demineralized water storage and waste neutralizing tank building	NA	M	NA	NA	NA	NA	NR	
Shorefront revetment ditch	NA	O	NA	NA(23)	NA	I	NR	
PNP exterior flood protection berms	NA	O	NA	NA	NA	I	NR	
Roof and storm drainage systems	P	RB,S,T,W, C,H,P,M,C	NA	NA	NA	NA	NR	
Spent fuel pool and Liner	NA	Pb	NA	I	NA	I	T	(29)
Miscellaneous Radiation Protection Equipment and Programs								
Portable radioactivity monitoring equipment	P	M	Non-1E	NA	NA	NA	NR	(34)
Radioactivity sampling equipment	P	M	Non-1E	NA	NA	NA	NR	(34)
Radioactivity contamination measurement and analysis equipment	P	M	Non-1E	NA	NA	NA	NR	(34)
Personnel monitoring equipment	P	M	Non-1E	NA	NA	NA	NR	(34)
Instrument storage, calibration, and maintenance program	P	M	NA	NA	NA	NA	NR	(34)

TABLE 3.2-1 (Cont)

	Scope of Supply	Location	Electrical Classification	Seismic Category	Quality Group Classification	Quality Assurance Requirement(31) 32,33,34	Tornado Protection	Notes	
Decontamination facilities	P	TB,W,d	NA	NA	NA	NA	NR		
Respiratory protection equipment	P	H	NA	NA	NA	NA	NR		
Contamination control equipment	P	H	Non-1E	NA	NA	NA	NR		9
Inplant I_2 monitoring equipment (NUREG-0737, Item III.D.3.3)	P	H	Non-1E	NA	NA	NA	NR	(34)	

TABLE 3.2-1 (Cont)

Keys to Abbreviations

KEY TO SCOPE OF SUPPLY:

GE = General Electric
P = Niagara Mohawk Power Corporation

KEY TO LOCATION:

PC = Primary containment
RB = Reactor building
M = Any other location
O = Outdoors onsite
S = Diesel generator building
T = Turbine building
W = Radwaste building
C = Control building
N = Normal switchgear building
P = Screenwell building

KEY TO ELECTRICAL CLASSIFICATION:

1E = Electrical equipment that meets the quality assurance standards of NRC guidelines and IEEE-323-1974.
Non-1E = Electrical equipment that is not required to meet 1E requirements.
NA = Not applicable because the equipment is not electrical.

KEY TO SEISMIC CATEGORY:

I = The equipment and structures are constructed in accordance with the requirements for Category I structures and components (Section 3.7).
NA = The seismic requirements for the SSE are not applicable to the equipment. No specific design is made to resist seismic forces. However, each system and component and its supporting elements is reviewed for proper anchorage and load carrying capability under seismic forces and evaluated on the basis of sound engineering judgement to ensure that failure of this class of equipment does not affect the operation of any Category I equipment or cause detrimental damage to Category I structures.

TABLE 3.2-1 (Cont)

KEY TO QUALITY GROUP CLASSIFICATION:

A,B, C,D = NRC quality group classification as defined in Regulatory Guide 1.26. The equipment is constructed in accordance with the codes listed in Table 3.2-2.
N/A = Quality group classification is not applicable to this equipment.

KEY TO QUALITY ASSURANCE REQUIREMENT:

I = Equipment meets the QA requirements of 10CFR50, in accordance with the QA program described in Chapter 17.
NA = QA requirements of 10CFR50 Appendix B are not applicable to this equipment.

KEY TO TORNADO PROTECTION:

T = Designed for tornado protection.
P = Tornado protection provided by virtue of location within a tornado-protected structure.
NR = Tornado protection is not provided.

Notes

(1) Application of Category I design criteria is limited to those reactor vessel internals that are part of engineered safety features, such as the core spray piping, core spray sparger, and hardware.

(2) These reactor vessel internal structures include the steam separators, steam dryers, and miscellaneous hardware items.

(3) a. Lines equivalent to 1-in or smaller liquid line that are part of the RCPB are Quality Group B and Category I.
b. All instrument lines connected to the RCPB and utilized to actuate and monitor safety systems are Quality Group B from the outer isolation valve or process shutoff valve (rootvalve) to the sensing instrumentation.
c. All instrument lines connected to the RCPB and not utilized to actuate and monitor safety systems are Quality Group D from the outer isolation valve or

TABLE 3.2-1 (Cont)

the process shutoff valve (root valve) to the sensing instrumentation.

d. All other instrument lines:

1) through the root valve are of the same classification as the system to which they are attached.
2) beyond the root valve, if used to actuate a safety system, are of the same classification as the system to which they are attached.
3) beyond the root valve, if not used to actuate a safety system, may be Quality Group D.

e. All sample lines from the outer isolation valve or the process root valve through the remainder of the sampling system are Quality Group D.

(4) Recirculation system pipe restraints are not required to function (i.e., restrain a pipe) during an earthquake. These restraints are designed to withstand an SSE without loss of functional capability.

(5) The CRD insert and withdraw lines from the drive flange up to and including the first valve on the hydraulic control unit (HCU) are Quality Group B. | 7

(6) The HCU is a GE factory-assembled engineered module of valves, tubing, piping, and stored water which controls a single CRD by the application of precisely timed sequences of pressures and flows to accomplish slow insertion or withdrawal of the control rods for power control and rapid insertion for reactor scram.

Although the HCU, as a unit, is field installed and connected to process piping, many of its internal parts differ markedly from process piping components because of the more complex functions they must provide. Thus, although the codes and standards invoked by Group A, B, C, and D pressure integrity quality levels clearly apply at all levels to the interfaces between the HCU and the connecting conventional piping components (e.g., pipe nipples, fittings, simple hand valves), it is considered that they do not apply to the specialty parts (e.g., solenoid valves, pneumatic components, and instruments).

The design and construction specifications for the HCU do invoke such codes and standards as can be reasonably

TABLE 3.2-1 (Cont)

applied to individual parts in developing required quality levels, but these codes and standards are supplemented with additional requirements for these parts and for the remaining parts and details. For example, 1) all welds are LP inspected, 2) all socket welds are inspected for gap between pipe and socket bottom, 3) all welding is performed by qualified welders, and 4) all work is done in accordance with written procedures. Quality Group D is generally applicable because the codes and standards invoked by that group contain clauses that permit the use of manufacturer's standards and proven design techniques not explicitly defined within the codes for Quality Groups A, B, or C. This is supplemented by the QC techniques previously described.

(7) The RCIC turbine does not fall within the applicable design codes. To assure that the turbine is fabricated to standards commensurate with safety and performance requirements, GE has established specific design requirements for this component as follows (all references below to the ASME Boiler and Pressure Vessel Code Section III are to the 1968 edition):

a. All pressure-containing castings and fabrications are hydrotested at 1.5 x design pressure.
b. All high-pressure castings are radiographed according to:
   ASTM E-94
   E-14 for maximum feasible volume
   E-71, 186, or 280 for Severity Level 3
c. As-cast surfaces are magnetic particle or liquid penetrant tested according to ASME Section III, Paragraph N-323.4 or N-323.3.
d. Wheel and shaft forgings are ultrasonically tested according to ASTM A-388.
e. Butt welds are radiographed and magnetic particle or liquid penetrant tested according to ASME Section III, Paragraph N 626 or N 627, respectively.
f. GE is to be notified of major repairs and records maintained thereof.
g. Record system and traceability is according to ASME Boiler and Pressure Vessel Code, Section III, Appendix IX, Paragraph IX-225.
h. Control and identification is according to ASME Section III, Appendix IX, Paragraph IX-226.
i. Procedures conform to ASME Section III, Appendix IX, Paragraph IX-300.

TABLE 3.2-1 (Cont)

j. Inspection personnel are qualified according to ASME Section III, Appendix IX, Paragraph IX-400.

(8) These items are classified as Seismic NA (except from seismic evaluation) because they suspend from a cable that dampens out the transmission of floor response spectra.

(9) The fuel storage container is classified as Seismic NA (exempt from seismic evaluation) because it is isolated from the seismic excitation.

(10) Liquid radwaste system atmospheric storage tanks made of fiberglass are designed, constructed, and tested in accordance with the requirements of ASTM D 3299-74 or NBS PS 15-69 (Section 11.2).

(11) Although Regulatory Guide 1.26 is not applicable, the equivalent quality group classification for radwaste management systems is Quality Group D. The radwaste management systems are designed, constructed, and tested in accordance with the QA provisions of Regulatory Guide 1.143.

(12) Waste solidification system components are designed, fabricated inspected, and tested in accordance with Topical Report No. WPC-VRS-1P (Section 11.4). This report was prepared by the Werner and Pfleiderer Corporation, supplier of the waste solidification system for Unit 2, and has been accepted by the NRC for reference in license applications.

(13) The main steam lines between the outermost containment isolation valve up to the turbine stop valve, the main turbine bypass lines up to the turbine bypass valve, and all branch lines connected to these portions of the main steam and turbine bypass lines up to the first valve capable of timely actuation are Quality Group D. These sections of pipe meet all of the pressure integrity requirements of Quality Group D plus the following additional requirements:

a. All longitudinal and circumferential butt weld joints are radiographed (or ultrasonically tested to equivalent standards). Where size or configuration does not permit effective volumetric examination, magnetic particle or liquid penetrant

TABLE 3.2-1 (Cont)

examination may be substituted. Examination procedures and acceptance standards are at least equivalent to those specified in ANSI B31.1.0.

b. All fillet and socket welds are examined by either magnetic particle or liquid penetrant methods. All structural attachment welds to pressure-retaining materials are examined by either magnetic particle or liquid penetrant methods. Examination procedures and acceptance standards are at least equivalent to those specified in ANSI B31.1.0.

c. The main steam line (MSL) from its outer isolation valve up to and including the turbine stop valve and all branch lines 2 1/2 inches in diameter and larger, up to and including the first valve (including restraints) is designed by the use of an appropriate dynamic seismic-system analysis to withstand OBE and DBE design loads in combination with other appropriate loads within the limits specified for Quality Group B pipe in ASME Section III. The mathematical model for the dynamic seismic analyses of the MSL and branch line piping includes the turbine stop valves and piping beyond the stop valves including the piping to the turbine casing. The dynamic input loads for design of the MSL are derived from a time history model analysis (or an equivalent method) of the reactor and applicable portions of the turbine building. The turbine building, housing the MSLs, may undergo some plastic deformation under the DBE, however, the plastic deformation will be limited to a ductility factor (defined as the ratio between the maximum displacement and the yield displacement) of 2 and an elastic multi-degree-of-freedom system analysis will be used to determine the input to the MSL. The stress allowable and associated deformation limits for piping will be in accordance with Quality Group B requirements for the OBE and DBE loading combinations. The MSL supporting structures (those portions of the turbine building) are such that the MSL and its supports can maintain their integrity within the Quality Group B requirements under the Category I seismic loading condition. 7

TABLE 3.2-1 (Cont)

d. The high integrity classification of the MSL from its outer isolation valve up to and including the turbine stop valve and all branch lines 2 1/2 in and larger, up to and including the first valve (as tabulated in this table, Power Conversion System, Items 1 through 6, and Note 14) is an acceptable equivalent of the integrity requirements of Quality Group B. The turbine stop valves and the piping beyond the stop valves to the turbine casing are not classified to Category I requirements. However, the turbine stop valves, and appropriate portions of the piping beyond the stop valves (including their restraints) are included in the mathematical model for the dynamic seismic analyses indicated in Note 13c. | 6 | 6

e. All inspection records will be maintained for the life of the station and will include data pertaining to qualification of inspection personnel, examination procedures, and examination results.

(14) The first valve capable of timely actuation in branch lines connected to the MSLs between the outermost containment isolation valve and turbine stop valve and in branch lines connected to turbine bypass line up to the turbine bypass valve will meet all the pressure integrity requirements of Quality Group D plus the following additional requirements:

a. Pressure-retaining components of all cast parts of valves of a size and configuration for which volumetric examination methods are effective will be radiographed. Ultrasonic examination to equivalent standards may be used as an alternate to radiographic methods. If size or configuration does not permit effective volumetric examination, magnetic particle or liquid penetrant methods may be substituted. Examination procedures and acceptance standards will be at least equivalent to those specified in ANSI B31.1.0.

b. All inspection records will be retained for the life of the station and will include data pertaining to the qualification of inspection personnel, examination procedures, and examination results.

TABLE 3.2-1 (Cont)

(15) A number of turbine generator components, including the stop and control valves, turbine bypass valve chest, and high-pressure turbine casing are made of a special GE proprietary alloy (copper-bearing carbon steel) that has no assigned ASME or ASTM material number. All welding to this material will be performed to the technical and quality requirements of the GE installation requirements. These requirements match or exceed those given in Note 13 of this table.

(16) A certification will be obtained from the vendors of the turbine stop valves and turbine bypass valves that all cast pressure-retaining parts of a size and configuration for which volumetric examination methods are effective have been examined by radiographic methods by qualified personnel. Ultrasonic examination to equivalent standards may be used as an alternate to radiographic methods. Examination procedures and acceptance standards will be at least equivalent to those specified as supplementary types of examination in ANSI B31.1.0, Paragraph 136.4.3.

(17) The turbine stop and control valves, turbine bypass valves (including the bypass valve chest), and main steam leads between the stop and control valves and the high-pressure turbine casing are fabricated under the requirements of GE's GEZ 4982A, General Electric Large Steam Turbine-Generator Quality Control Program. | 12

The turbine stop and control valves and the main steam leads to the turbine chest will be installed to GE technical and quality requirements equivalent to the fabrication requirements. The erection activity is of a quality level generally equivalent to QA Category I.

(18) In addition to a swing check valve inside containment and a positive acting check valve outside containment similar to an Atwood-Morrill boiler feed check valve as described in Catalog 63, Section I, a third valve with high leaktight integrity will be provided in each line outside containment. The spring loaded piston operator of the positive acting check valve will be held open by air pressure during normal operation. Fail-open solenoid valves will be used to release air pressure to permit the check valve piston operator to close. The positive acting check valve and the high leaktight integrity isolation valve will be remote manually

operated from the control room using signals that indicate loss of feedwater flow. The classification of the feedwater lines from the reactor vessel to and including the third isolation valve will be Quality Group A; beyond the third valve will be Quality Group D.

(19) The condensate storage tank is designed, fabricated, and tested in accordance with the requirements of ASTM D 3299-74 or NBS PS 15-69.

(20) The radwaste building is designed and constructed in full compliance with Regulatory Guide 1.143. The radwaste building has been designed to withstand loads associated with the SSE. 13

(21) The standby gas treatment building is designed and constructed in accordance with seismic and QA Category I requirements up to el 286 ft only.

(22) The reactor building polar crane (RBPC) is designed to withstand the spectrum of tornado-generated missiles (Section 3.5.1.4). The metal siding above the refueling floor is designed to withstand the wind loading generated by a tornadic event. This precludes RBPC from exposure to tornadic wind loading.

(23) The revetment ditch system has been analyzed for the combination of (1) the instantaneous lake level at el 248.8 ft due to 25-year flood and an SSE, and (2) the instantaneous lake level at el 249.5 ft due to 100-year flood and an OBE, and the factors of safety are 1.07 and 1.51, respectively; therefore, the revetment ditch system is sufficiently stable. Pseudo-static stability analyses with seismic coefficients of 0.15 (SSE) and 0.075 (OBE) were performed using the Lease II program(1). The Modified Bishop's method was adopted for the analyses, and the minimum factor of safety was searched for each aforementioned case. The critical failure surface was found to be on the lake side slopes.

(24) Examples of the Quality Group B essential valves in the recirculation system are the following:

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(1) Lease II User's Manual, "Slope Stability Analysis" by P.J. Trudeau and J.T. Christian, August 1980, Stone & Webster Engineering Corporation

TABLE 3.2-1 (Cont)

1. Valves F001, F002, F009, F013, F014, and F017 for pump seal purge line (inside containment) to recirculation pump.

2. Valves F019, F020, F021, F022, and F059 for sample line from recirculation loops.

3. Vent valves F025, F026, F068, and F069 for remote operated valves.

4. Valve F079 for pump seal staging line.

Examples of the Quality Group C essential piping and valves in the recirculation system are the following: 9

1. Pump seal leak detection piping up to and including valve F086.

2. Recirculation motor cooling water piping inside containment including valves F007, F085, and F082.

3. Recirculation motor bearing cooling water piping inside containment.

4. Pump seal cooling water piping inside containment including valves F081 and F087.

(25) Examples of Quality Group D nonessential piping and valves in the recirculation system are the following:

1. Pump seal purge piping (outside containment) to recirculation pump including valves F008, F016, and F015.

2. Recirculation pump seal staging piping including valves F084 and F088.

3. Pump seal leak detection piping beyond valve F086.

(26) This equipment conforms to ANSI Standard B31.1 and IEEE 344-71 seismic requirements. To qualify as equivalent to ASME Section III, Class 3 standards, the equipment will be pressure tested at above normal operating pressures.

TABLE 3.2-1 (Cont)

(27) Effluent monitors meet the environmental qualification and quality assurance requirements of Regulatory Guide 1.97, Revision 2.

(28) The quality assurance classifications for the biological shielding and the post-accident shielding are consistent with the classifications of the structures in which they are located.

(29) The classification of a structure described herein also applies to all major structural components of that structure, unless noted otherwise herein.

(30) Reactor pressure vessel stabilizers are constructed in accordance with ASME III, 1977 Edition through Summer 1978 Addenda, except that for installation, the requirements of Paragraph NF-4600 of ASME III, 1974 Code are applicable.

(31) All safety-related instrumentation and controls (I&C) described in FSAR Sections 7.1 through 7.6 and other safety-related I&C for safety-related systems meet the quality assurance requirements of 10CFR50, Appendix B. These safety-related I&C are listed in FSAR Table 3.2-1, as, for example, "electrical modules with safety function," or "instrument modules with safety function." In Table 3.2-1, the designation "I" indicates that these safety-related I&C meet the quality assurance requirements of 10CFR50, Appendix B, as described in FSAR Chapter 17.

Insert 32, 33, 34 →

(36) The stair tower attached to the exterior side of the secondary containment wall in the southeast corner of the reactor building is a non-Category I structure.

(35) The reactor water cleanup system classification meets Standard Review Plan 5.4.8, paragraph II.3. | 13

FOOTNOTE 32

Those structures, components and equipment described by Regulatory 1.29 Section C2 and C3 are described in FSAR Sections 3.5.1.1.4, 3.7 and 3.8. The pertinent provisions of the operational Quality Assurance Program apply.

FOOTNOTE 33

All containment Isolation valves not specifically listed in the table are Seismic and Quality Assurance Category I. See table 6.2-56 for additional information on these valves.

FOOTNOTE 34

Pertinent provisions of the Operational Quality Assurance Program apply to:

1. Portable radioactive monitoring equipment used for emergency purposes.
2. Air and liquid sampling equipment for emergency purposes.
3. Portable equipment which is used to perform radioactivity contamination measurement and analysis.
4. Personnel monitoring and decontamination equipment including TLD's, whole body counter.
5. Instrumentation storage, calibration and maintenance for instruments used during emergencies.
6. Respiratory protection equipment including testing.
7. Modifications to roof and site drainage systems and grading used for handling the Probable Maximum Precipitation.
8. Reactor vessel steam dryer and steam separator and miscellaneous hardware.
9. Post Accident Sampling System.
10. Emergency plans and related equipment/components/structure described in the Emergency Procedures.
11. Conduit and cable tray which are not Class IE but whose failure could affect safety related equipment.
12. Reactor Pressure Vessel Insulation.

5.2 INTEGRITY OF REACTOR COOLANT PRESSURE BOUNDARY

This section discusses measures employed to provide and maintain the integrity of the reactor coolant pressure boundary (RCPB) for the plant design lifetime.

5.2.1 Compliance with Codes and Code Cases

5.2.1.1 Compliance with 10CFR50, Section 50.55a

Table 3.2-1 shows compliance with 10CFR50. Code editions, applicable addenda, and component dates are in accordance with 10CFR50.55a.

5.2.1.2 Applicable Code Cases

The reactor pressure vessel (RPV) and appurtenances, and the RCPB piping, pumps, and valves are designed, fabricated, and tested in accordance with the applicable edition of the ASME Code, including addenda that were mandatory at the order date for the applicable components.

Regulatory Guides 1.84 and 1.85 provide a list of ASME design and fabrication code cases that have been approved by the regulatory staff. Code cases on this list may be used for design, fabrication, or installation until annulled. Annulled cases are considered active for equipment that has been contractually committed to fabrication prior to the annulment. The various ASME code cases that were applied to components in the RCPB are listed in Table 5.2-1.

5.2.2 Overpressure Protection

This section provides evaluation of the systems that protect the RCPB from overpressurization.

5.2.2.1 Design Basis

Overpressure protection is provided in conformance with 10CFR50, Appendix A, General Design Criterion 15.

Safety/relief valves are in conformance with ASME Section III, Article NB-7000. Preoperational and startup instructions are given in Chapter 14.

5.2.2.1.1 Safety Design Bases

The nuclear pressure-relief system has been designed:

QUESTION F410.34 (9.3.1)

Verify that the instrument air system is designed in accordance with ANSI MC11.1-1976 (ISA 57.3). Discuss how the system complies with the criteria of this standard.

RESPONSE

See revised Section 9.3.1

QUESTION F410.37(9.3.1)

Provide a discussion of the maintenance and periodic testing program for each instrument air system to assure compliance with the requirements of ANSI MC11.1-1976. Specify the maximum time between testing of the compressed air system in the discussion.

RESPONSE

Maintenance of the instrument air system will consist of routinely blowing down air receivers and moisture drains during shift rounds. The actual system utilizes nonlubricated cylinder compressors followed by a refrigerant dryer rather than a dessicant dryer. Therefore, no foreign material is expected to be injected into the system. However, to ensure clean air, a sample that meets the requirements of ANSI MC11.1-1976 for particle size and oil content will be performed on an annual basis.

The automatic depressurization system is safety-related, and all pressure-retaining components of the system are designed, constructed, and inspected in accordance with the applicable requirements of ASME Section III, Division 1, Subsection ND for Class 3 components, and Subsection NC for Class 2 components. Not included in this safety-related classification are the nitrogen gas storage tanks, equipment, and components located in the yard outside the reactor building.

Piping segments that penetrate the primary containment and serve as a containment boundary are designed to Safety Class 2, Category I requirements.

The loss of nitrogen gas for instrumentation and controls causes gas-operated valves to fail to appropriate safe positions. In the event that the nitrogen gas supply from the nitrogen gas storage tanks is lost, a 7-day supply is available to the accumulators from ADS nitrogen receiver tanks 2IAS*TK4(Z-) and 2IAS*TK5(Z-). In addition, there are provisions for recharging the ADS nitrogen receiver tanks through its individual supply lines located in a missile-protected area outside the standby gas treatment building from special emergency tube trailer supply connections. These special, emergency recharging lines are part of the GSN system and are classified Seismic Category I, Safety Class 3.

Power Generation Bases

The automatic depressurization system is designed to supply clean, dry, oilfree nitrogen gas at 185 psig to the selected group of seven main steam safety relief valves and their respective accumulators located inside the reactor primary containment. This designated group of ADS safety relief valves and accumulators is divided into two subgroups with three and four valves and accumulators in each subgroup. Each subgroup is supplied with nitrogen gas from one of two separate ADS receiver tanks. Each ADS receiver tank is supplied with nitrogen gas at 365 psig from a bank of six horizontal, high-pressure nitrogen gas storage tanks located outside the reactor building. Nitrogen gas supplied for instrumentation and controls meets or exceeds the equivalent air quality requirements established for safety-related control air systems (SRCAS) by ANSI MC11.1-1975, (ISA-S7.3), Quality Standard for Instrument Air. (APPROVED JANUARY 15, 1976)

All piping, valves, and fittings associated with the automatic depressurization system are of stainless steel materials. Also, the system will be given a complete

9.3.1.5 Instrument Nitrogen System

9.3.1.5.1 Design Bases

Safety Design Basis

Instrumentation and control systems located inside the reactor primary containment are supplied with nitrogen gas at 120 psig from the instrument nitrogen system (GSN). The IAS designation is retained for these systems which are nitrogen gas exclusively during normal plant operation.

Instrumentation and control systems located inside the reactor primary containment, except as described in Section 9.3.1.4.5, are not safety related. However, all piping, valves, and fittings located in Category I areas are seismically analyzed and supported in accordance with safe shutdown earthquake (SSE) design requirements so that their failure will not damage safety-related equipment. For containment penetrations and items within the containment areas, see Section 3.2.

Power Generation Design Bases

Nitrogen gas for instrumentation and control systems located inside the reactor primary containment areas is supplied from the vapor spaces of two 11,000-gal liquid nitrogen vertical storage tanks maintained under a constant pressure of approximately 200 psig. The liquid nitrogen tanks are located in the yard area, north-northeast of the reactor building, alongside the railroad access lock. From the liquid nitrogen tanks nitrogen flows through an active bank of finned ambient vaporizers, a trim heater for heating to 70°F, and a 200/120 psig pressure-reducing station. An instrument nitrogen receiver is provided inside the reactor building for additional storage capacity. Nitrogen gas for instrumentation and controls inside the primary containment is distributed from this nitrogen receiver.

A nitrogen gas backup supply connection is provided from the high-pressure nitrogen gas storage cylinders to the instrument nitrogen receiver through a 365/110 psig pressure-reducing station.

Although instrumentation and control systems within the reactor primary containment are nonsafety-related, the nitrogen gas supplied for these systems meets or exceeds the quality requirements of ANSI MC11.1-1975 (ISA-S7.3), Quality Standard for Instrument Air, for use with safety-related

(APPROVED JANUARY 15, 1976)

INSERT "A" to CE 42.40

Additional NRC ORAL QUESTION ON RCIC INITIATION LOGIC

QUESTION

The NRC questioned ~~This is in response to the question regarding~~ the length of time the operator will be required to hold the RCIC initiation button in a depressed condition to assure injection into the reactor. The concern is that if the manual initiation button is depressed only momentarily the opening of the RCIC injection valve will not be sealed in and reactor injection will not occur. The NRC has recently indicated that they feel this design may not satisfy IEEE-279, Paragraph 4.16, which requires the system, once initiated, to go to completion.

Response

The logic for the RCIC injection valve E51-F013 is shown in Attachment 1. Contacts of relays K3, K20, and K40 must all be closed for F013 to open in response to a manual initiation signal or a low reactor water level 2 signal. Relay K3 is a momentary contact relay which is energized when the manual initiation button is depressed or when reactor water level is below Level 2. Relay K20 is energized when the turbine trip and throttle valve is partially or fully open. Since the trip and throttle valve is open during system standby the contacts of relay K20 will already be closed when RCIC is started. Relay K40 is energized when the steam admission valve E51-F045 is fully closed. Since F045 is closed when the system is on standby the contacts of K40 are open at that time.

Given this logic, to manually initiate RCIC and assure the injection valve opening is sealed in, the operator must maintain the initiation switch in a depressed condition until valve F045 comes off its seat causing closure of relay K40 contacts. A red-valve position indicating light will inform the operator when F045 has started to open. At this time the initiation switch can be released since the seal-in circuit in the MCC for valve F013 will now drive it to the full open position.

OPERATED DIRECTLY FROM THE VALVE LIMIT SWITCH CONTACTS (LSC)

Limit switch LS6 energizes relay K40 when valve F045 is fully closed. Depending on the adjustment of this limit switch, it is not expected to take more than 1-2 seconds for relay K40 to be deenergized and its contacts closed when F045 starts to open. This is the time required for the operator to hold the initiation button down to assure vessel injection.

As explained in the above the contacts of relay K3 in the initiation logic have to be closed only 1 to 2 seconds before the injection valve opening logic is sealed in for automatic initiation. For an actual transient event requiring the RCIC system (i.e., loss of feedwater events) reactor water level will be below the initiation level for well over this time required to seal-in the injection valve logic, since water level will not begin to recover until the RCIC and/or HPCS is initiated. It is GE's position that this meets the intent of IEEE-279 in that the RCIC system initiation will go to completion when required for it to perform its safety function. A momentary Level 2 lasting less that 1 to 2 seconds is considered very unlikely and could only occur if feedwater flow is reestablished in time to reverse the water level drop. In this case it would be preferable not to initiate RCIC, thereby avoiding injection of cold water into the reactor.

In conclusion, GE considers the current RCIC design to be adequate and that it satisfies IEEE-279, Paragraph 4.16. Requiring the operator to hold the button for 1 to 2 seconds for a manual start does not impose a hardship on the operator. Normally, on a manual start the operator will stay with RCIC for at least 30 seconds or more to verify turbine speed, flow and valve positions. Operating procedures will include a precaution statement for the operator to ensure that he holds the manual initiation switch/button for RCIC until the valve position indicator shows the valve is opening.

Further an engineering evaluation of this concern will be performed. A cost benefit of the proposed fix will also be provided. This information will be provided by March 1985.

QUESTION

421.43 If control systems are exposed to the environment resulting from the rupture of reactor coolant lines, steam lines, or feedwater lines, the control systems may malfunction in a manner which would cause consequences to be more severe than assumed in safety analyses. I&E Information Notice 79-22 discusses certain non-safety grade or control equipment, which if subjected to the adverse environment of a high energy line break, could impact the safety analyses and the adequacy of the protection functions performed by the safety-related systems.

The staff is concerned that a similar potential may exist at light water facilities now under construction. You are, therefore, requested to perform a review per the I&E Information Notice 79-22 concern to determine what, if any, design changes or operator actions would be necessary to assure that high energy line breaks will not cause control system failures to complicate the event beyond the FSAR analyses. Provide the results of your review including all identified problems and the manner in which you have resolved them.

The specific "scenarios" discussed in the above referenced Information Notice are to be considered as examples of the kinds of interactions which might occur. Your review should consider analogous interactions as relevant to the BWR design.

RESPONSE

HIGH ENERGY LINE BREAK AND CONTROL SYSTEM FAILURE EVALUATION

INTRODUCTION

IE Information Notice 79-22 identifies the concern that the performance of nonsafety grade equipment subjected to an adverse environment could impact the protective functions performed by safety grade equipment. The purpose of this analysis is to determine if a malfunction of a nonsafety control system, associated with a high energy line break, might result in a severe event not bounded by FSAR Chapter 15. The analysis will be provided by the second quarter of 1985.

METHODOLOGY

The HELB/control system failure evaluation will be analyzed as follows:

1. Identify all nonsafety control systems and components within these systems which may impact critical reactor parameters (water level, pressure, power).

2. Establish the criteria for energy lines, break postulation, and consequence evaluation.

3. Identify critical nonsafety grade components located in areas of high energy piping.

4. Postulate breaks in these areas and determine the resultant effects on the components.

5. Evaluate the events to determine if the event is bounded by FSAR Chapter 15. If not bounded, additional analysis or a corrective action will be taken.

NONSAFETY CONTROL SYSTEMS

All plant nonsafety control systems are included in the initial evaluation for HELB. The following criteria is used for the elimination of systems from the initial list prior to performing a detailed HELB analysis.

1. Dedicated inputs into the process computer, as well as the computer itself.

2. Control systems which have no direct or indirect interaction with reactor operating parameters. Examples are communications, lighting, ventilation for exterior buildings, machine shop systems, refueling or maintenance systems, etc.

3. Control systems that do interact or interface with reactor operating systems, but which cannot affect the reactor parameters either directly or indirectly.

4. Electrical systems, the loss of which will result in a condition similar to total or partial loss of offsite power. Examples include the station transformers, ac instrument power, and dc instrument power.

5. Systems which are not used during normal power operation. For example, refueling systems, turning gear, and turbine bearing lift pumps.

6. Safety systems or safety portions of control systems.

7. Mechanical and structural type systems. Examples include structural steel, turbines, cranes, etc.

All control components, including power sources, within systems not eliminated by the above criteria are evaluated for component elimination by the following criteria prior to the final HELB analysis.

1. Instruments which provide only indication or position status information are excluded from the detailed analysis.

2. Components which provide passive inputs into the control logic, examples of which are arming-type permissives which require additional manual action to command equipment to operate, are excluded from the detailed analysis.

3. Instruments and other dedicated inputs to the process computer are excluded from the detailed analysis.

4. Position switches on air- and motor-operated valves which are not interlocked with other equipment but rather provide position indication or position status to the process computer are excluded from the detailed analysis.

5. Mechanical type components, such as structural steel, tanks, and pipes are not considered "components" which can fail. However, associated instruments, taps, tubing, and control components not eliminated by Items 1 through 4 and physically located on the above mechanical components, are evaluated.

PIPE BREAK CRITERIA

The pipe break criteria is taken directly from FSAR Section 3.6.

1. Pipe Criteria

High energy piping is defined as including those systems or portions of systems in which the maximum operating temperature exceeds 200°F or the maximum operating pressure exceeds 275 psig during normal full power operation. Those lines that operate above these limits for only a relatively short period of time (less than 2 percent) to perform their intended function, are classified as moderate energy and excluded from consideration.

2. Break Postulation

High energy pipes are assumed to break only at terminal ends and at each intermediate pipe fitting or weld attachment. Each longitudinal or circumferential break in high energy fluid system piping is considered separately as a single postulated initial event occurring during normal plant conditions.

3. Consequence Evaluation

Pipe breaks are evaluated for the effects of pipe whip, jet impingement, and environmental effects.

a. Pipe Whip

Pipe whip is assumed to occur in the plane defined by the piping geometry and to cause movement in the direction of the jet reaction.

b. Jet Impingement

Jet impingement loads are determined by taking the jet force as being constant at all effective distances from, and normal to, the break area and by assuming that the jet stream diverges conically at a solid angle of 20 degrees.

ANALYSIS

1. Utilizing current plant drawings, the nonsafety control components and high energy systems will be located in particular zones.

2. In small zones it will be assumed that any HELB would incapacitate all nonsafety control components in the zone.

3. In large zones the effect of a high energy line break on each component will be evaluated based upon the pipe criteria.

4. Postulate breaks and evaluate the effects on the controls equipment.

5. Compare postulated effects with events as reported in FSAR Chapter 15 to determine if they are bounded.

6. If not bounded, determine if protection or relocation of the controls equipment is appropriate.

7. If required, may be performed additional analysis to determine if the effect is significant and then a corrective action will be taken.

8. Draft final report.

QUESTION F430.23 (SRP 8.1, 8.3.1)

Regarding separation of electrical circuits:

a. Describe the separation of non 1E circuits from associated circuits and Class 1E circuits. Also address the qualification and identification of the associated circuits.

b. In FSAR Section 8.3.1.4.2 you state that if the required 6 inch separation cannot be maintained between circuits on terminal boards a fire resistant barrier is provided between the terminals or an analysis is made to establish that a fire in one divisional circuit inside the panel will not disable both divisions. Identify the areas where an analysis is used and provide the analysis results for staff review.

c. Does the electrical penetration separation discussed in Section 8.3.1.4.2 result in 3 ft. horizontal and 5 ft. vertical clearance between redundant Class 1E circuits and Class 1E and non-Class 1E circuits?

d. Justify the routing of redundant Class 1E circuits in the east vertical cable chase and the routing of Class 1E and non-Class 1E circuits in the second and third electrical tunnels. Your response should address position C.8 of R.G. 1.75.

e. Is flexible conduit utilized as a barrier in the NSSS or non-NSSS portions of the plants? If so identify the areas where it is used and the separation distances maintained.

f. Describe the separation provided for the RPS circuits.

g. FSAR appendix 9A, section 9.A.3.7.3, addresses the means used to route cables into the control building and through the cable routing areas within the control building. Provide a comparable description in FSAR Chapter 8 which addresses the cable separation used in those areas to meet the IEEE 384-1974 and R.G. 1.75 requirements. Do these areas contain high energy equipment or piping (high or moderate energy) that could be a potential source of missiles or pipe whip? Are power cables routed through the area?

POWER SYSTEM BRANCH (PSB) COMMENTS:

a. Your response on associated circuits should describe the identification and color coding used for these circuits. Do the circuits become associated because of inadequate separation distances or by virtue of being connected to the Class 1E power system? Verify that the associated circuit is routed only with the division to which it is associated down to an isolation device.

b. Your response to this question states that to date there are no cases where analysis has been used to justify less than 6-in. separation. Verify that this response includes cabinets located in the PGCC.

c. Response OK

d. In accordance with position C.8 of R.G. 1.75 verify that the electrical tunnels and vertical cable chases are ventilated.

e. Your response indicates that flexible conduit is used as a barrier in NSSS panels to achieve required separation. Provide an analysis supported by tests which indicate the flex conduit is a suitable barrier and describe the separation maintained between the flex conduit and external circuit. We also understand that a fire retardant tape will be used as a barrier in PGCC cabinets. Provide an analysis supported by tests which indicate the tape is a suitable barrier and describe the separation maintained between the tape and external circuit.

RESPONSE

See revised Sections 8.3.1.4.1 and 8.3.1.4.2 for response to parts a, c, d, e, f and g.

RESPONSE TO PSB COMMMENTS:

A) See revised Section 8.3.1.4.1

b) REFER TO QUESTION 421.47

d) Electrical tunnels and vertical cable chases are ventilated. See Section 9.4.1.2.1 and 9.4.1.2.6.