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WYR 80-90
B.3.2.1

August 1, 1980

United States Nuclear Regulatory Commission
Washington, DC 20555

Attention: Mr. Dennis M. Crutchfield, Chief
Operating Reactors Branch #5
Division of Licensing

References: (a) License No. DPR-3 (Docket No. 50-29)
(b) YAEC Letter to USNRC dated November 28, 1978 (WYR 78-103)
(c) YAEC Letter to USNRC dated June 5, 1980 (WYR 80-62)

Subject: Environmental Qualification of Electrical Equipment

Dear Sir:

Enclosed is our revised equipment list for electrical equipment qualification purposes which we agreed to submit at our mid-July 1980 site audit with the NRC staff. This list has been revised to include only electrical equipment and displays involved in direct mitigation of a LOCA, MSLB, and FWLB. The following changes have been made:

1. Equipment required for cold shutdown has been added as per your guidelines.

2. Enclosure B (asterisked items on Enclosure A) identifies equipment located in harsh environments (both inside and outside containment). Equipment in harsh environments resulting from recirculating fluid lines have not been identified. This information is still being developed and will be submitted in several weeks. Equipment not in a harsh environment (i.e., control room, switchgear room, and some locations in the PAB) remain on the list (Enclosure A) as per the guidelines.

3. Pneumatic equipment has been deleted for the purposes of this list.

4. Equipment installed as a result of NUREG-0578 short term requirements has been added.

We are still in the process of updating our equipment data sheets for equipment in harsh environments and will submit these in several weeks.

These data sheets are being revised to provide additional information on the specific environment, to add radiation doses, and to supply vendor information.

The following additional information is also submitted and was requested at the site meeting. The maximum containment water level, after a LOCA, was calculated to be approximately elevation 1057' (refer to FM-1C and FM-1X attached). This calculation assumed an injection of approximately 18,580 ft^3 of water into the containment and a concrete displacement of approximately 4000 ft^3. The details of the calculation are summarized in Enclosure C.

We trust this information is satisfactory; however, if you have any questions, please contact us.

Very truly yours,

YANKEE ATOMIC ELECTRIC COMPANY

J. A. Kay
Senior Engineer - Licensing

JAK/ncj

Enclosure

FACILITY: YANKEE ROWE
DOCKET NO.: 50-29

EQUIPMENT LIST

SYSTEM: Component Cooling

Tag Number	Description	Location	References
P-20-1,-2	Motor, Component Cooling Pump	PAB	CC-1

SYSTEM: Charging and Volume Control

Tag Number	Description	Location	References
P-15-1,-2,-3	Motor, Charging Pump	PAB	CH-1

SYSTEM: Containment Isolation

Tag Number	Description	Location	References
K-CI-9,10,11,12	Relay, Containment Isolation Actuation	SWGR	CI-0
K-CI-13,14,15,16	Relay, Containment Isolation Actuation	MCR	CI-1
PS-CI-230	Pressure Switch, Cont. Iso. Actuation	PAB	CI-2
PT-CI-227	Transmitter Vapor Container Pressure	PAB	CI-3
SOV-CI-801-820	Containment Isolation Solenoid Operated Valves	PAB	CI-4
SOV-CI-901-920	Containment Isolation Solenoid Operated Valves	PAB	CI-5

EQUIPMENT LIST

SYSTEM: Containment Isolation (Continued)

Tag Number	Description	Location	References
LOR-CI-A,B	Lockout Relay	PAB	CI-6
K-CI-21,22	Auxiliary Relay	PAB	CI-7
Switch	Cont. Iso. Switch Pnl.	PAB/MCR	
K-CI-40-94	Relays, Cont. Iso. Reset Sys. A	MCR	CI-9

SYSTEM: Service Water

Tag Number	Description	Location	References
P-6-1,2,3	Motor, Service Water Pump	SCRN	SW-1

EQUIPMENT LIST

SYSTEM: Main Coolant

Tag Number	Description	Location	References
PT-MC-6	Pressure Detector Pressurizer	VC*	MC-3
PT-MC-9	Pressure Detector MC	VC*	MC-4
PT-MC-712	Pressure Xmitter LTOP	VC*	MC-4
MC-MOV-301	Main Coolant Inlet/Outlet Valve	VC	MC-5
MC-MOV-302	Main Coolant Inlet/Outlet Valve	VC	MC-5
MC-MOV-309	Main Coolant Inlet/Outlet Valve	VC	MC-5
MC-MOV-310	Main Coolant Inlet/Outlet Valve	VC	MC-5
MC-MOV-318	Main Coolant Inlet/Outlet Valve	VC	MC-5
MC-MOV-319	Main Coolant Inlet/Outlet Valve	VC	MC-5
MC-MOV-325	Main Coolant Inlet/Outlet Valve	VC	MC-5
MC-MOV-326	Main Coolant Inlet/Outlet Valve	VC	MC-5
MC-TD-78	Main Coolant Cold Leg RTD	VC	MC-9
MC-TD-60	Main Coolant Cold Leg RTD	VC	MC-9
MC-TD-66	Main Coolant Cold Leg RTD	VC	MC-9
MC-TD-72	Main Coolant Cold Leg RTD	VC	MC-9

EQUIPMENT LIST

SYSTEM: Pressurizer

Tag Number	Description	Location	References
LD-PR-8	Level Detector Pressurizer Level (WR)	VC	PR-3
SOV-PR-90	Power Operated Relief Valve	VC	PR-4
PT-PR-700	Pressure Transmitter Sat. Monitor	VC	
PR-MOV-512	Block Valve for PR-PRV-90	VC	PR-5
ZT-PR-1A,B,C	Transmitter Accoustic Acc. Pressurizer	VC	
ZE-PR-1A,B,C	Sensor Accoustic Acc. Pressurizer	VC	

SYSTEM: Purification

Tag Number	Description	Location	References
PU-MOV-541	Motor Operated Valve, Containment Isolation	PAB	PU-1

EQUIPMENT LIST

SYSTEM: Feed Water

Tag Number	Description	Location	References
LI-FW-1003,1103, 1203,1303	Ind. Steam Generator Level (NR)	MCR	FW-3
LT-FW-1003,1103, 1203,1303	Transmitter Steam Generator Level (NR)	VC*	FW-4
P/S-FW-1003,1103, 1203,1303	Power Supply Steam Generator Level (NR)	SWGR	FW-7

SYSTEM: Hydrogen Vent

Tag Number	Description	Location	References
HV-SOV-1,2	Post-Accident H_2 Vent Valve	VC*	HV-1
GA-HV-1	Hydrogen Analyzer	SWGR	HV-2

SYSTEM: Radiation Monitoring

Tag Number	Description	Location	References
GG-RM-1	Emergency Rad. Monitor/High Range	TB/MCR	RM-1
RD-RM-112	Emergency Rad. Monitor/High Range	TB	RM-2
RI-RM-112	Emergency Rad. Monitor Indicator	MCR	RM-3

EQUIPMENT LIST

SYSTEM: Miscellaneous

Tag Number	Description	Location	References
FN18-1,2,3	Post-Accident Recirc. Fan	VC*	MIS-1

SYSTEM: Safety Injection

Tag Number	Description	Location	References
LI-SI-1	Level Indicator SI Tank Level	MCR	SI-1
LS-SI-1,2,3,4	Level Switch SI Accumulator Low Water Level	PAB	SI-3
SI-PP-LP1,2,3	Motor, Low Pressure SI Pump	PAB	SI-4
SI-PP-HP-1,2,3	Motor, High Pressure SI Pump	PAB	SI-5
PS-SI-14	Pressure Switch, VC Pressure/SI Initiation Ckt.	VC	SI-6
PS-SI-238,239	Pressure Switch, SI Initiation Ckt.	PAB	SI-7
	Switch Auto - Manual Bypass Ch. A & B	MCR	
SI-MOV-1	SI Accumulator Outlet Valve	PAB	SI-8
P/S-SI-1	Power Supply, SI Tank Level	MCR	SI-12

EQUIPMENT LIST

SYSTEM: Safety Injection (Continued)

Tag Number	Description	Location	References
LSX-SI-1,2,3,4	Aux. Relay Vent Accumulator	MCR	SI-13
MOV-CS-533	LPSI Path Isolation Valve	PAB	SI-23
MOV-CS-535	LPSI Path Isolation Valve	VC*	SI-9
MOV-SI-48,49	HPSI Recirculation Valve	PAB	SI-8
MOV-SI-514,515	HPSI to Charging Hdr. Iso. Valve	PAB	SI-8
MOV-SI-516	Containment Sump Isolation Valve	PAB	SI-8
MOV-SI-517	Containment Sump Isolation Valve	PAB	SI-8
MOV-SI-518	SI Tank Discharge Valve	PAB	SI-8
SOV-SI-45	Accumulator, Actuator for TV-608	PAB	SI-10
SOV-SI-46	Accumulator, Actuator for TV-604,605,606	PAB	SI-10
SOV-SI-47	Accumulator, Actuator for TV-604,605,606	PAB	SI-10
SOV-SI-56,57	Safety Valve Accumulator	PAB	SI-11

EQUIPMENT LIST

SYSTEM: Safety Injection (Continued)

Tag Number	Description	Location	References
SOV-SI-639	Safety Valve Accumulator	PAB	SI-11
SOV-SI-640	Safety Valve Accumulator	PAB	SI-11
WL-SI-1	Relay, SI Initiation Ckt.	MCR	SI-15
WL-SI-1-1	Relay, SI Initiation Ckt.	MCR	SI-15
TDC-PR-1,2,3,4	Relay, Pressurize Accumulator	MCR	SI-16
TDC-SI-1,2,3,4	TD Relay Accumulator	MCR	SI-17
X-SI-1-1,2	Relay Multiplier	MCR	SI-18
K-CI-7,8	Lockout Relay, Diverse Cont. Isol.	MCR	SI-19
K-31,32	Auxiliary Relay	MCR	SI-20
K-SG	Relay, Operates WL-SI-1-1	MCR	SI-21
SIAS-A,B	Lockout Relay	MCR	SI-22

EQUIPMENT LIST

SYSTEM: Service Water

Tag Number	Description	Location	References
P-1,2,3	Service Water Pumps	SCRN	

SYSTEM: Shutdown Cooling

Tag Number	Description	Location	References
P-1	Motor Shutdown Cooling Pump	PA3	
SC-MOV-551,2,3,4	Shutdown Cooling Valves	VC*	

EQUIPMENT LIST

SYSTEM: Reactor Protection

Tag Number	Description	Location	References
RPS	Reactor Protection System (Westinghouse)	MCR	RP-4
BK-1,2	Circuit Breaker, Rod Scam	SWGR	RP-5

SYSTEM: Electrical Equipment For All Systems

Tag Number	Description	Location	References
	Emergency Diesel Gen. 1,2,3	PAB	J1
LT-DG-1,2,3	Level Transmitter Level Control Day Tank	PAB	J2
SOV-DG-1,2,3	SOV Diesel Gen. Day Tank Fill Valve	PAB	J3
LIC-1,2,3	Level Receiver Level Control Day Tank	PAB	J4
	No. 1&2 Battery	SWGR	J5
	No. 3 Battery	PAB	J6
	No. 1&2 Battery Charger - MG Set	SWGR	J7
	No. 3 Battery Charger - Static	PAB	J8
	No. 1&2 Battery Switchboard	SWGR	J9
	No. 3, 3A, 3B Battery Switchboard	PAB	J10

EQUIPMENT LIST

SYSTEM: Electrical Equipment For All Systems (Continued)

Tag Number	Description	Location	References
	480 Volt Emergency Bus 1,2,3	PAB	J11
	480 Volt Emergency MCC 1	SWGR	J13
	480 Volt Emergency MCC 2	PAB	J14
	Vital Bus Inverter (M-G Set)	SWGR	J15
	Vital Bus Distribution Cubicle	SWGR	J16
	Terminal Block 12 Point	VC	J18
	Penetration Assembly	VC	J19

EQUIPMENT LIST

SYSTEM: Electrical Equipment For All Systems (Continued)

Tag Number	Description	Location	References
	Cable Mineral Insulated	VC	J20
	Cable Polyethylene/PVC	VC	J21
	Cable Butyl Rubber/PVC	VC	J22
	Cable Silicone Rubber/Asbestos	VC	J23
	Cable XLP/Neoprene (or Hypalon)	VC	J24
	Cable PVC Shielded	VC	J25
	Relay, Reverse Power (CRM-1)	MCR	J29
	Relay, Time Delay TDPU 2.5-30 Sec.	MCR	J28
	Selector Switch for MOV	MCR	J27
	Cable Mineral Insulated	VC	J20
	Cable Polyethylene/PVC	VC	J21
	Cable Butyl Rubber/PVC	VC	J22

EQUIPMENT LIST

SYSTEM: Electrical Equipment For All Systems (Continued)

Tag Number	Description	Location	References
	Cable Silicone Rubber/Asbestos	VC	J23
	Cable XLP/Neoprene (or Hypalon)	VC	J24
	Cable PVC Shielded	VC	J25
	Control Switch	MCR	J33
	Relay Over/Under Voltage (CV-7)	MCR	J32
	Relay Voltage (SV)	MCR	J31
	Relay Auxiliary (Various)	MCR	J30

* Indicates equipment required to function in hostile environment.

ENCLOSURE C

Summary of Calculation to Determine
Maximum Water Elevation Inside Containment
During the LOCA Injection Phase

1. Water volumes inside VC

. Accumulator	700 ft^3
. Safety Injection Tank (max)	15,600 ft^3
. Loop Volumes - 4 @ 342 each	1,368 ft^3
. S.G. Primary - 4 @ 208 each	832 ft^3
. Pressurizer (water only)	90 ft^3

2. Concrete displacement

. Vessel Support Area	3,750 ft^3
. Concrete posts	310 ft^3

3. Formula to approximate water level-volume of a partially full hemisphere

$$V = 1/3\pi h^2 (3r - h)$$

$$\frac{3V}{\pi} = 187.5h^2 - h^3 \qquad r = 62.5 \text{ ft (v.c. radius)}$$

4. Solution: by trial and error

$$h \cong 11.1 \text{ ft}$$