GPU Nuclear

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February 16, 1982
82-018

Office of Nuclear Reactor Regulations
Attn: D. G. Eisenhut, Director
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Sir:

Three Mile Island Nuclear Station, Unit 1 (TMI-1)
Operating License No. DPR-50
Docket No. 50-289
EFW Seismic Qualification - Electrical

In response to your letter of February 10, 1981 and to supplement our letters of September 19, 1981 (L1L 269) and December 8, 1981 (L1L 354), enclosed please find our evaluation for the electrical and instrumentation and controls portion of the Emergency Feedwater System. The evaluation included (See Table A):

1. EFW pump Motors
2. EFW System electric valve operators
3. EFW System electric power supplies
4. EFW Initiation, control and flow indication
5. Structures supporting or housing these EFW system items

In addition, a walkdown on the nonseismically qualified portions of the TMI-1 EFW System was conducted with discrepancies indicated in Table B.

Sincerely,

H. D. Hukill
Director, TMI-1

HDH:LWH:vjf

cc: R. C. Haynes
J. F. Stolz

A048
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TABLE A

DEVICE	FUNCTION	SEISMICALLY QUALIFIED/REFERENCE				COMMENT
		DEVICE	LOCATION	POWER SUPPLY	CABLE ROUTING	
EF-P2A	EF pump motor A	D2	L1	P1	R1	-
EF-P2B	EF pump motor B	D2	L1	P2	R1	-
EF-V1A	EF pump A suction valve m.o.	D1	L1	P3	R2	-
EF-V1B	EF pump B suction valve m.o.	D1	L1	P4	R2	-
EF-V2A	EF pumps disch. header iso. valve m.o.	D1	L1	P3	R2	-
EF-V2B	EF pumps disch. header iso. valve m.o.	D1	L1	P4	R2	-
EF-V4	River water to EF pump valve m.o.	D1	L1	P5	R3	C1
EF-V5	River water to EF pump valve m.o.	D1	L1	P5	R3	C1
SV/EF-V8A	EF-P2A min. flow (recirc.) valve	see comment	L1	see comment	→	C2
SV/EF-V8B	EF-P1 min. flow (recirc.) valve	see comment	L1	see comment	→	C2
SV/EF-V8C	EF-P2A min. flow (recirc.) valve	see comment	L1	see comment	→	C2
EF-V30A	EF flow control valve to S.G.A.	-	-	-	-	-
SP-V-5A	E/P converter for EF-V30A	see comment	L1	see comment	→	C3
EF-V30B	EF flow control valve to S.G.B.	-	-	-	-	-
SP-V-5B	E/P converter for EF-V30B	see comment	L1	see comment	→	C3
FI-S-77	Flow switch for EF-V8A	see comment	L1	see comment	→	C2
FI-S-78	Flow switch for EF-V8B	see comment	L1	see comment	→	C2
FI-S-79	Flow switch for EF-V8C	see comment	L1	see comment	→	C2
EF-FE-777	EF flow to S.G.A flow element	see comment	L1	see comment	→	C4
EF-FT-778	EF flow to S.G.A flow tansducer	see comment	L2	see comment	→	C4
EF-FE-780	EF flow to S.G. B flow element	see comment	L1	see comment	→	C4
EF-FT-781	EF flow to S.G. B flow transducer	see comment	L2	see comment	→	C4
EF-FE-786	EF flow to S.G.A flow element	see comment	L1	see comment	→	C4
EF-FT-787	EF flow to S.G.A flow transducer	see comment	L2	see comment	→	C4
EF-FE-789	EF flow to S.G.B flow element	see comment	L1	see comment	→	C4
EF-FT-790	EF flow to S.G.B flow transducer	see comment	L2	see comment	→	C4
LT-775	S.G.A level transmitter	see comment	L3	see comment	→	C5
LT-776	S.G.B level transmitter	see comment	L3	see comment	→	C5
LT-788	S.G.B level transmitter	see comment	L3	see comment	→	C5
LT-789	S.G.A level transmitter	see comment	L3	see comment	→	C5
-	CST A low level alarm	see comment	—	—	→	C6
-	CST B low level alarm	see comment	—	—	→	C6
MS-V2A	Main Steam dump iso. valve m.o.	D1	L1	P5	R3	C7
MS-V2B	Main Steam dump iso. valve m.o.	D1	L1	P5	R3	C7
LS/MS-V6	Limit Switch on EF turb.pump steam supply reg. valve	D1	L1	-	R3	C8

DEVICE	FUNCTION	SEISMICALLY QUALIFIED/REFERENCE				COMMENT
		DEVICE	LOCATION	POWER SUPPLY	CABLE ROUTING	
MS-V8A	Main Steam dump to cond. iso. valve m.o.	D1	L1	P5	R3	C7
MS-V8B	Main Steam dump to cond. iso. valve m.o.	D1	L1	P5	R3	C7
SV/MS-V13A	SV for MS-V13A, main Steam to EF tub. pump	see comment	L1	see comment	———	C9
LS/MS-V13A	LS for MS-V13A	see comment	L1	see comment	———	C9
SV/MS-V13B	SV vor MS 13B, main Steam to EF tub. pump	see comment	L1	see comment	———	C9
LS/MS-V13B	Lim. Sw. for MS-V13B	see comment	L1	see comment	———	C9
MS-V10A	Main steam to EF turb. pump valve m.o.	D1	L1	P8	R4	C10
MS-V10B	Main steam to EF turb. pump valve m.o.	D1	L1	P8	R4	C10
Starter/ MS-V10A	Local Starter for MS-V10A m.o.	see comment	L1	P8	R3	C10
Starter/ MS-V10B	Local Starter for MS-V10B m.o.	see comment	L1	P8	R1+R3	C10
AS-V4	Aux. steam to EF turb. pump	D1	L1	P9	R3	C17
CO-V10A	CST-A iso. valve m.o.	D1	L4	P10	R3	C12
CO-V10B	CST-B iso. valve m.o.	D1	L4	P11	R3	C12
CO-V14A	CST-A to cond. iso. valve m.o.	D1	L1	P3	R3	C13
CO-V14B	CST-B to cond. iso. valve m.o.	D1	L1	P4	R3	C13
CO-V111A	CST cross connect valve m.o.	D1	L1	P12	R3	C14
CO-V111B	CST cross connect valve m.o.	D1	L1	P12	R3	C14
RCPPM	Reactor coolant pump power monitors	see comment	———	———	———	C15
DPS-829	Diff. press.sensor for loss of main FW pumpA	see comment	———	———	———	C16
DPS-830	Diff. press.sensor for loss of main FW pumpA	see comment	———	———	———	C16
DPS-542	Diff. press.sensor for loss of main FW pumpB	see comment	———	———	———	C16
DPS-543	Diff. press.sensor for loss of main FW pumpB	see comment	———	———	———	C16

LEGEND

D1. Limitorque valve motor operators, SMB-000 to SMB-5, have been seismically qualified up to 6 g's per Limitorque Report B-0037.

D2. EFW pump motor is a seismic Class I component per FSAR Section 5.1.1.1 j and FSAR Table 5-7 and per Westinghouse letter Rice to Sailer dated November 11, 1969.

L1. The Intermediate Building is a seismic Class I structure per FSAR section 5.1.1.1 a and FSAR Table 5-7.

L2. The Diesel Generator Building is a seismic Class I structure per FSAR section 5.1.1.1 a and FSAR Table 5-7.

L3. The Reactor Building is a seismic Class I structure per FSAR section 5.1.1.1 a and FSAR Table 5-7.

L4. Component is located in the small concrete building adjacent to the CST, and the valve is part of the piping path from the CST to the EFP suction, which in seismic Class I.

P1. 1D 4160v ES Switchgear is a seismic Class I component per FSAR sections 5.1.1.1 e and 8.2.2.10 c and FSAR Table 5-7.

P2. 1E 4160v ES Switchgear is a seismic Class I component per FSAR sections 5.1.1.1 e and 8.2.2.10 c and FSAR Table 5-7.

P3. 1AES 480v Motor Control Center is a seismic Class I component per FSAR sections 5.1.1.1e and 8.2.2.10d and FSAR Table 5-7.

P4. 1BES 480v Motor Control Center is a seismic Class I component per FSAR sections 5.1.1.1e and 8.2.2.10d and FSAR Table 5-7.

P5. 1CES 480v Motor Control Center is a seismic Class I component per FSAR section 5.1.1.1e and 8.2.2.10d and FSAR Table 5-7.

P6. 1C DC Distribution Panel is a seismic Class I component per FSAR sections 5.1.1.1e and 8.2.2.10e and FSAR Table 5-7.

P7. Panel XCC as an electrical power source is part of the D-C Power Supply System and Inverters indicated as a seismic Class I component per FSAR sections 5.1.1.1e and 8.2.2.10e and FSAR Table 5-7.

P8. 1D DC Distribution Panel is a seismic Class I component per FSAR sections 5.1.1.1e and 8.2.2.10e and FSAR Table 5-7.

P9. 1A 480v Reactor Plant Control Center is not part of the Emergency Power Supply System and has not specifically been designed to seismic requirements. This control center is located in the Control Building, a seismic Class I structure per FSAR section 5.1.1.1a and FSAR Table 5-7.

LEGEND continued

P10. 1A 480v Turbine Plant Control Center is not part of the Emergency Power Supply System and has not specifically been designed to seismic requirements. This control center is located in the Turbine Building, a non-seismic structure.

P11. 1A 480v Rad. Waste Control Center is not part of the Emergency Power Supply System and has not specifically been designed to seismic requirements. This control center is located in the Auxiliary Building, a seismic Class I structure per FSAR section 5.1.1.1a and FSAR Table 5-7.

P12. 1D 480v Turbine Plant Control Center is not part of the Emergency Power Supply System and has not specifically been designed to seismic requirements. This control center is located in the Turbine Building, a non-seismic structure.

R1. Cable is routed in conduit, ES cable trays, non-ES cable trays in seismic Class I structures, and underground encased conduit between the Control Building and Intermediate Building. The seismic qualification of non-ES cable trays in seismic Class I structures is equivalent to that of ES cable trays. ES cable trays are seismic Call I per FSAR Section 5.1.1.1e and FSAR Table 5-7. The design of the underground encased conduit has been evaluated as remaining serviceable after a seismic event.

R2. Cable is routed in conduit, ES cable trays and underground encased conduit between the Control Building and Intermediate Building. Refer to R1 above for seismic qualification references.

R3. Cable is routed in conduit, ES cable trays, non-ES cable trays in seismic Class I structures, and non-ES cable trays in non-seismic structures. Refer to R1 above for seismic qualification references on ES cable trays and non-ES cable trays in seismic Class I structures.

R4. Cable is run in conduit only in the Intermediate Building.

C1. The only non-seismic part of this item is the cable routing through the Turbine Building. EF-V4 and EF-V5 are only operated after the source of water from the CST has been depleted. The time involved is such that local manual operation of the valves.

C2. The existing EFP minimum flow (recirculation) solenoid valves, controlling flow switches and associated circuitry have not specifically been designed to seismic requirements.

C3. The existing EFW control functions including associated circuitry have not in total been specifically designed to seismic requirements.

C4. EFW flow indication is a safety grade design per TMI-1 Restart Report section 2.1.1.7.3.

LEGEND (continued)

C5. New OTSG level transmitters, independent of the ICS, have been installed as safety grade. The seismic qualification of the original OTSG level transmitters is discussed in TMI-1 Restart Report section 2.1.1.7.3.

C6. The existing CST low level alarm has not specifically been designed to seismic requirements.

C7. The only non-seismic part of this item is the cable routing through the Turbine Building. MS-V2A/B and MS-V8A/B are not required to change position for the EFW system during normal operation. The valves are required for isolation of OTSG during a seismic event in which the OTSG is depressurized.

C8. LS/MS-V6 is for indication of the valve position only. The valve itself is pneumatically controlled and functions independent of the limit switch. Valve operation and EFW turbine driven pump operation can be verified by using qualified instrumentation for EFW flow and OTSG level.

C9. The solenoid valves on MS-V13A/B are not specifically designed to seismic requirements. Valve position can be verified independent of the limit switches by using qualified instrumentation for EFW flow and OTSG level. The solenid valves are continuously energized to keep the valve closed; loss of electrical power causes the valve to open and supply steam to the EFW turbine driven pump steam supply control valve. Failure of MS-V13A/B would not affect operation of the two EFW motor driven pumps. Failure of MS-V13A/B in the open position may result in lifting relief MS-V2A/B. Failure of MS-V13A/B in the closed position may isolate steam to the turbine driven EFW pump.

C10. The non-seismic parts of these items are the cable routing through the Turbine Building and the fact that the starters are not specifically designed to seismic requirements. MS-V10A/B valves are normally closed and need to be operated only when the OTSG pressure is very low to maintain operation of the EFW turbine driven pump. The time involved is such that local manual operation or the use of alternate systems is available.

C11. Deleted.

C12. The non-seismic parts of this item are the cable routing through the Turbine Building and the electric power supplies. CO-V10A/B are normally open and are not required to change position for the system to become operational.

C13. The only non-seismic part of this item is the cable routing through the Turbine Building. CO-V14A/B are normally open and are required to change position for the system to become operational if a pipe break occurs in the hotwell makeup piping.

C14. The non-seismic parts of this item are the cable routing through the Turbine building and the electric power supplies. CO-V11A/B are not required to change position for the system to become operational.

LEGEND (continued)

C15. The Reactor Coolant Pump Power Monitors being part of the RPS are seismic Class I per FSAR sections 5.1.1.1c and 7.1.1.8 and FSAR Table 5-7. The EFW auto-start signal on loss of all four RCP's is also discussed in TMI-1 Restart Report section 2.1.1.7.3.

C16. The EFW auto-start signal on loss of both main feedwater pumps has been made as safety grade as possible by recent modification. By necessity, the differential pressure switches which are seismically qualified must be located in the Turbine Building, the location of the main feedwater pumps. That is the only non-safety grade feature of the design. Also refer to TMI-1 Restart Report section 2.1.2.6.

C17. The non-seismic parts of this item are the cable routing through the Turbine Building and the electric power supply. AS-V4 is normally closed and is not required to change position for the system to become operational.

Table B

WALKDOWN IDENTIFIED DEFICIENCIES

Deficiency	Modifications	Schedule
1. Conduit to MSV-6 has loose clamp	Tighten clamp	Have been or will be completed prior to restart.
2. Conduit to EFW 8B had no clamps to hold it to existing steel	Add clamp for securing	Have been or will be completed prior to restart.
3. Unistrut supporting conduit to EFV 8C is loose as the base	Tighten	Have been or will be completed prior to restart.