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Office of Nuclear Reactor Regulation
Attn: J. F. Stolz, Chief
Operating Reactors Branch No. 4
U.S. Nuclear Regulatory Commission
Washington, D. C. 20555

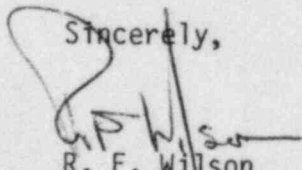
Dear Sir:

Three Mile Island Nuclear Generating Station Unit 1 (TMI-1)
Operating License No. DPR-50
Docket No. 50-289
Environmental Qualification - SBLOCA Radiation

As discussed in a phone conversation between R. LaGrange (NRC) et al and L. W. Harding (GPUN) et al on January 3 and 18, 1985 and discussions during the January 29 and 30 EQ audit, enclosed please find information requested associated with GPUN Letters dated August 23, 1984 (5211-84-2217), November 9, 1984 (5211-84-2255) and December 11, 1984 (5211-84-2292).

GPUN confirms that the electrical equipment required to mitigate a SBLOCA at TMI-1 identified in our letters of August 23, 1984, August 27, 1984 and November 9, 1984 is qualified to LOCA radiation levels in NRC Order CLI 84-11 subject to completion of the open items (equipment replacement) indicated in enclosure 1.

Sincerely,


R. F. Wilson
Director
Technical Functions

1r/0523e

cc: R. Conte
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Enclosure 1

Resolution of Equipment Items Whose SBLOCA Radiation Qualification Was Identified In Previous Submittals

1. Incore Thermocouples

The 46 operational incore thermocouples discussed in our August 23, 1984 submittal was derived from a telephone conversation with personnel at TMI-2 in August of 1984. These 46 incore thermocouples gave readings around the expected average value. Based on a review of LER's for TMI-2, 23 thermocouples are now considered in service as defined by the TMI-2 Tech. Spec. This telephone conversation also revealed that some thermocouples move in and out of operational status in a random way. These failures by all indications are believed to be caused by weakness in the junctions not by radiation effects on the extension cable. The 50 thermocouples discussed in attachment 6 of our letter of December 11, 1984 (JIO-TI-84-6) was derived from electrical resistance measurements reported in GEND INF 031 Vol. 2 of April 1984. This report states that two thermocouples were considered open and dry; 26 are considered open and wet and 24 were considered to have formed new junctions.

Note that the GEND report also states that the extension cable insulation resistance data showed only a minor decrease from the value specified in the original specification.

The basis for the need for incore thermocouples for 10 hours following a SBLOCA is discussed in JIO-TI-84-6 Rev.1 submitted February 11, 1985. The incore thermocouples assemblies are considered environmentally qualified for radiation.

Note that cold junction compensation RTDs are required to be qualified as part of the Incore Thermocouple System (see JIO-TI-84-7 Rev. 1). These Rosemount 139U RTD's will be replaced by qualified WEED RTD's by March 31, 1985 (EQ-TI-136).

2. MUP-3A/B/C (Makeup Main Lube Oil Pump)

GPUN has qualified these motors to the DOR Guidelines for LB LOCA radiation dose (EQ-TI-121). GPUN has confirmed that the electrical interface qualification is established and that these motors are environmentally qualified for radiation.

3. Rosemount RTD Model Nos. 177 HW and 177GY

There are no 177GY's installed at TMI-1 which require environmental qualification. GPUN has test information on model No. 177 HW RTD's which shows that beta shields are not required. GPUN performed an audit of test data, verified the conduit seal installation and confirmed that the accuracy is compatible with the plant specific application (EQ-TI-130). These RTD's are now considered environmentally qualified for radiation.

4. Limiter Valve

- a) DHV-4A/B The existing motor leads are frayed, and action is being taken to correct this situation. The Ding's brakes are now documented as qualified (EQ-TI-105) and other outstanding action items for this file have been resolved. DHV-4A/B will be considered qualified for radiation when these motor leads problem is corrected.
- b) DHV-7A/B The existing splices have been replaced by qualified Raychem splices. Outstanding action items for this file (EQ-TI-105) have been resolved, and DHV-7A/B are now considered qualified for radiation.
- c) NSV-4, 15 The existing splices have been replaced by qualified Raychem splices. Outstanding items for this file (EQ-TI-105) have been resolved, and NSV-4, 15 are now considered qualified for radiation.
- d) NSV-35 This valve was added to the SB LOCA Master List by letter dated August 27, 1984 (5211-84-2227). The existing splice has been replaced by a qualified Raychem splice (EQ-TI-103). The electrical interfaces have been confirmed the motor operator has been shown to be acceptable to the plant specific application and outstanding open items have been resolved. Therefore, NSV-35 is now considered qualified for radiation.
- e) CAV 1, 3 & 13 The existing splices have been replaced by qualified Raychem splices for CAV 1 & 13. CAV-3's motor will be replaced with qualified motor and splices in February 1985 because of damaged motor lead wires. The electrical interfaces have been confirmed; the motor operators have been shown to be acceptable for the plant specific application; and outstanding open items have been resolved with the exception of the torque switch for CAV 13. Therefore, CAV 1 is now considered qualified for radiation. CAV 3 and 13 will be qualified for radiation upon replacement of their respective motor and torque switch.
- f) MUV-12 As discussed in TDR 598 provided to NRC for review during the September 6, and 7, 1984 audit, MUV-12 is not required to be environmentally qualified for radiation for the following reasons and was inadvertently added to the SBLOCA Master List: :

"This motor operated valve is normally open. If the valve operator fails due to the SBLOCA postulated radiation, it will fail as-is. Since procedure O.P. 1104-2 limits the MU tank gas pressure to prevent gas entrainment to the HPI pumps, this valve may be left open or closed during a SBLOCA. Failure of this valve due to radiation will not affect the ability to mitigate a SBLOCA. Therefore, this valve does not need to be qualified for the SBLOCA postulated radiation."

Attached is revised page 2 of 14 of our August 23, 1984 (5211-84-2217) submittal, which deletes this value from the SBLOCA master list.

- g) MUV-2A/B, 25; WDGV-3; and WDLV-303 As a result of a word processing formatting problem, attached are clarified pages 1 and 2 of our December 11, 1984 (5211-84-2292) Attachment 2. The existing splices have been replaced by qualified Raychem splices. The electrical interfaces have been confirmed; the motor operators have been shown to be acceptable for the plant specific application; and outstanding open items have been resolved. Therefore, MUV-2A/B, 25; WDGV-3; and WDLV-303 are now considered environmentally qualified for radiation.
- h) ICV-2 The existing splices have been replaced by qualified Raychem splices. The electrical interfaces have been confirmed, the motor operators has been shown to be acceptable for the plant specific application and outstanding open items have been resolved except the replacement of the limit switches. Therefore, ICV-2 will be considered to be environmentally qualified for radiation when the limit switch replacement is complete.
- i) DHV 1 & 2 The torque and limit switches will be replaced by March 31, 1985. Therefore, DHV 1 & 2 will be considered qualified for radiation when this replacement is complete.

5. Samuel Moore Instrumentation Cable

GPUN has researched the environmental qualification documentation of this cable and has determined this cable to be environmentally qualified (EQ-TI-140) for radiation.

6. HPI Pump Oil System

MUP-2A/B/C motors have been qualified to the DOR Guidelines for LB LOCA radiation dose (EQ-TI-121). GPUN has confirmed that the electrical interface qualification is established and that these motors are environmentally qualified. The associated pressure switches (PS-479 A/B/C) will be replaced by March 31, 1985 with ASCO pressure switches (SA21AR) which are considered qualified (EQ-TI-147) for radiation.

7. HPI Flow Indication & RCP Seal Injection Flow Indication

MU-23-DPT 1,2,3 & 4 and MU-42-DPT will be replaced by March 31, 1985 with Rosemount differential pressure transmitters Model 1153HB which are qualified (EQ-TI-149) for radiation. In our letter dated December 11, 1984 (5211-84-2292) GPUN provided J10-TI-84-3 which contained a typographical error for the existing transmitters (Note: The maximum integrated (aging) dose in 40 years should be 1.8×10^4 rads vice 1.8×10^3 rads.).

8. LPI Flow Indication

DH-1 DPT 1&2 will be replaced by March 31, 1985 with Rosemount transmitters which are qualified (EQ-TI-149) for radiation.

9. Makeup Tank Level Indication

MU-14-LT will be replaced by March 31, 1985 with a Rosemount transmitter which is qualified (EQ-TI-149) for radiation.

Transorb Diodes (ICV-3, MUV-3, MUV-18)

These diodes have been successfully tested for the LBLOCA environment and GPUN has the test report on file (EQ-TI-133). The test report has been reviewed and as the result of a low current leakage anomaly displayed during the test, these diodes will be replaced with low leakage TransZorb diodes of the same model by March 31, 1985. Following replacement, these diodes will be considered qualified for radiation. The TransZorb diodes were inadvertently left off the SBLOCA Master List due to a clerical error.

11. Weed RTD's

Similarity between the installed RTD's (AO 611-1B) and those tested (AO 611-1A) has been established in the file (EQ-TI-136) by documentation from Weed. Details and drawings are on file in our document center. These RTD's are now considered qualified for radiation.

12. GE Electrical Penetrations

General Electric is preparing an EQ file on these containment electrical penetrations. The file is expected to be completed by March 1, 1985. Discussions and a letter from GE concludes that there is a high degree of confidence that these penetrations are qualified for radiation.

Specific Equipment EQ Deficiencies
NRC TER IB, IIA, IIB Categories

A. Limitorque Motor Operators

TER NOS.	Tag NOS.	Description (Model etc.)	Previous NRC Category	Previous Deficiencies	Proposed Resolution
1	[WDG-V3]	MVA SMB00	II.A	2, 3, 4	For Limitorque motor operators, similarity to units tested, aging analysis and qualified life are established in the Limitorque generic report B0058, PWR Report 600456, purchase orders and plant walkdowns. Material discrepancies found during the plant walkdown are documented and are scheduled to be corrected and in complete compliance by March 1985.
3	[DH V1&2]	MVA SMB3	II.A	2, 3, 4	
6	[CFV-2B, 3A&3B]	MVA SMB000	II.A	2, 3, 4	
7	[CA-V1,3,4A/B, CFV2A]	MVA SMB000	II.A	2, 3, 4	
118	[CA-V13]	MVA SMB000	II.A	1, 2, 3, 4	
120	[MU-V25]	MVA SMB00	II.A	1, 2, 3, 4	
	[W DLM-303]	MVA SMB000			

2	[AH V1B&1C]	MVA SMB2	II.A	1, 2, 3, 4	All of the TER No. 1 comments apply to these in containment motor operators.
7	IC V2	MVA SMB000	II.A	2, 3, 4	
119	MU V2A/B	MVA SMB00	II.A	2, 3, 4	

The Dings motor brake model 6-71010-6 is qualified by similarity to model 6-63009-50 which was tested as described in test report 600198 (F-C2232-01). Both models are constructed of the same materials and rated for approximately the same torque, but differ only in size.

The Dings brake is qualified to 1×10^6 rads by GPUN analysis (material list from vendor) which is documented in GPUN calculation 1101X-5350-018, Rev. 1. This calculation shows Polyimide (not Polyamide) as the limiting material [EPRI NP-1558 p C-2]. The specified 2×10^7 rads total integrated dose for these motor operators is based upon the DOR Guidelines.

This in-containment motor operator (ICV-2) is located below the flood level. Evaluation of operating time in process

Specific Equipment EQ Deficiencies

A. Limitorque Motor Operators - Continued

TER Nos.	Tag Nos.	Description (Model etc.)	Previous NRC Category	Previous Deficiencies	Proposed Resolution
10	[FW V5B]	MVA SB3	II.A	1, 2, 3, 4, 7a	All of the above comments (for TER No. 2) apply to these out-of-containment motor operators except that these have Reliance class B insulated motors.
11	[EF V2AR2B]	MVA SMB0	II.A	1, 2, 3, 4, 7a	
14	[FW V92B]	MVA SMB00	II.A	1, 2, 3, 4, 7a	
15	[EF V1ARB]	MVA SMB000	II.A	1, 2, 3, 4, 7a	

These motor operator are qualified by Limitorque Report B0003. A thermal lag analysis which shows that the operator will operate through the Intermediate Bldg MSLB temperature spike of 322°F was developed (GPUN Calc. C-1101-424-5350-001 Rev. 2).

SBLOCA MASTER LISTSystem Make-up and Purification

<u>Plant ID No.</u>	<u>Description</u>	<u>Location</u>	<u>Device Manufacturer</u>
MU-P1A	Pump Motor	AB	Westinghouse
MU-P1B	Pump Motor	AB	Westinghouse
MU-P1C	Pump Motor	AB	Westinghouse
MU-P3A	Pump Motor (Main Oil)	AB	General Electric
MU-P3B	Pump Motor (Main Oil)	AB	General Electric
MU-P3C	Pump Motor (Main Oil)	AB	General Electric
MU-V2A	Letdown cooler outlet Valve Motor Operator	RB	Limatorque
MU-V2B	Letdown cooler outlet Valve Motor Operator	RB	Limatorque
LSA/MU-V3	Letdown cooler outlet Valve Limit Switch	AB	NAMCO
LSB/MU-V3	Letdown cooler outlet Valve Limit Switch	AB	NAMCO
SV/MU-V3	Letdown cooler outlet Valve Solenoid Valve	AB	ASCO
MU-V14A	Pump Suction From BWST Valve Motor Operator	AB	Limatorque
MU-V14B	Pump Suction From BWST Valve Motor Operator	AB	Limatorque
MU-V16A	Pump discharge Valve Motor Operator	AB	Limatorque
MU-V16B	Pump discharge Valve Motor Operator	AB	Limatorque
MU-V16C	Pump discharge Valve Motor Operator	AB	Limatorque
MU-V16D	Pump discharge Valve Motor Operator	AB	Limatorque

SBLOCA MASTER LIST

<u>Plant ID No.</u>	<u>Description</u>	<u>Location</u>	<u>Device</u> <u>Manufacturer</u>
MUP 2A,B,C	MU Pump Motor (Aux. Lube Oil)	AB	General Electric
PS 479 A,B,C*	Pressure Switches MU Aux. Lube Oil Pump	AB	ASCO
MU-23-DPT-1,2,3,4*	HPI Flow Transmitters	AB	Rosemount
MU-42-DPT*	Seal Injection Flow Transmitters	AB	Rosemount
MU-14-LT* LT-778	Make Up Tank Level	AB	Rosemount
DH-1-DPT-1 & 2*	LPI Flow Transmitters	AB	Rosemount
	Suppression Diodes	AB	TransZorb

* Presently being replaced with a new qualified component