GPU Nuclear

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Writer's Direct Dial Number:

August 23, 1984
5211-84-2217

Office of Nuclear Reactor Regulation
Attn: Darrell 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
Environmental Qualification (SBLOCA/Radiation)

In response to your letter of August 8, 1984, enclosed as Attachment 1 is the master list of the electrical equipment located in a harsh radiation environment that is necessary to mitigate small break LOCAs and loss of main feedwater transients. This list was prepared in accordance with the guidance provided in your letter of May 25, 1984. Radiation qualification information for those components in Attachment 1 will be available for review during the NRC audit scheduled for August 29-30, 1984. Attachment 2 lists the additions/deletions made since our letter of May 18, 1981 along with reasons for them. Attachment 3 describes the resolution of equipment items whose radiation qualification documentation is incomplete at the time of this letter.

GPUN affirms that the environmental qualification files for the components in Attachment 1 (as modified by Attachment 3) adequately demonstrate SBLOCA qualification for radiation levels associated with large break LOCAs in accordance with the DOR Guidelines.

As permitted by the DOR Guidelines (Section 4.1.2), TMI-1 plant application specific large break LOCA radiation doses were calculated for

A048
1/1

use in qualifying certain pieces of equipment located inside containment. These calculations will be available for review during the audit.

Sincerely,

R. F. Wilson
Vice President,
Technical Functions

RFW/LWH/MRK/0359e

Attachments

cc: R. Conte, NRC Resident Inspector
J. F. Stolz, NRC Chief, Operating Reactors Branch No. 4
J. Van Vliet, NRC Project Manager

Sworn and subscribed to before me this 23 day of August, 1934.

Carol Dispoto

CAROL DISPOTO
NOTARY PUBLIC OF NEW JERSEY
My Commission Expires June 30, 1988

SBLOCA MASTER LIST

System Main Steam

Plant ID No.	Description	Location	Device Manufacturer
SP6A-PT1	OTSG Discharge Press Transmitter	RB	Foxboro
SP6A-PT2	OTSG Discharge Press Transmitter	RB	Foxboro
SP6B-PT1	OTSG Discharge Press Transmitter	RB	Foxboro
SP6B-PT2	OTSG Discharge Press Transmitter	RB	Foxboro
PT-950	OTSG Discharge Press Transmitter	RB	Rosemount
PT-951	OTSG Discharge Press Transmitter	RB	Rosemount

SBLOCA MASTER LIST

System Make-up and Purification

Plant ID No.	Description	Location	Device Manufacturer
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	Limitorque
MU-V2B	Letdown cooler outlet Valve Motor Operator	RB	Limitorque
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
MUV-12	Pump suction valve motor operator	AB	Limitorque
MU-V14A	Pump Suction From BWST Valve Motor Operator	AB	Limitorque
MU-V14B	Pump Suction From BWST Valve Motor Operator	AB	Limitorque
MU-V16A	Pump discharge Valve Motor Operator	AB	Limitorque
MU-V16B	Pump discharge Valve Motor Operator	AB	Limitorque
MU-V16C	Pump discharge Valve Motor Operator	AB	Limitorque
MU-V16D	Pump discharge Valve Motor Operator	AB	Limitorque

SBLOCA MASTER LIST

System Make-up and Purification

Plant ID No.	Description	Location	Device Manufacturer
SV/MU-V18	Charging Line Isolation Valve-Solenoid Valve	AB	Ross
LSA/MU-V18	Charging Line Isolation Valve-Limit Switch	AB	NAMCO
LSB/MU-V18	Charging Line Isolation Valve-Limit Switch	AB	NAMCO
LSA/MU-V20	Seal Isolation Valve-Limit Switch	AB	NAMCO
LSB/MU-V20	Seal Isolation Valve-Limit Switch	AB	NAMCO
SV/MU-V20	Seal Isolation Valve-Solenoid Valve	AB	Ross
MU-V25	RCP Letdown Cooler Isolation Valve-Motor Operator	RB	Limitorque
SV/MU-V26	RCP Letdown Cooler Isolation Valve-Solenoid Valve	AB	ASCO
LSA/MU-V26	RCP Letdown Cooler Isolation Valve - Limit Switch	AB	NAMCO
LSB/MU-V26	RCP Letdown Cooler Isolation Valve - Limit Switch	AB	NAMCO
PS745A	Pressure Switch Lube Oil	AB	Static-O-Ring
PS745B	Pressure Switch Lube Oil	AB	Static-O-Ring
PS745C	Pressure Switch Lube Oil	AB	Static-O-Ring

SBLOCA MASTER LIST

System Decay Heat Removal

Plant ID No.	Description	Location	Device Manufacturer
DH-P1A	Pump Motor	AB	Westinghouse
DH-P1B	Pump Motor	AB	Westinghouse
DH-V4A	Discharge Valve-Motor Operator	AB	Limitorque
DH-V4B	Discharge Valve-Motor Operator	AB	Limitorque
DH-V6A	RB Sump Pump Suction Valve-Motor Operator	AB	Limitorque
DH-V6B	RB Sump Pump Suction Valve-Motor Operator	AB	Limitorque
DH-V7A	MU System Suction Valve-Motor Operator	AB	Limitorque
DH-V7B	MU System Suction Valve-Motor Operator	AB	Limitorque
DPT-802	DH Flow Transmitter	AB	Rosemount
DPT-803	DH Flow Transmitter	AB	Rosemount
DH-V1	DH Dropline Isolation Valve-Motor Operator	RB	Limitorque
DH-V2	DH Dropline Isolation Valve-Motor Operator	RB	Limitorque
DH-V3	DH Dropline Isolation Valve-Motor Operator	A	Limitorque
RC-V3	Pressurizer Spray Line Isolation Valve-Motor Operator	RB	Limitorque
RC-V4	DH Injection Line Isolation Valve-Motor Operator	RB	Limitorque

SBLOCA MASTER LIST

System Reactor Building Isolation

Plant ID No.	Description	Location	Device Manufacturer
LSA/AH-V1A	RB Purge Valve-Limit Switch	AB	NAMCO
LSB/AH-V1A	RB Purge Valve-Limit Switch	AB	NAMCO
SV/AH-V1A1	RB Purge Valve-Solenoid Valve	AB	ASCO
SV/AH-V1A2	RB Purge Valve-Solenoid Valve	AB	ASCO
CA-V1	Pzr. Sample Valve Motor Oper.	RB	Limitorque
LSA/CA-V2	RCS Sample Valve-Limit Valve	AB	NAMCO
LSB/CA-V2	RCS Sample Valve-Limit Valve	AB	NAMCO
SV/CA-V2	RCS Sample Valve-Solenoid Valve	AB	ASCO
CA-V3	Pzr. Water Sample Valve-Motor Operator	RB	Limitorque
CA-V4A	OTSG FW Isolation Valve-Motor Operator	RB	Limitorque
CA-V4B	OTSG FW Isolation Valve-Motor Operator	RB	Limitorque
CA-V13	RCS Letdown Sample Valve-Motor Operator	RB	Limitorque
LSA/CA-V189	Demin. Water Isolation Valve-Limit Switch	AB	Micro Switch
LSB/CA-V189	Demin. Water Isolation Valve-Limit Switch	AB	Micro Switch
SV/CA-V189	Demin. Water Isolation Valve-Solenoid Valve	AB	ASCO
AH-V1B	RB Purge Valve-Motor Oper.	RB	Limitorque

SBLOCA MASTER LIST

System Reactor Building Isolation

Plant ID No.	Description	Location	Device Manufacturer
AH-V1C	RB Purge Valve-Motor Oper.	RB	Limitorque
IC-V2	IC Closed Loop Isolation Valve-Motor Operator	RB	Limitorque
SV/IC-V3	IC Return Isolation Solenoid Valve	AB	ASCO
LSA/IC-V3	IC Return Isolation Valve-Limit Switch	AB	NAMCO
LSB/IC-V3	IC Return Isolation Valve-Limit Switch	AB	NAMCO
WDG-V3	RB Vent header Isolation Valve-Motor Operator	RB	Limitorque
WDG-V4	RB Vent header Isola. Valve-Solenoid Valve	AB	Target Rock
WDL-V303	RCS Drain tank Outlet Isola. Valve-Motor Oper.	RB	Limitorque
LSA/WDL-V304	RCS Drain Isolation Valve-Limit Switch	AB	NAMCO
LSB/WDL-V304	RC Drain Isolation Valve-Limit Switch	AB	NAMCO
SV/WDL-V304	RC Drain Isolation Valve-Solenoid Valve	AB	ASCO
LSA/WDL-V534	RB Sump Isolation Valve-Limit Switch	AB	NAMCO
LSB/WDL-V534	RB Sump Isolation Valve-Limit Switch	AB	NAMCO
SV/WDL-V534	RB Sump Isolation Valve-Solenoid Valve	AB	ASCO
LSA/WDL-V535	RB Sump Isolation Valve-Limit Switch	AB	NAMCO
LSB/WDL-V535	RB Sump Isolation Valve-Limit Switch	AB	NAMCO
SV/WDL-V535	RB Sump Isolation Valve-Solenoid Valve	AB	ASCO

SBLOCA MASTER LIST

System Reactor Protection

Plant ID No.	Description	Location	Device Manufacturer
RC3A-PT1	RC NR Pressure Transmitter	RB	Rosemount
RC3A-PT2	RC NR Pressure Transmitter	RB	Rosemount
RC3B-PT1	RC NR Pressure Transmitter	RB	Rosemount
RC3B-PT2	RC NR Pressure Transmitter	RB	Rosemount
RC4A-TE2	RC Outlet Temp RTD	RB	Rosemount
RC4A-TE3	RC Outlet Temp RTD	RB	Rosemount
RC4B-TE2	RC Outlet Temp RTD	RB	Rosemount
RC4B-TE3	RC Outlet Temp RTD	RB	Rosemount
PS-672	RB Pressure Switch	AB	Static-O-Ring
PS-673	RB Pressure Switch	AB	Static-O-Ring
PS-674	RB Pressure Switch	AB	Static-O-Ring
PS-675	RB Pressure Switch	AB	Static-O-Ring

SBLOCA MASTER LIST

System Engineered Safeguards Actuation

Plant ID No.	Description	Location	Device Manufacturer
RC3A-PT3	RC WR Pressure Transmitter	RB	Foxboro
RC3A-PT4	RC WR Pressure Transmitter	RB	Foxboro
RC3B-PT3	RC WR Pressure Transmitter	RB	Foxboro
PT-282	RB Pressure Transmitter	AB	Foxboro
PT-285	RB Pressure Transmitter	AB	Foxboro
PT-288	RB Pressure Transmitter	AB	Foxboro

SBLOCA MASTER LIST

System Reactor Building Emergency Cooling

Plant ID No.	Description	Location	Device Manufacturer
AH-E1A	RB Cooler Fan Motor	RB	General Electric
AH-E1B	RB Cooler Fan Motor	RB	General Electric
AH-E1C	RB Cooler Fan Motor	RB	General Electric

SBLOCA MASTER LIST

System Core Flood

Plant ID No.	Description	Location	Device Manufacturer
CF-V2A	CF Sample Isolation Valve-Motor Operator	RB	Limitorque
CF-V2B	CF Sample Isolation Valve-Motor Operator	RB	Limitorque
LSA/CF-V19A	CF Makeup Valve-Limit Switch	AB	Micro Switch
LSB/CF-V19A	CF Makeup Valve-Limit Switch	AB	Micro Swtich
SV/CF-V19A	CF Makeup Valve-Solenoid Valve	AB	ASCO
LSA/CF-V19B	CF Makeup Valve-Limit Switch	AB	Micro Switch
LSB/CF-V19B	CF Makeup Valve-Limit Switch	AB	Micro Switch
SV/CF-V19B	CF Makeup Valve-Solenoid Valve	AB	ASCO
LSA/CF-V20A	CF Sample Isolation Valve-Limit Switch	AB	Micro Switch
LSB/CF-V20A	CF Sample Isolation Valve-Limit Switch	AB	Micro Switch
SV/CF-V20A	CF Sample Isolation Valve-Solenoid Valve	AB	ASCO
LSA/CF-V20B	CF Sample Isolation Valve-Limit Switch	AB	Micro Switch
LSB/CF-V20B	CF Sample Isolation Valve-Limit Switch	AB	Micro Switch
SV/CF-V20B	CF Sample Isolation Valve-Solenoid Valve	AB	ASCO

SBLOCA MASTER LIST

System Nuclear Services Closed Loop Cooling

Plant ID No.	Description	Location	Device Manufacturer
NS-V4	RCP Cooler Isolation Valve-Motor Operator	AB	Limitorque
NS-V15	RCP Cooler Inlet Isolation Valve-Motor Operator	AB	Limitorque

SBLOCA MASTER LIST

System Additional Accident Monitoring Equipment*

Plant ID No.	Description	Location	Device Manufacturer
SP1A-LT2	OTSG Level Transmitter	RB	Bailey
SP1A-LT3	OTSG Level Transmitter	RB	Bailey
SP1B-LT2	OTSG Level Transmitter	RB	Bailey
SP1B-LT3	OTSG Level Transmitter	RB	Bailey
RC1-LT1	PZ Level Transmitter	RB	Bailey
RC1-LT2	PZ Level Transmitter	RB	Bailey
RC1-LT3	PZ Level Transmitter	RB	Bailey
LT-777	PZ Level Transmitter	RB	Rosemount
RC5A-TE1	RC Inlet Temp RTD	RB	Rosemount
RC5A-TE2	RC Inlet Temp RTD	RB	Rosemount
RC5A-TE3	RC Inlet Temp RTD	RB	Rosemount
RC5A-TE4	RC Inlet Temp RTD	RB	Rosemount
RC5B-TE1	RC Inlet Temp RTD	RB	Rosemount
RC5B-TE2	RC Inlet Temp RTD	RB	Rosemount
RC5B-TE3	RC Inlet Temp RTD	RB	Rosemount
RC5B-TE4	RC Inlet Temp RTD	RB	Rosemount
SP1A-LT4	OTSG Level Transmitter	RB	Bailey
SP1A-LT5	OTSG Level Transmitter	RB	Bailey
SP1B-LT4	OTSG Level Transmitter	RB	Bailey
SP1B-LT5	OTSG Level Transmitter	RB	Bailey
PT-949	RC Pressure Transmitter	RB	Rosemount
PT-963	RC Pressure Transmitter	RB	Rosemount

SBLOCA MASTER LIST

System Additional Accident Monitoring Equipment*

Plant ID No.	Description	Location	Device Manufacturer
RC-4A-TE1	RC T_{Hot} RTD	RB	Rosemount
RC-4A-TE4	RC T_{Hot} RTD	RB	Rosemount
RC-4B-TE1	RC T_{Hot} RTD	RB	Rosemount
RC-4B-TE4	RC T_{Hot} RTD	RB	Rosemount
TE-958	RC T_{Hot} RTD	RB	Weed
TE-960	RC T_{Hot} RTD	RB	Weed
TE-959	RC T_{Cold} RTD	RB	Weed
TE-961	RC T_{Cold} RTD	RB	Weed
PT-981A	RB Pressure Transmitter	RB	Rosemount
PT-981B	RB Pressure Transmitter	RB	Rosemount
PT-982A	RB Pressure Transmitter	RB	Rosemount
PT-982B	RB Pressure Transmitter	RB	Rosemount
LT-775	OTSG Level Transmitter	RB	Rosemount
LT-776	OTSG Level Transmitter	RB	Rosemount
LT-788	OTSG Level Transmitter	RB	Rosemount
LT-789	OTSG Level Transmitter	RB	Rosemount
--	Incore Thermocouples	RB	(Various)

*Instrumentation for compliance with RG 1.97 is not within the scope of this list.

SBLOCA MASTER LIST

System Common Equipment

Plant ID No.	Description	Location	Device Manufacturer(s)
--	Heat Shrink Tubing	RB	Raychem
--	Elec. Penetration Assy.	RB/AB	General Electric
--	Instrument Cable	RB/AB	Continental/ Anaconda/BIW/ Samuel Moore
--	Power & Control Cable	RB/AB	Kerite
--	Electrical Seal Assemblies	RB	Conax
--	Terminal Block	AB	General Electric/ States

Attachment 2

Components Added to the Master List Subsequent to the 5/18/81 Submittal

Component	Description
TE-958, 960 (1)(3)	WR T_{HOT} RTD
TE-959, 961 (1)	WR T_{COLD} RTD
PT-949, 963 (1)(3)	WR RCS PRESS TRANS.
LT-777 (1)(4)	PZR. LEVEL TRANS.
PT-981A/B, 982A/B(1)	RB PRESS TRANS.
PT-950, 951 (1)	OTSG A/B PRESS. TRANS.
LT-775, 776, 788, 789 (1)	OTSG A/B FULL RANGE LEVEL TRANS.
SP1A-LT3/5(4)	OTSG A/B LEVEL TRANS.
SP1B-LT3/5(4)	OTSG A/B LEVEL TRANS.
RC-4A-TE-1/4(4)	NR T_{HOT} RTD
RC-4B-TE-1/4(4)	NR T_{HOT} RTD
PS-745 A/B/C(2)	MU PUMP LOW OIL PRESS. TRIP PRESS. SW.
DPT-802,803(1)	LPI FLOW TRANS.
Incore Thermocouples(3)	INCORE TEMP. INDICATION
RC-V3(3)	PZR. SPRAY LINE ISOL. VALVE-M.O.
RC-V4(3)	AUXILIARY SPRAY LINE ISOL. VALVE-M.O.
--(1)	INSTRUMENT CABLE
WDG-V4(8)	RB Vent Header Isolation Valve & position switches

Components Deleted from the Master List Subsequent to the 5/18/81 Submittal

Component	Description
MUP-2A,B&C(5)	Aux. Oil Pump Motors
MUP-4A,B&C(5)	Gear Oil Pump Motors
MUV-36,37(6)	Recirc. Valve Motor Operators
PS480AB&C(2)	Lube Oil Pressure Switches
DHV-5A,B(6)	BWST Suction Valve Motor Operators
SV/WDG-V4(8)	RB Vent Header Isolation Solenoid Valve
LSA/WDG-V4(8)	RB Vent Header Isolation Valve Limit Switch
LSB/WDG-V4(8)	RB Vent Header Isolation Valve Limit Switch
PS-283,4,6,7,9(7) and 290	RB Pressure Switch
CFV-3A/B(7)	CF Vent Valve Motor Operators
NSV-32(7)	Non Nuclear Equipment Cooler Isolation Valve Motor Operator

Footnotes

(1) New equipment added for ICS/NNI independence.

(2) New equipment added to replace another pressure switch which has been deleted.

(3) Changes in procedural guidance now requires the use of these components (i.e., ATOG symptom-oriented procedures).

(4) These instruments are being added because they would prevent misleading the operator and they are identical to other qualified items included in the SBLOCA list (e.g. SP1A-LT3 is identical to SP1A-LT2 which is on the SBLOCA list).

(5) These are backup lube oil pumps that are not required when employing the single failure criteria for SBLOCA.

(6) These components perform their required function prior to being exposed to the harsh radiation environment due to recirculated radioactive fluids and their subsequent possible failure as a result of the harsh environment will not affect safety.

(7) These components are not required to perform a safety function during or following exposure to a harsh radiation environment created by a SBLOCA, and failure of the equipment will not affect safety.

(8) This solenoid valve controlled pneumatic operator with seperate limit switches was replaced by a solenoid operator with self contained limit switches.

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Attachment 3

RESOLUTION OF EQUIPMENT ITEMS WHOSE RADIATION QUALIFICATION DOCUMENTATION IS INCOMPLETE

The following is a list of equipment required for small break LOCA mitigation whose radiation qualification has not been fully established including a description of the resolution for each item:

1. Incore Thermocouples

   While qualification of the incore thermocouple indicating system to the DOR Guidelines large break LOCA radiation level has not yet been fully documented, operating experience demonstrates that forty-six (46) of the fifty-two (52) identical units at TMI-2 are still operational after more than five years since the accident and exposure to approximately one Megarad gamma integrated dose. We are not aware of anything in the TMI-2 incore thermocouple system which suggests that the failures were due to radiation. The configuration and materials of the incore thermocouple system at TMI-1 are similar to that in TMI-2. This operating experience provides a basis for concluding that this equipment will perform its function when required.

2. MU-P3A/B/C (Make-up Main Lube Oil Pump Motors)

   Radiation qualification for these motors to the DOR Guidelines large break LOCA radiation dose will either be demonstrated prior to restart or these motors will be replaced with qualified units or a JIO will be provided.

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

   Beta shields will be installed on the RTD head assemblies such that the ethylene propylene O-ring is shielded from beta radiation. The beta shields will be installed prior to restart. With beta shields installed, these RTD's are qualified.

4. Limitorque Valves (DHV-4B; 7A/B; NSV-4, 15,35; CAV-1,3,13; MUV-12,2A/B,25; WDG-V3; WDLV-303; ICV-V2)

   The material used in the existing splices on these operators will be replaced with qualified splices prior to restart. Additionally, documentation for the sealing compound material for the Dings brakes (DHV-4 A/B only) is incomplete, but should be available for the audit. Should this documentation show that the brakes are unqualified, they will be replaced or a JIO will be provided.

5. Samuel Moore Instrumentation Cable (PT-981B)

   The cable for Rosemount pressure transmitter PT 981B was supplied by Samuel Moore Corporation. We are in the process of researching the radiation qualification documentation for this cable. We will have the radiation qualification file available by the audit date, or the cable will be replaced prior to restart, or a JIO will be prepared.