Nuclear

GPU Nuclear Corporation
Post Office Box 480
Route 441 South
Middletown, Pennsylvania 17057-0191
717 944-7621
TELEX 84-2386
Writer's Direct Dial Number:

December 11, 1984
5211-84-2292

Office of Nuclear Reactor Regulation
Attn: J. F. Stolz, Chief
Operating Reactors Branch No. 4
Division of Licensing
U. S. 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 of Electrical Equipment

On December 10, 1982 NRC issued the Safety Evaluation Report (SER) regarding the Environmental Qualification of Safety Related Electrical Equipment at TMI-1. The SER contained a Technical Evaluation Report (TER), written by Franklin Research Center (FRC), which noted a number of environmental qualification documentation deficiencies for safety-related electrical equipment at TMI-1. On October 5, 1983 and March 8, 1984 meetings were held with members of your staff to discuss GPUN's proposed resolution, for each of those deficiencies. Discussions also took place at the meetings regarding GPUN's general method for achieving compliance with 10CFR 50.49, which became effective February 22, 1983. The purpose of this letter is to document our response to your letter of May 25, 1984 concerning environmental qualification of electrical equipment at TMI-1. Enclosure 1 to this letter, "GPUN Response to the NRC's May 25, 1984 Letter Enclosed Request For Additional Information", includes the following attachments:

Attachment 1 Design Basis Accidents - TMI-1 Environmental Concerns
Attachment 2 TMI-1 TER Qualification Deficiencies Resolution Summary
Attachment 3 Master List TMI-1
Attachment 4 Changes to the TER Master List for TMI-1 - An Explanation
Attachment 5 TMI-1 EQ Open Items and Resolution
Attachment 6 Justification For Interim Operation For TMI-1

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The method of identification of electrical equipment within the scope of paragraph (b)(2) of 10CFR 50.49 (i.e. non-safety-related electrical equipment whose failure under postulated environmental conditions could prevent satisfactory accomplishment of safety functions) is described in response to question 2 of the enclosure. No additional non-safety-related electrical equipment at TMI-1 was identified during this review, which had to be previously included in the Master List.

The method used to identify electrical equipment within the scope of paragraph (b)(3) of 10CFR 50.49 (i.e., certain post accident monitoring equipment) involved a variable-by-variable comparison of the specific requirements of Regulatory Guide 1.97 to the design of TMI-1. An evaluation of this comparison has been conducted by the B&W Owners Group and GPUN to determine which instrumentation and sampling equipment at TMI-1 requires environmental qualification. The results of this evaluation were submitted to NRC on October 1, 1984. The Master List has been revised as necessary to include identified instrumentation and sampling equipment which requires environmental qualification.

In conclusion, an assessment of compliance with the requirements of 10 CFR 50.49 involves the exercise of technical judgments. Based upon our technical judgment and understanding of those requirements, GPUN believes that the Master List of safety-related electrical equipment (attached) complies with the scope requirements of paragraphs (b)(1) and (2) of 10 CFR 50.49, and will be brought into compliance with paragraph (b)(3) when the schedules in our October 1, 1984 letter concerning R.G. 1.97, Rev. 3, and actions described in response to question 1 of the enclosure, are complete.

Again, based on our technical judgment and understanding of the requirements, GPUN believes that the environmental qualification documentation maintained in the GPUNC Equipment Qualification Files complies with the requirements of 10 CFR 50.49, and as noted in Attachment 5. These files are available for NRC audit and have been sampled by NRR on various occasions from March through September, 1984. GPUN also maintains that TMI-1 can operate without undue risk to public health and safety based on the Justifications for Interim Operation supplied in Attachment 6.

As discussed at our meeting of March 8, 1984, GPUN requests that a supplemental SER(s) be issued to indicate the resolution of the deficiencies noted in the December 10, 1982 SER.

Sincerely,

R. F. Wilson
Director Tech. Functions

RFW/RJM/CWS/kds

cc: R. Conte
J. Van Vliet

Enclosure 1

GPUN Response to the NRC's
May 25, 1984 Letter Enclosed
Request For Additional
Information

Item

1. At the time of restart, all electrical equipment important to safety, as defined in 10CFR 50.49, is required to be qualified or safe plant operation is required to be demonstrated with equipment not shown to be qualified. Therefore, for any item of equipment that will not be demonstrated to be qualified prior to restart, a justification for continued operation (JCO) must be submitted.

Response

The Electrical Equipment Environmental Qualification (EQ) files have been prepared to support the qualification documentation for components identified on the EQ Master List, which provided as Attachment 3. Where additional analyses or field verifications are necessary to confirm the qualification documentation for components in an EQ file, commitments have been identified in the EQ file to complete the evaluation, or to make the necessary modifications. Further, EQ Master List component circuits are being reviewed to confirm cable type installed. A review of two vendor data bases for a number of specific EQ files is also planned. For components found not to be qualified a JIO is attached (Attachment 6). Files requiring further evaluation are noted in Attachment 5. We are continuing our efforts to close-out all EQ files requiring additional analyses/verifications in January 1985.

Justifications for interim operation are included in Attachment 6 for the following components:

84-1	DH-1-DPT 1&2	LPI Flow Indication
84-2	BS-1-DPT-1&2	Reactor Building Spray Flow
84-3	MU-23-DPT 1-4	HPI Flow Transmitters
	MU-42-DPT	Seal Injection Flow Transmitters
84-4	MU-14-LT	Makeup Tank Level
84-5	DH2-TE1/2	Decay Heat Outlet Temperature
84-6		Incore Thermocouple Extension Cable
84-7	TE-952A/B-955A/B	Incore T/C Penetration RTD's
84-8		Transzorb Diodes
84-9	RMG-22, 23	Victoreen Radiation Monitor

Item 2. The licensee should reaffirm that in performing its review of the methodology to identify equipment within the scope of 10CFR 50.49(b)(2) that the following steps have been addressed:

(a) A list was generated of safety-related electric equipment as defined in paragraph (b)(1) of 10CFR 50.49 required to remain functional during or following design-basis Loss of Coolant Accident (LOCA) or High Energy Line Break (HELB) Accidents. The LOCA/HELB accidents are the only design-basis accidents which result in significantly adverse environments to electrical equipment which is required for safe shutdown or accident mitigation. The list was based on reviews of the Final Safety Analysis Report (FSAR), Technical Specifications, Emergency Operating Procedures, Piping and Instrumentation Diagrams (P&IDs), and Electrical Distribution Diagrams;

Response

A list was generated of safety-related electric equipment as defined in paragraph (b)(1) of 10CFR50.49 required to remain functional during or following design basis Loss of Coolant Accident (LOCA) or High Energy Line Break (HELB) Accidents. The LOCA/HELB accidents are the only design basis accidents which result in significantly adverse environments to electrical equipment which is required for safe shutdown or accident mitigation.

The methodology included a review of the following TMI-1 documents:

1 - Final Safety Analysis Report (FSAR)
2 - Technical Specifications & Manuals
3 - Normal Operating & Emergency Procedures including Abnormal Transient Procedures
4 - System Flow Diagrams
5 - Piping Drawings
6 - Electrical Distribution & Elementary Wiring Diagrams

Item

2b. The elementary wiring diagrams of the safety-related electrical equipment identified in Step 1 were reviewed to identify any auxiliary devices electrically connected directly into the control or power circuitry of the safety-related equipment (e.g., automatic trips) whose failure due to postulated environmental conditions could prevent required operation of the safety-related equipment.

Response

A review of the electrical systems interactions for failure of electrical components which have not been qualified for harsh environments, on electrical components which are required for accident mitigation has been accomplished. This has been accomplished by a review of the TMI-1 electrical wiring diagrams, with the following results:

a - All motor operated valves required to be qualified have dedicated overcurrent protection devices and contain no interfacing devices that could impact their operation.

b - All solenoid valves are individually fused and have no other electrical devices except limit switches that could impact their operation. These limit switches are identified as part of the valve and are qualified. (See JIO-T1-84-8)

c - The pumps identified do not contain any electrical devices other than those identified and qualified which could interface with the operation of these pumps.

d - The identified air handling fan motors do not contain any electrical devices which, if not qualified, could interfere with their operation.

e - The effect of non-qualified instrumentation failure on safety-related instrumentation power supplies has been evaluated. This evaluation concluded that their failure could not result in a failure of the safety-related instrumentation power supplies or affect the operation of components required for accident mitigation.

Certain instrumentation requiring qualification receive their power from ICS/NNI power. While the ICS/NNI power is non-safety-related, it does have diesel backed power and failure of an ICS/NNI power supply is indicated in the control room.

Each such qualified instrument has its power supply identified on the control room panel, therefore, the operator will be aware of an ICS/NNI power supply failure and could then rely on other qualified instrumentation for the required indication. Where such instrumentation provides an automatic control function, the means for qualified manual control and indication are available in the control room.

Item

2c. The operation of the safety-related systems and equipment were reviewed to identify any directly mechanically connected auxiliary systems with electrical components which are necessary for the required operation of the safety-related equipment (e.g., cooling water or lubricating systems). This involved the review of P&IDs, component technical manuals, and/or system descriptions in the FSAR.

Response

The support auxiliary systems, the system interfaces, the required instrumentation and electrical auxiliary devices were identified by a review of the specific system flow diagrams, component specifications, manuals and drawings and the elementary wiring diagrams.

The following systems provide for the performance of one or more of the required mitigating functions:

1 - Reactor Protection System
2 - Nuclear Instrumentation (Neutron Monitors)
3 - Engineered Safeguards Actuation System
4 - Containment Isolation System
5 - Reactor Coolant System Instrumentation
6 - High Pressure Injection System
7 - Core Flood System
8 - Low Pressure Injection System
9 - Emergency Feedwater, Main Steam, Condensate and Feedwater Systems
10 - Reactor Building Emergency Cooling System
11 - Vital and ES Electric Power Systems
12 - Reactor Building Spray
13 - Hydrogen Recombiner

The cooling water support systems are generally located in non-harsh radiological areas. Components within these cooling water systems which are not clearly identifiable to be either located in a non-harsh environment and/or to be non-electrical in nature were listed. All other such auxiliary support systems including the river water supply systems are located in non-harsh environments. This includes all of the electrical components in the following systems:

1 - Decay Heat Closed Cooling Water System
2 - Nuclear Services Closed Cooling Water System (except RB Isolation)
3 - Intermediate Closed Cooling Water System (except RB Isolation)
4 - Auxiliary Building HVAC System
5 - Control Building HVAC System
6 - Vital and ES Power and Control Systems and Relays

These mitigating and mitigating-support systems encompass all of the systems required to mitigate LOCA/HELB's.

Item

2d. Nonsafety-related electrical circuits indirectly associated with the electrical equipment identified in Step 1 by common power supply or physical proximity were considered by a review of the electrical design including the use of applicable industry standards (e.g., IEEE, NEMA, ANSI, UL, and NEC) and the use of properly coordinated protective relays, circuit breakers, and fuses for electrical fault protection.

Response

In response to IE Notice 79-22 dated 7/21/82 GPUN reviewed principal components and their associated trains of control and power subcomponents to determine the effects of an adverse environment on their performance. The results showed that the necessary systems will perform their function during HELB/LOCA accidents by virtue of location and/or environmental qualification and will not result in an adverse effect on the safety analysis. This review identified no additional electrical equipment at TMI-1 which was not previously included in the Master List. Further, GPUN performed an additional study: (1) to identify power sources of instruments, (2) to determine if the power is safety related and if the failure of the instrument can cause any degradation of a safety related power supply and (3) to identify equipment interlocks associated with these instruments. The result is summarized in response to item 2b.

Those non-safety circuits which are related by "common power supply" were addressed by a review of the plant electrical design to verify that all such circuits are protected by properly coordinated protective devices which will ensure that failure of a non-safety related circuit will not cause loss of a power supply to qualified electrical equipment.

Those non-safety circuits which are related by "physical proximity" of their wiring are addressed by the fact that the plant design standard is that all circuits are protected by fuses or circuit breakers which are properly sized to protect the circuit wiring. This insures that damage due to faults will be limited and will not result in either fire or excessive heat in raceways or enclosures which might disable qualified electrical equipment. As an extension of the electrical design review noted above, a review is being performed to verify that properly sized fuses have been specified and installed.

Non-safety-related circuits related by "physical proximity" of equipment are much less likely to be sources of damage to qualified equipment. There is no mechanism by which environmental conditions would cause a spontaneous explosion in an electrical device. Heat generation due to circuit faults will remain localized and restricted to a short duration because of the energy limiting effects of the protective devices referred to above.

Item

3. Reaffirm that all design basis events which could potentially result in a harsh environment, including flooding outside containment were addressed in identifying safety-related electrical equipment with the scope of 10CFR 50.49(b)(1).

Response

All design basis events which could potentially result in a harsh environment, including flooding outside containment were addressed in identifying safety related electrical equipment within the scope of 10CFR50.49(b)(1). The environmental effects resulting from all postulated design basis accidents documented in Chapter 14 of the TMI-1 FSAR including Loss of Coolant Accident and the Main Steam Line Break Accident (in Containment and the Intermediate Building) [for EQ purposes these were the only bounding events] were considered in the identification of safety related electrical equipment which was to be environmentally qualified (Attachment 1). The flooding resulting from LOCA's and High Energy Line Breaks (HELB) inside containment is documented in GPUN letters dated June 11, 1982, September 1, 1982 and April 14, 1983. The maximum flood level of 5.66 ft. above the Reactor Building mat based on a large break LOCA is below instruments of interest (S/G Level & Pressurizer Level which are located at or above 5.89 ft.) Sufficient flood volume in the Intermediate Building exists (as is addressed in TDR 250 dated January 22, 1984 and GPUN letter dated April 1 and 26 and August 1, 1984) such that no operator action is required for 25 minutes. Therefore, all design basis events including accidents at TMI-1 were considered in the identification of electrical equipment within the scope of paragraph (b)(1) of 10CFR 50.49.

Item

4. The level of detail for the proposed resolutions of the equipment environmental qualification deficiencies, identified in the FRC TER dated November 5, 1982, should be similar to the examples that are on the enclosed sample. For each TER equipment item, the deficiencies should be listed and a proposed resolution identified for each deficiency.

Response

Attachment 2 discusses the resolution of each open TER item both specific and generic in nature as indicated in Table 4-1 categories (I.B., II.A., II.B., II.C. and IV) of the FRC/TER. This enclosure revises our submittal of February 10, 1984, February 22, 1984 and March 29, 1984.

Item

5. Verify completeness of the list of equipment required to be environmentally qualified.

Response

Attachment 3 contains a revised Master List of safety related electrical equipment for TMI-1 within the scope of 10CFR 50.49. This Summary Master List reflects the changes provided to the original Master List dated August 28, 1981 in letters dated May 3, 1982 and May 16, 1983 and additional items added to the list, in GPUN letters dated 8/22/84, 5/10/84, 11/9/84, 8/6/84, 5/31/84 and 10/2/84. Since GPUN has a continuous program of reviewing and cross verification of equipment qualification this master list may be modified to accomodate changes in plant configuration, regulatory requirements and refinements in the EQ Program.

Attachment 4 identifies the components in the revised EQ Master List which were added or deleted from the Technical Evaluation Report dated November 8, 1982. A statement as to why each of these components was changed from the Technical Evaluation Report is included in Attachment 4.

Attachment 1

DESIGN BASIS

ACCIDENTS - TMI-1

ENVIRONMENTAL CONCERNS

Attachment 1

Design Basis Accidents - TMI-1
Environmental Concerns

FSAR

1. Uncompensated Operating Reactivity Changes (14.1.2.1)

No harsh environment created since there is no breach in the primary or secondary boundary or fuel failure.

2. Startup Accident (14.1.2.2)

No harsh environment created since there is no breach in primary or secondary boundary or fuel failure.

3. Rod Withdrawal Accident at Rated Power (14.1.2.3)

No harsh environment created since there is no breach in primary or secondary boundary or fuel failure.

4. Moderator Dilution Accident (Power/Shutdown) (14.1.2.4)

No harsh environment created at power since there is no breach in primary or secondary boundary or fuel failure.

During shutdown in a drained down condition with the head removed dilution events occur very slowly and do not result in above normal environmental conditions or fuel failure.

5. Cold Water Accident (14.1.2.5)
No harsh environment created since there is no breach in primary or secondary boundary or fuel failure.

6. Loss of Coolant Flow (14.1.2.6)
No harsh environment created since there is no breach in primary or secondary boundary or fuel failure

7. Stuck Out, Stuck In or Dropped Control Rod (14.1.2.7)
No Harsh Environment Created since there is no breach in primary or secondary boundary or fuel failure

8. Loss of Electrical Power (14.1.2.8)
a) Loss of Load
No harsh environment created since there is no breach in primary or secondary boundary or fuel failure
b) Loss of all AC
No harsh environment created since there is no breach in primary or secondary boundary or fuel failure. Some temperature rise would occur in the Intermediate Building by the operation of the turbine driven EFW pump without ventilation available. However, some cooling would be accomplished by building natural circulation.

9. Steam Line Break (14.1.2.9)
a) Inside Containment
The TMI-1 design incorporates the RB Emergency Cooling System and RB Spray system which, in conjunction provide a single failure protected post accident mechanism to limit peak RB pressure and temperature (Enveloped by LOCA in accordance with IEB-79-01-B Section 4.2.1. A 60 second peak of approximately 320°F occurs at the outset of a MSLB based on a conservative plant analysis. A thermal lag analysis for components of interest in containment shows that the equipment qualification would be enveloped by the LOCA profile.)
b) Outside Containment (Intermediate Bldg.)
A steam environment is created in the Intermediate Building from a MSLB which returns to ambient conditions in about 2 hours. The profile also includes a turbine driven EFW pump steam line break.

10. Steam Generator Tube Rupture (14.1.2.10)
No harsh environment is created unless Feed and Bleed is required. The environment created by Feed and Bleed is enveloped by LOCA conditions.

11. Fuel Handling Accident (14.2.2.1)
a. Inside Containment
The radiation exposure presented by a fuel handling accident is enveloped by a LOCA in containment.

b. Outside Containment
Using source term data of RG 1.25 and assuming conservatively that all radioisotopes remain in the FHB the 30 day maximum integrated radiation dose is less than 5000 rads. Therefore, no harsh environment is created.

12. Rod Ejection Accident (14.2.2.2)
A breach occurs in the primary boundary (SB LOCA) which creates a harsh environment but which is enveloped by LOCA.

13. Large Break LOCA (14.2.2.3)
A breach occurs in the primary boundary which produces a harsh environment with RB Spray and RB emergency cooling which limit RB peak pressure and temperature profiles (FSAR Figures 6.B-14 & 13)

14. Small Break LOCA (14.2.2.4)
The harsh environment created by SBLOCA is enveloped by Large Break LOCA.

15. Maximum Hypothetical Accident (14.2.2.5)
This accident discusses offsite release of gross fission products resulting from a LB/LOCA (See item 13 above).

16. Waste Gas Tank Rupture (14.2.2.6)
No equipment assumed to operate to mitigate consequences of this accident.

17. Loss of Feedwater Accident (14.2.2.7)
No Harsh Environment Created Outside or Inside Containment.

18. Fuel Cask Drop (14.2.2.8)
No equipment assumed to operate to mitigate consequences of this accident.

19. Feedwater Line Break (Restart Report Chapter 8)
Enveloped by MSLB inside and outside containment except for flooding in Intermediate Bldg. for which 25 minutes is available for operator action.

NATURAL EVENTS - TMI 1

FSAR

(5.4.3.2.2. & 5.2.1.2.6)

1. TORNADOS - Special structures at TMI-1 have been designed to withstand short term loadings including tornado generated missiles where such structures house systems and components whose failure could result in an inability to safely shutdown and isolate the reactor. Therefore, no harsh environment for plant systems results.

(2.6.4 & 5)

2. FLOODS - TMI is protected against flooding from external sources by dikes, channels, pressure conduits and other physical barriers. Other protective equipment are discussed in Section 2.6.5 of the FSAR. No harsh environment for plant systems results from external flooding.

3. EARTHQUAKES - TMI-1 is protected against earthquakes by design of building and structures, and systems and components required for protection of the reactor coolant pressure boundary, safe shutdown and containment of radioactive materials. Such systems were re-evaluated as part of the IEB-79-02/14 program as described in GPUN letters dated 9/1/81 and 7/17/81. Additionally, GPUN has analyzed the Auxiliary Steam System in the Intermediate Building as described in GPUN letter dated September 7, 1984 to show it has adequate seismic resistance. Further GPUN by letter dated August 6, 1984 agreed to qualify COV 14A/B and 111A/B as a result of seismic and EQ considerations. Therefore, no harsh environment is predicted for which required components are not qualified..

(5.2.4.2)

4. MISSILES - TMI-1 is protected against missiles inside the Reactor Building as discussed in Section 5.2.4.2 of the FSAR. Outside the Reactor Building engineered safety features are adequately protected against internally generated missiles. Therefore, no harsh environment for plant systems results.

(9.9)

5. FIRE - TMI-1 is protected against fires as described in the TMI-1 Fire Hazards Analysis and FSAR Section 9.9. Further analyses are being accomplished under 10CFR50 Appendix R for safe shutdown at TMI-1.

(1.2.7, 2.4 & 5.1.3)

6. AIRCRAFT IMPACT - TMI-1 is protected against aircraft impact by aircraft hardened structures as shown in Section 5.1.3 of the FSAR. The structures house systems vital for the protection of the reactor coolant pressure boundary, safe shutdown equipment and containment of radioactive materials. Therefore, no harsh environment for plant systems results.

Attachment 2

TMI-1 FRC/TER Qualification

Deficiencies Resolution Summary

QUALIFICATION DEFICIENCIES SUMMARY - NRC CATEGORIES IB, IIA, IIB

NRC Requirement		Deficiencies
1	Documentation	20
2	Similarity	30
3	Aging evaluation	24
4	Qualified life	21
5	Aging program	0
6	Aging simulation	5
7A	Peak temperature	5
7B	Peak pressure	2
7C	Duration	2
7D	Profile envelope	3
7E	steam exposure	2
8	spray	1
9	submergence	0
10	radiation	1
11	test sequence	2
12	test failure	0
13	function test	0
14	instrument accuracy	0
15	duration margin	2
16	margins	0

NRC Category
I.B Equipment Qualification Pending Modification
II.A Equipment Qualification Not Established
II.B Equipment Not Qualified

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	[IC-V2, 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] [W DLU-303]	MVA SMB00	II.A	1, 2, 3, 4	
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. 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.

A. Limitorque Motor Operators - Continued

TER Nos.	Tag Nos.	Description (Model etc.)	Previous NRC Category	Previous Deficiencies	Proposed Resolution
					The Dings brake is qualified to 1×10^8 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.
7	IC-V2	MVA SMB000	II.A	2, 3, 4	This in-containment motor operator (ICV-2) is located below the flood level. Evaluation of operating time in process 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. 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).
119	MU-V2A/B	MVA SMB00	II.A	2, 3, 4	
10	[FW-V5B]	MVA SB3	II.A	1, 2, 3, 4, 7a	
11	[EF-V2A&2B]	MVA SMB0	II.A	1, 2, 3, 4, 7a	
14	[FW-V92B]	MVA SMB00	II.A	1, 2, 3, 4, 7a	
15	[EF-V1A&B]	MVA SMB000	II.A	1, 2, 3, 4, 7a	

Specific Equipment EQ Deficiencies

B. ASCO Solenoid Valves

TER Nos.	Tag Nos.	Description (Model etc.)	Previous NRC Category	Previous Deficiencies	Proposed Resolution
26	[EFV30A/B (SV1&2)]	LB8210C94	II.A	1	As described in GPUN letter dated August 2, 1982 (82-183) and May 10, 1984 (5211-84-2114) GPUN has removed the EFW latch signal from the EFW control valves. Therefore, this solenoid is no longer required to be qualified and was deleted from the Master List. These TER items should be placed in the NRC SER Qualification Category III.B. "Equipment Not in the Scope of the Review".
28	[EFV304/B (SV3&4)]	83000C8G	II.A	2, 3	
26	[FW-V16 B&17B/SV3&SV4)]	LB8210C94	II.A	1	These solenoid valves are qualified per 10CFR50.49 Section F. New ASCO Model NP831666E Qualified per Report AQR67368 was installed in June 1984. This TER Item should now be placed in the NRC SER Qualification Category I.A. "Equipment Qualified."
27	[FW-V17B/SV1&2]	8300C68G	II.A	2, 3	New ASCO Model NP 206-381-7RVF, qualified by AQR 67368, were installed by June 1984. These valves are qualified in accordance with 10CFR50.49 Section F. These TER Items should now be placed in the NRC SER Qualification Category I.A "Equipment Qualified".
29	[FW-V16B/SV1&2]	8300C68G	II.A	2, 3	
32	[MS-V13A/B (SV)]	LB83146	II.A	1	These valves are not required for hot shutdown. (See GPUN Letter dated 3/10/84 and 3/22/83.) This TER Item should be placed in the NRC SER Qualification Category III.B. "Equipment Not in the Scope of the Review". (See Section I.G.)

C. Westinghouse Motors

TER Nos.	Tag Nos.	Description (Model etc.)	Previous NRC Category	Previous Deficiencies	Proposed Resolution
45	[MUP-4]	I82T	II.A	2, 3, 4 & 6	Bearing Analysis showed that the bearings can withstand a LOCA/HELB (ref. GPUN calculation 1101X-5350-020).
46	[MUP-1]	HP700	II.A	2, 3, 4, 6 & 10	
49	[BSP-1]	HP250	II.A	2, 3, 4, 6 & 10	
50	[DHP-1]	HP350	II.A	2, 3, 4, 6, 7A, B,C,D,E	Motor Lubrication (Exxon Terisstic 32) is controlled within the preventive maintenance program by GPUN procedure E-41.
51	[EFP-2]	HP450	II.A	2, 3, 4, 6, 7A B,C,D,E	Qualification of lead splices is controlled within the corrective maintenance program by GPUN procedure 1420-Y-15.

Similarity for the above listed motors is established by Westinghouse Report WCAP 7829.

Westinghouse Report WCAP 7829 thermally aged the motors for 21 days at 200°C and tested to 2×10^8 rads and LOCA (324°F at 80 psia and 9.5 pH). WCAP 7829 tested the complete motor assembly.

Item 49 is also located in the Auxiliary Building in an area where the GPUN analysis resulted in a TID of 1.6×10^6 rads.

EFP-2 was analyzed in Westinghouse Report 80F31215 dated 1/81 for motor insulation life analysis which envelopes the thermal lag peak for the Intermediate Building of 322°F. See GPUN letter dated May 31, 1984 (5211-84-2122).

These TER Items should be placed in the NRC SER Qualification Category I.A. "Equipment Qualified" with the exception of MUP-4 which should be placed in NRC SER Qualification Category III.B "Equipment not in the scope of the Review."

Specific Equipment EQ Deficiencies

D. Victoreen Radiation Monitors

TER Nos.	Tag Nos.	Description (Model etc.)	Previous NRC Category	Previous Deficiencies	Proposed Resolution
53	[RM-A2; A5, A6]		II.A	1	These radiation monitors are indicators of LOCA and are located outside containment (subject to a mild environment). They are not required for a main steam line or feedwater line break. This TER Item should be placed in the NRC SER Qualification Category III.B "Equipment Not in the Scope of the Review."
E. Static O Ring Pressure Switch					
57	[PS600-607]	9TA-B45-NX CIA-JJTT-X6	II.A	1, 2, 4, 7 A, B, C, D&E	These switches were replaced with qualified SOR switches model 9TA-B45-NX-CIA-JJTT-X6 in May of 1984. Qualification is based upon Action Report 17344-82N-D.

Specific Equipment EQ Deficiencies

F. Bailey E/P Converters

TER Nos.	Tag Nos.	Previous NRC Category	Previous Deficiencies	Proposed Resolution
60	[MSV-4, S[illegible]	II.A	1	The MSV-4's are not required to mitigate the consequences of an HELB or LOCA for hot shutdown, and exposure to harsh environmental conditions cannot cause these valves to fail into the open position. The limit switches provide indication in the main control room only and there is no interconnection with other system functions (See GPUN letter dated 5/10/84) Therefore, the F/P converters for the MSV-4's need not be environmentally qualified. These converters should be placed in the NRC SER Qualification Category III.B "Equipment Not in the Scope of the Review". The EFV-30's converters were replaced by I/P converters Conoflow model GT45CA1826 (Conoflow reports 3021 & 3419) & GPUN calculation C-1101-424-5350-010) [See GPUN Ltrs. date 5/10/84, 5/31/84 and 8/6/84] which are fully qualified. This TER item should now be placed in NRC Category I.A "Equipment Qualified."

Specific Equipment EQ Deficiencies

G. Namco Limit Switches

TER Nos.	Tag Nos.	Description (Model etc.)	Previous NRC Category	Previous Deficiencies	Proposed Resolution
66	[MSV-6]	D2400X	II.A	1	Under LOCA and MSLB sufficient flow is provided to the OTSGs by a single motor driven EFW pump. (See GPUN letter dated 3/22/83). The steam driven EFW pump is only required for station blackout which does not produce a harsh environment. Failure of the limit switch with MSV-6 open may result initially overfeeding the OTSG which could be reduced immediately (manually) based on qualified EFW flow and OTSG level instrumentation. Therefore, the EFW system will function and the operator will not be misled. Failure of the limit switch (MSV-13) results in the inability to monitor valve position and may result in lifting reliefs but because of qualified EFW flow and OTSG level instrumentation this will not mislead the operator. (See GPUN Ltr. dtd. 5/10/84). These TER items should be reclassified to NRC SER Category III.B "Equipment Not in Scope of the Review".
67	[MSV-13]	D1200G2	II.A	1, 3, 4	

Specific Equipment EQ Deficiencies

H. Fisher Limit Switches

TER Nos.	Tag Nos.	Description (Model etc.)	Previous NRC Category	Previous Deficiencies	Proposed Resolution
71	[MSV-4/LS] [EF-V30A&B//LS]	Gov. 304	II.A	1	These switches are used for diagnostic purposes only. Flow indication for the emergency feedwater system is provided by the qualified redundant flow indicators sensed by FT-779, 782, 788 & 791. They have been installed in accordance with the requirements of Item II.E.1.2 of NUREG 0737. A secondary indication of emergency feedwater flow is provided by the qualified steam generator level indication system. See Bailey E/P Converter Proposed Resolution. These limit switches (MSV4) should be placed in NRC Category III.B "Equipment Not in the Scope of the Review".

Specific Equipment EQ Deficiencies

I. Foxboro Transmitters

TER Nos.	Tag Nos.	Description (Model etc.)	Previous NRC Category	Previous Deficiencies	Proposed Resolution
78 81	[RC3A-PT3&4, RC3B-PT3] [SP6A-PT1&PT2, SP6B-PT1&PT2]	E11GH-HINM2 E11GM-HSAE1	II.A II.A	2, 3 2, 3	Foxboro Report Q9-6005 qualifies these transmitters to a HELB (318°F at 90 psig) and report T2-1075 qualifies the transmitters to 2.4 X 10^8 (1 Hour) rad limit set by the DOR Guidelines. The service life is based on the analysis provided in B&W report 77-1127001-00 and test data from report Q9-6005 and Wyle Report 45592-4. The resultant service life (12.8 yrs. at 100°F) is based upon the Arrhenius data from the Wyle Report since this is the most conservative value. (GPUN Calculation 1101X-5350-011) [See GPUN letter dated 5/31/84] The LOCA duration of 19.5 Hours is enveloped within the 25 days tested by Q9-6005. These in-containment transmitters are qualified per 10CFR50.49 Sections F and K. These TER items should be placed in the NRC SER Qualification Category I.A "Equipment Qualified".

Specific Equipment EQ Deficiencies

I. Foxboro Transmitters

TER Nos.	Tag Nos.	Description (Model etc.)	Previous NRC Category	Previous Deficiencies	Proposed Resolution
79	[PT-282, 285, 288]	E11AM	II.A	2, 4	These transmitters are located within the Auxiliary Bldg. which is a harsh area only because of 3.55×10^5 rads. Radiation qualification to 1×10^7 Rads is documented in Foxboro report T2-1075. These out-of-containment transmitters are qualified per 10CFR50.49 Sections F and K. This TER item should be placed in the NRC SER Qualification Category I.A. "Equipment Qualified".
93	[FT-20 thru 24] RB Cooler Outlet Flow	E13DMK	II.A	1	These transmitters are classified as GPUN display instrumentation not requiring qualification. They should be reclassified to the NRC SER Qualification Category III.A "Equipment Exempt From Qualification".

J. GEMS Limit Switch

98	[WDL LS-116] RB Sump Level	LS800	II.A	1	The Reactor Building Sump Level instrumentation has been upgraded in accordance with NUREG 0737 Item II.F.1. (See R.G. 1.97 Sheet) Environmentally Qualified Level Transmitters LT 804 thru 807 have been installed. This item will continue to be included by GPUN as display instrumentation not requiring qualification. It should be reclassified as NRC Category III.B "Equipment not in the scope of the review."

Common Equipment EQ Deficiencies

TER Item	Description (Manf. & Model No.)	Previous NRC Category	Previous Deficiencies	Proposed Resolution
106	Kerite Cable	II.A	2	A letter from Kerite report dated 5/16/84 establishes the applicability of the Kerite dated 8/21/81 to TMI-1 cable purchased under PO97099 dated 4/23/69. Power and control cable was qualified per Kerite Qualification Document HTK/FR cable" dated 8/21/81. Power cable was qualified per Wyle report 45453-2. See GPUN EQ-T1-111. This cable is qualified per 10CFR50.49 Sections F and K. This TER item should be placed in the NRC SER Qualification Category I.A. "Equipment Qualified".
107	Continental Cable	II.A	2	Instrument cable procured per PO 40067 dated 6/9/70 is qualified per DOR Guidelines as outlined in GPUN EQ-T1-109. Instrument cable procured for EF-V30A and B is qualified to NUREG 0588 Cat. #1 per GPUN EQ-T1-108. This cable is qualified per 10CFR50.49 Sections F and K. This TER item should be placed in the NRC SER Qualification Category I.A. "Equipment Qualified".
108	Ray Chem Cable Splice	II.A	2	GPUN has reviewed the applicable Ray Chem Reports and determined that is applicable to the splices at TMI-1 because the material composition is the same for all Ray Chem splices. This splice is qualified per 10CFR50.49 Sections F and K. This TER item should be placed in the NRC SER Qualification Category I.A. "Equipment Qualified".

Common Equipment EQ Deficiencies

TER Item	Description (Manf. & Model No.)	Previous NRC Category	Previous Deficiencies	Proposed Resolution
109	GE Penetration FO1	II.A	3, 4, 8, 10	These C.E. Penetrations are qualified for a service life of 100°F/42 yrs., 1 x 10^8 R, LOCA (340°F, 78 psig, 9.5 pH). This data is based upon the FO1 penetration qualification test conducted by GE in April 30, 1971 and on tests conducted by the 3M Company on the epoxy sealant. Additionally, there is no deterioration of the Epoxy caused by caustic spray. (This is based upon data obtained from the Oak Ridge National Lab Report ORNL-TM-2412.) The irradiation data referenced on the SCEW sheet was not for the exact type of sealant used in the FO1 penetrations. Subsequently, irradiation data has been obtained for the exact type of epoxy sealant used in the penetration. This epoxy is a "Scotchcast" type produced by the 3M Company. The irradiation test data shows no damage at 1 x 10^8 rads and little or no damage at 5 x 10^8 rads. The required TID dose for these containment penetrations is 2 x 10^7 Rad Gamma and 10% of 2x10^8 Rad Beta based. The above data is being verified by test and analysis conducted by General Electric for GPUN. GE will issue a formal report. The above data is being verified by test and analysis conducted by General Electric for GPUN. G.E. will issue a formal report.
111	GE Terminal Block EB25	II.A	2	G.E. letter GEN-8-18 states that there is very little difference between CR151B and EB terminal blocks. They are made of the same material (cellulose filled phenolic). Terminal Block LOCA Test for Electrical Penetration Assy by R.M. Schuster 11/6/73 was used to quality these Terminal Blocks. These terminal blocks are qualified per 10CFR50.49 Sections F and K. This TER item should be placed in the NRC SER Qualification Category I.A. "Equipment Qualified".
114	Conax Connector SA-1000 Conax Connector PL14B2	II.A	1, 2	Conax connectors are mechanical pressure connectors which are used to pump Humidity out of electrical equipment. Actual connectors used (PL-Series and 7590-1000-10 thru 23) are qualified by IPS 409, IPS 325, and Bailey [illegible] report QR-4201-1152 GPT. These pressure connectors are qualified per 10CFR 50.49 Sections F & K. This TER item should be placed in the NRC Qualification Category I.A. "Equipment Qualified."

Common Equipment EQ Deficiencies

TER Item	Description (Manf. & Model No.)	NRC Category	Deficiencies	Proposed Resolution
116	Thyrectors CR2095100DJA	II.A	1	These are suppression devices across DC coils. These thyrectors have been replaced by a MIL qualified device, MIL-S-19500/507 Transzorb Diodes. These transzorbs are only located within the TMI-1 Auxiliary Building which is only harsh due to low level radiation. A radiation test is being conducted to verify the radiation threshold of the transzorb by March, 1985. Existing data shows qualification to 2×10^7 Rads Gamma. JIO is submitted for appropriate solenoid valves. (JIO-T1-84-8)

Equipment Qualification Deficiencies Resolution

(NRC Category II.C - Equipment Satisfies All Requirements Except Qualified Life or Replacement Schedule)

I. Qualified Life

A. Limitorque Motor Operators

TER Items 5, 17-22, 24 [BS-V-1; 2; 3; DH-V-3, 4, 6, 5 & 7: MU-V-12, 14, 16, 36, 37; NS-V-3]

Qualified life is established by Impell Calculation 0370-079-026.

TER Item 19 (DH-V-5A, 5B) and TER Item 24 (MU-V-12, 36, 37) are not required to be environmentally qualified to mitigate a DBA and should be placed in NRC Category III.B "Equipment Not in the Scope of this Review".

B. ASCO Solenoid Valves

TER Items 33, 39 [SV/AHV-1A; SV/CAV-2, 189; SV/ICV-6; SV/MUV-3, 26; SV/WDL-V304, V534, V535]

The qualified life is based upon an Arrhenius Analysis using Impell Calculation 0370-079-011, Rev. 1 and ASCO AQR67368, Rev. 1. SV/CAV-5 and SV/CAV-6 should be placed in Category III.B.

TER Item 36 [SV/CAV-5A, 5B]

These solenoid valves are located in the Turbine Building mild environment area. This TER Item should be reclassified as NRC SER Qualification Category III.B "Equipment Not in the Scope of this Review".

TER Item 40 [SV/CF-V19A, V19B, V20A, V20B; SV/WDG-4]

Qualified life is established by ASCO Test Report AQR 67368, Rev. 1, except for SV/WDG-4 which has been replaced with a qualified solenoid valve, Target Rock Model 80Z-14-008.

C. Static-O-Ring Switches

TER Item 56 [PS-672 through 675]

The qualified life is established upon an Arrhenius Analysis using GPUN Calculations (C-1101X-68, 70, 72 through 77, 85)

These switches are qualified in accordance with 10CFR 50.49 Sections F and K. This TER Item should be reclassified as NRC SER Qualification Category I.A. "Equipment Qualified".

D. Square D Switches

1. TER Item 58 [PS 745]

This switch was replaced with SOR Model 4N6-B4-NX-C1A-JJTTX6 in June 1984 which is qualified in accordance with 10CFR 50.49 Section K by Impell Calculation 0370-079-006, Rev. 0. This TER item should reclassified as NRC Category I.A.

2. TER Item 59 [PS-283, 284, 286, 287, 289 and 290]

The diaphragm in these switches has been replaced with one made of Nitrile rubber. This qualifies these switches for 40 years based on an Arrhenius Analysis, Impell Calculation 0370-079-012. These switches should be reclassified as NRC Category I.A.

E. NAMCO Snap Lock Switches

TER Items 63, 64, 69](LSA, LSB) AHV-1A; (LSA, LSB) CAV-2; (LSB, 33) ICV-3; (LSA, LSB), MU-V-3, 18, 20, 26; (LSA, LSB) WDL-V304, V534, 535]

The material evaluation for a 40 year life of Nitrile rubber is correct based upon a Arrhenius Analysis (Impell Calculation 0370-079-015). The conflicting temperature data in the TER does not include an Arrhenious Analysis and therefore cannot be evaluated.

F. Micro Switches

TER Item 72 [(LSA, LSB) CFV-19, 20, CAV-189; (LSA, LSB) WDG-V4]

The qualified life is established by Impell Calculation 0370-079-055, Rev. 0, except for WDG-V4 which has qualified internal limit switches in the replacement solenoid valve described for TER Item 40.

II. Replacement Schedule

The replacement schedule for all environmentally qualified equipment at TMI-1 is included in the computerized Preventive Maintenance schedule or Licensing Action Item List (for transmitters). The SCEW sheets specify qualified life on subcomponents, or materials when that life is less than 40 years.

Equipment Qualification Deficiencies and Resolutions

(NRC Category IV "Documentation Not Made Available")

I. Generic

The qualification documentation for these TER items is contained in the GPUN File specified below for each plant specific items. The qualification status of each file is described in Attachment 5.

II. Plant Specific Items

A. Ross Solenoid Valves

TER Item 42 [SV/MUV-18, 20]

Qualification is established by File No. EQ-T1-138.

B. GE Motors

TER Item 44 [(A, B, C) MU-P-2, 3]

Qualification is established by File No. EQ-T1-121.

C. GE Motors

TER Item 47 [(A, B, C) AH-E-1]

Qualification is established by File No. EQ-T1-123.

These motors are qualified per 10CFR50.49 Sections F and K. This TER item should be placed in the NRC SER Qualification Category I.A "Equipment Qualified".

D. Rosemount Pressure Transmitters

TER Item 76 [(PT1, 2) RC3A, B]

Qualification is established by File No. EQ-T1-129.

These transmitters are qualified per 10CFR50.49 Sections F and K. This TER item should be placed in the NRC SER Qualification Category I.A "Equipment Qualified".

E. Barton D/P Switches

TER Item 77 [EFW FI-S-77, 78, 79]

These flow switches are for the EFW pump recirculation line. Per our discussion in GPUN letter dated February 4, 1983, the valves are now locked open.

This TER Item should be reclassified to the NRC SER "Qualification Category III.B "Equipment Not in the Scope Of This Review".

F. Bailey Level Transmitters

TER Items 85, 88 [(LT1, 2, 3) RC1; (LT2, 4) SP1A, B]

Qualification is established by File No. EQ-T1-128.

These transmitters are qualified per 10CFR50.49 Sections F and K. This TER item should be placed in the NRC SER Qualification Category I.A "Equipment Qualified".

G. Bailey Level Transmitters

TER Item 87 [(BS1)DPT1, 2; BS3-LT; BS5-LT]

BS-1 DPT 1 & 2 will be replaced prior to 3/31/85 by qualified transmitters. A justification for continued operation is attached. (Attachment 6)

These transmitters should be reclassified to NRC Category I.B.

Transmitters BS3-LT and BS5-LT should be reclassified to the NRC SER Qualification Category III.A "Equipment Exempt From Qualification".

H. Rosemount Temperature RTD

TER Items 90, 91 [(TE2, 3) RC4A, B: (TE1, 2, 3, 4) RC5A, B]

Qualification is established by File No. EQ-T1-130.

Attachment 3

Summary

MASTER LIST

Three Mile Island Unit 1

Docket No. 50-289

(Class 1E Electrical Equipment Required

To Function Under Postulated

Accident Conditions)

HELB/LOCA MASTER LIST

System Main Steam

TER No.	Plant ID No.	Description	Location	Device Manufacturer
81	SP6A-PT1	OTSG Discharge Press Transmitter	RB	Foxboro E11GMSAE1
81	SP6A-PT2	OTSG Discharge Press Transmitter	RB	Foxboro E11GMSAE1
81	SP6B-PT1	OTSG Discharge Press Transmitter	RB	Foxboro E11GMSAE1
81	SP6B-PT2	OTSG Discharge Press Transmitter	RB	Foxboro E11GMSAE1
-	PT-950	OTSG Discharge Press Transmitter	RB	Rosemount 1153GD9
-	PT-951	OTSG Discharge Press Transmitter	RB	Rosemount 1153GD9
-	MSV-2A/B	Motorized Valve Actuator	IB	Limitorque SMB1
57	PS600-607	Pressure Switch FW Isolation	RB	Static O Ring 9TA-B45-NX-C1A - JJ TT-X6

HELB/LOCA MASTER LIST

System Feedwater/Condensate

TER No.	Plant ID No.	Description	Location	Device Manufacturer
10	FWV-5B	Feedwater Block Valve	IB	Limitorque SB3
14	FWV-92B	FW Bypass Block Valve	IB	Limitorque SMB00
26	SV 3/FWV 16B	FW Solenoid Control Va.	IB	ASCO NP831666E
26	SV 4/FWV 16B	FW Solenoid Control Va.	IB	ASCO NP831666E
26	SV 3&4/FWV 17B	FW Solenoid Control Valve	IB	ASCO NP831666E
29	SV 1&2/FWV 16B	FW Solenoid Control Valve	IB	ASCO NP206-381-7RVF
27	SV 1&2/FWV 17B	FW Solenoid Control Valve	IB	ASCO NP206-381-7RVF
-	COV 14A/B	Condensate Tank Isolation	IB	Limitorque SMB-0
-	COV 111A/B	Condensate Tank Isolation	IB	Limitorque SMB-000
11	EF-V2A&B	Motorized Valve Actuators	IB	Limitorque SMB-0
15	EF-V1A&B	Motorized Valve	IB	Limitorque SMB-000
51	EF-P2A&B	Pump Motors	IB	Westinghouse HP 450
77	FT-791, 799, 782, 788	Flow Transmitters	IB	Foxboro NE 13DM
60	FY-850A FY-849A	I/P Converters	IB	Conoflow GT45CA1826R

HELB/LOCA MASTER LIST

System Make-up and Purification

TER No.	Plant ID No.	Description	Location	Device Manufacturer
46	MU-P1A	Makeup Pump Motor	AB	Westinghouse Style 68F20835
46	MU-P1B	Makeup Pump Motor	AB	Westinghouse Style 68F20835
46	MU-P1C	Makeup Pump Motor	AB	Westinghouse Style 68F20835
44	MU-P3A	Makeup Pump Motor (Main Oil)	AB	General Electric 5K37JG403
44	MU-P3B	Makeup Pump Motor (Main Oil)	AB	General Electric 5K37JG403
44	MU-P3C	Makeup Pump Motor (Main Oil)	AB	General Electric 5K37JG403
119	MU-V2A	Letdown cooler outlet Valve Motor Operator	RB	Limitorque SMB00
119	MU-V2B	Letdown cooler outlet Valve Motor Operator	RB	Limitorque SMB00
63	LSA/MU-V3	Letdown cooler outlet Valve Limit Switch	AB	NAMCO SLM8
63	LSB/MU-V3	Letdown cooler outlet Valve Limit Switch	AB	NAMCO SLM8
39	SV/MU-V3	Letdown cooler outlet Valve Solenoid Valve	AB	ASCO HT8321AB
18	MU-V14A	Pump Suction From BWST Valve Motor Operator	AB	Limitorque SMB1
18	MU-V14B	Pump Suction From BWST Valve Motor Operator	AB	Limitorque SMB1
17	MU-V16A	Pump discharge Valve Motor Operator	AB	Limitorque SMB1

HELB/LOCA MASTER LIST

System Make-up and Purification

TER No.	Plant ID No.	Description	Location	Device Manufacturer
17	MU-V16B	Pump discharge Valve Motor Operator	AB	Limitorque SMB1
17	MU-V16C	Pump discharge Valve Motor Operator	AB	Limitorque SMB1
17	MU-V16D	Pump discharge Valve Motor Operator	AB	Limitorque SMB1
42	SV/MU-V18	Charging Line Isolation Valve-Solenoid Valve	AB	Ross 2676A4011
64	LSA/MU-V18	Charging Line Isolation Valve-Limit Switch	AB	NAMCO SL 3B2L
64	LSB/MU-V18	Charging Line Isolation Valve-Limit Switch	AB	NAMCO SL 3B2L
42	SV/MU-V20	Seal Isolation Valve-Solenoid Valve	AB	Ross 2676A4011
64	LSA/MU-V20	Seal Isolation Valve-Limit Switch	AB	NAMCO SL 3B2L
64	LSB/MU-V20	Seal Isolation Valve-Limit Switch	AB	NAMCO SL 3B2L
120	MU-V25	RCP Letdown Cooler Isolation Valve-Motor Operator	RB	Limitorque SMB00
39	SV/MU-V26	RCP Letdown Cooler Isolation Valve-Solenoid Valve	AB	ASCO HT8321A8
63	LSA/MU-V26	RCP Letdown Cooler Isolation Valve-Limit Switch	AB	NAMCO SLM8
63	LSB/MU-V26	RCP Letdown Cooler Isolation Valve-Limit Switch	AB	NAMCO SLM8
58	PS745A	Pressure Switch Lube Oil	AB	Static-O-Ring 4N6-B4-NX-CIA-JJTT-X6
58	PS745B	Pressure Switch Lube Oil	AB	Static-O-Ring 4N6-B4-NX-CIA-JJTT-X6

HELB/LOCA MASTER LIST

System Make-up and Purification

TER No.	Plant ID No.	Description	Location	Device Manufacturer
58	PS745C	Pressure Switch Lube Oil	AB	Static-O-Ring 4N6-B4-NX-CIA-JJTT-X6
-	MU-23-DPT 1,2, 3,4	HPI Flow Transmitter	AB	Rosemount 1153HB6PA*
-	MU-42-DPT	Seal Injection Flow Transmitter	AB	Rosemount 1153HB5PA*
86 -	MU-14-LT LT-778	Makeup Tank Level Transmitter	AB	Rosemount 1153DB4PA*
44	MUP-2A,B,C	Aux. Lube Oil Pump	AB	General Electric 5K37JC403
-	PS 479 A,B,C	Pressure Switch Aux. Lube Oil	AB	ASCO SA21AR

*Not presently installed

HELB/LOCA MASTER LIST

System Decay Heat Removal

TER No.	Plant ID No.	Description	Location	Device Manufacturer
50	DH-P1A	DH Pump Motor	AB	Westinghouse HP350
50	DH-P1B	DH Pump Motor	AB	Westinghouse HP350
20	DH-V4A	Discharge Valve-Motor Operator	AB	Limitorque SMB3
20	DH-V4B	Discharge Valve-Motor Operator	AB	Limitorque SMB3
21	DH-V6A	RB Sump Pump Suction Valve-Motor Operator	AB	Limitorque SMB0
21	DH-V6B	RB Sump Pump Suction Valve-Motor Operator	AB	Limitorque SMB0
24	DH-V7A	MU System Suction Valve-Motor Operator	AB	Limitorque SMB000
24	DH-V7B	MU System Suction Valve-Motor Operator	AB	Limitorque SMB000
-	DH-1-DPT-1	DH Flow Transmitter	AB	Rosemount* 1153DB5PA
-	DH-1-DPT-2	DH Flow Transmitter	AB	Rosemount* 1153DB5PA
3	DH-V1	DH Dropline Isolation Valve-Motor Operator	RB	Limitorque SMB3
3	DH-V2	DH Dropline Isolation Valve-Motor Operator	RB	Limitorque SMB3
22	DH-V3	DH Dropline Isolation Valve-Motor Operator	AB	Limitorque SMB3
-	RC-V3	Pressurizer Spray Line Isolation Valve-Motor Operator	RB	Limitorque SMB00
-	RC-V4	DH Injection Line Isotion Valve-Motor Operator	RB	Limitorque SMB00

*Not presently installed

HELB/LOCA MASTER LIST

System Reactor Building Isolation

TER No.	Plant ID No.	Description	Location	Device Manufacturer
63	LSA/AH-V1A	RB Purge Valve-Limit Switch	AB	NAMCO SLM82
63	LSB/AH-V1A	RB Purge Valve-Limit Switch	AB	NAMCO SLM82
33	SV/AH-V1A1	RB Purge Valve-Solencid Valve	AB	ASCO 7LB8316C35MO
33	SV/AH-V1A2	RB Purge Valve-Solenoid Valve	AB	ASCO 7LB8316C35MO
7	CA-V1	Pzr. Sample Valve Motor Oper.	RB	Limitorque SMB000
69	LSA/CA-V2	RCS Sample Valve-Limit Valve	AB	NAMCO M8300
69	LSB/CA-V2	RCS Sample Valve-Limit Valve	AB	NAMCO M8300
39	SV/CA-V2	RCS Sample Valve-Solenoid Valve	AB	ASCO LB8321A5
7	CA-V3	Pzr. Water Sample Valve-Motor Operator	RB	Limitorque SMB000
7	CA-V4A	OTSG FW Isolation Valve-Motor Operator	RB	Limitorque SMB000
7	CA-V4B	OTSG FW Isolation Valve-Motor Operator	RB	Limitorque SMB000
118	CA-V13	RCS Letdown Sample Valve-Motor Operator	RB	Limitorque SMB000
69	LSA/CA-V189	Demin. Water Isolation Valve-Limit Switch	AB	Micro Switch BZE62RN
69	LSB/CA-V189	Demin. Water Isolation Valve-Limit Switch	AB	Micro Switch DTE62RN
39	SV/CA-V189	Demin. Water Isolation Valve-Solenoid	AB	ASCO HT8321A5
2	AH-V1B	RB Purge Valve-Motor Oper.	RB	Limitorque SMB2

HELB/LOCA MASTER LIST

System Reactor Building Isolation

TER No.	Plant ID No.	Description	Location	Device Manufacturer
	PS932, 933, 937, 934, 935, 936	RB Iso. Pressure Switch	AB	Static-O-Ring 6NN-AA3-M4-C2A-GGTT-X3
2	AH-V1C	RB Purge Valve-Motor Operator	RB	Limitorque SMB2
7	IC-V2	IC Closed Loop Isolation Valve-Motor Operator	RB	Limitorque SMB000
35	SV/IC-V3	IC Return Isolation Solenoid Valve	AB	ASCO LB8320A35
63	LSA/IC-V3	IC Return Isolation Valve-Limit Switch	AB	NAMCO SLM82
63	LSB/IC-V3	IC Return Isolation Valve-Limit Switch	AB	NAMCO SLD2400X-2
1	WDG-V3	RB Vent Header Isolation Valve-Motor Operator	RB	Limitorque SMB00
-	SV/WDG-V4	RB Vent Header Isolation Valve-Solenoid Valve	AB	Target Rock 80Z-14-008
120	WDL-V303	RCS Drain Tank Outlet Isola. Valve-Motor Oper.	RB	Limitorque SMB000
63	LSA/WDL-V304	RCS Drain Isolation Valve-Limit Switch	AB	NAMCO SLM82
63	LSB/WDL-V304	RC Drain Isolation Valve-Limit Switch	AB	NAMCO SLM82
39	SV/WDL-V304	RC Drain Isolation Valve-Solenoid Valve	AB	ASCO FT8321A5
63	LSA/WDL-V534	RB Sump Isolation Valve-Limit Switch	AB	NAMCO SLM82
63	LSB/WDL-V534	RB Sump Isolation Valve-Limit Switch	AB	NAMCO SLM82
39	SV/WDL-V534	RB Sump Isolation Valve-Solenoid Valve	AB	ASCO FT8321A5

HELB/LOCA MASTER LIST

System Reactor Building Isolation

TER No.	Plant ID No.	Description	Location	Device Manufacturer
63	LSA/WDL-V535	RB Sump Isolation Valve-Limit Switch	AB	NAMCO SLM82
63	LSB/WDL-V535	RB Sump Isolation Valve-Limit Switch	AB	NAMCO SLM82
39	SV/WDL-V535	RB Sump Isolation Valve-Solenoid Valve	AB	ASCO LB8321A5

HELB/LOCA MASTER LIST

System Reactor Protection

TER No.	Plant ID No.	Description	Location	Device Manufacturer
76	RC3A-PT1	RC NR Pressure Transmitter	RB	Rosemount 1152 GP9A92T0010PB
76	RC3A-PT2	RC NR Pressure Transmitter	RB	Rosemount 1152 GP9A92T0010PB
76	RC3B-PT1	RC NR Pressure Transmitter	RB	Rosemount 1152 GP9A92T0010PB
76	RC3B-PT2	RC NR Pressure Transmitter	RB	Rosemount 1152 GP9A92T0010PB
90	RC4A-TE2	RC Outlet Temp RTD	RB	Rosemount 177 HW2
90	RC4A-TE3	RC Outlet Temp RTD	RB	Rosemount 177 HW2
90	RC4B-TE2	RC Outlet Temp RTD	RB	Rosemount 177 HW2
90	RC4B-TE3	RC Outlet Temp RTD	RB	Rosemount 177 HW2
56	PS-672	RB Pressure Switch	AB	Static-O-Ring 12NK45CMRR
56	PS-673	RB Pressure Switch	AB	Static-O-Ring 12NK45CMRR
56	PS-674	RB Pressure Switch	AB	Static-O-Ring 12NK45CMRR
56	PS-675	RB Pressure Switch	AB	Static-O-Ring 12NK45CM3RRY

HELB/LOCA MASTER LIST

System Engineered Safeguards Actuation

TER No.	Plant ID No.	Description	Location	Device Manufacturer
78	RC3A-PT3	RC WR Pressure Transmitter	RB	Foxboro E11GH
78	RC3A-PT4	RC WR Pressure Transmitter	RB	Foxboro E11GH
78	RC3B-PT3	RC WR Pressure Transmitter	RB	Foxboro E11GH
79	PT-282	RB Pressure Transmitter	AB	Foxboro E11AM
79	PT-285	RB Pressure Transmitter	AB	Foxboro E11AM
79	PT-288	RB Pressure Transmitter	AB	Foxboro E11AM
59	PS-283, 284, 286, 287, 289, 290	RB Pressure Switch	RB	Square D Class 9013 AMG-5

HELB/LOCA MASTER LIST

System Reactor Building Emergency Cooling

TER No.	Plant ID No.	Description	Location	Device Manufacturer
47	AH-E1A	RB Cooler Fan Motor	RB	General Electric 5K810037A1
47	AH-E1B	RB Cooler Fan Motor	RB	General Electric 5K810037A1
47	AH-E1C	RB Cooler Fan Motor	RB	General Electric 5K810037A1

HELB/LOCA MASTER LIST

System Core Flood

TER No.	Plant ID No.	Description	Location	Device Manufacturer
7	CF-V2A	CF Sample Isolation Valve-Motor Operator	RB	Limitorque SMB000
6	CF-V2B	CF Sample Isolation Valve-Motor Operator	RB	Limitorque SMB000
72	LSA/CF-V19A	CF Makeup Valve-Limit Switch	AB	Micro Switch BZE62RN
72	LSB/CF-V19A	CF Makeup Valve-Limit Switch	AB	Micro Switch BZE62RN
40	SV/CF-V19A	CF Makeup Valve-Solenoid Valve	AB	ASCO 2063815RVF
72	LSA/CF-V19B	CF Makeup Valve-Limit Switch	AB	Micro Switch BZE62RN
72	LSB/CF-V19B	CF Makeup Valve-Limit Switch	AB	Micro Switch BZE62RN
40	SV/CF-V19B	CF Makeup Valve-Solenoid Valve	AB	ASCO 2063815RVF
72	LSA/CF-V20A	CF Sample Isolation Valve-Limit Switch	AB	Micro Switch BZE62RN
72	LSB/CF-V20A	CF Sample Isolation Valve-Limit Switch	AB	Micro Switch BZE62RN
40	SV/CF-V20A	CF Sample Isolation Valve-Solenoid Valve	AB	ASCO 2063815RVF
72	LSA/CF-V20B	CF Sample Isolation Valve-Limit Switch	AB	Micro Switch BZE62RN
72	LSB/CF-V20B	CF Sample Isolation Valve-Limit Switch	AB	Micro Switch BZE62RN
40	SV/CF-V20B	CF Sample Isolation Valve-Solenoid Valve	AB	ASCO 2063815RVF

HELB/LOCA MASTER LIST

System RB Spray

TER No.	Plant ID No.	Description	Location	Device Manufacturer
49	BS-P1A	RB Spray Pump	AB	Westinghouse HP250
49	BS-P1B	RB Spray Pump	AB	Westinghouse HP250
18	BS-V1A	RBS Pump Discharge Valve	AB	Limitorque SMB1
18	BS-V1B	RBS Pump Discharge Valve	AB	Limitorque SMB1
24	BSV-2A	RBS Pump Suction NaOH	AB	Limitorque SMB000
24	BSV-2B	RBS Pump Suction NaOH	AB	Limitorque SMB000
24	BSV-3A	RBS Pump Suction NaOH	AB	Limitorque SMB000
24	BSV-3B	RBS Pump Suction NaOH	AB	Limitorque SMB00
87	BS1-DPT-1	RB Spray Flow	AB	Rosemont* 1153PP5
87	BS1-DPT-2	RB Spray Flow	AB	Rosemont* 1153PP5

*Not presently installed

HELB/LOCA MASTER LIST

System Nuclear Services Closed Loop Cooling

TER No.	Plant ID No.	Description	Location	Device Manufacturer
23	NS-V4	RCP Cooler Isolation Valve-Motor Operator	AB	Limitorque SMB00
23	NS-V15	RCP Cooler Inlet Isolation Valve-Motor Operator	AB	Limitorque SMB00
5	NS-V35	RBI for NS Cooling	RB	Limitorque SMB-00

HELB/LOCA MASTER LIST

System Additional Accident Monitoring Equipment

TER No.	Plant ID No.	Description	Location	Device Manufacturer
88	SP1A-LT2	OTSG Level Transmitter	RB	Bailey BY8B41XA
-	SP1A-LT3	OTSG Level Transmitter	RB	Bailey BY8B41XA
88	SP1B-LT2	OTSG Level Transmitter	RB	Bailey BY8B41XA
-	SP1B-LT3	OTSG Level Transmitter	RB	Bailey BY8B41XA
85	RC1-LT1	PZR Level Transmitter	RB	Bailey BY3B40X-A
85	RC1-LT2	PZR Level Transmitter	RB	Bailey BY3B40X-A
85	RC1-LT3	PZR Level Transmitter	RB	Bailey BY3B40X-A
-	LT-777	PZR Level Transmitter	RB	Rosemount 1153DD5
91	RC5A-TE1	RC Inlet Temp RTD	RB	Rosemount 177HW2
91	RC5A-TE2	RC Inlet Temp RTD	RB	Rosemount 177HW2
91	RC5A-TE3	RC Inlet Temp RTD	RB	Rosemount 177HW2
91	RC5A-TE4	RC Inlet Temp RTD	RB	Rosemount 177HW2
91	RC5B-TE1	RC Inlet Temp RTD	RB	Rosemount 177HW2
91	RC5B-TE2	RC Inlet Temp RTD	RB	Rosemount 177HW2
91	RC5B-TE3	RC Inlet Temp RTD	RB	Rosemount 177HW2

HELB/LOCA MASTER LIST

System Additional Accident Monitoring Equipment

TER No.	Plant ID No.	Description	Location	Device Manufacturer
91	RC5B-TE4	RC Inlet Temp R1D	RB	Rosemount 177HW2
88	SP1A-LT4	OTSG Level Transmitter	RB	Bailey BY8B41XA
-	SP1A-LT5	OTSG Level Transmitter	RB	Bailey BY8B41XA
88	SP1B-LT4	OTSG Level Transmitter	RB	Bailey BY8B41XA
-	SP1B-LT5	OTSG Level Transmitter	RB	Bailey BY8B41XA
-	PT-949	RC Pressure Transmitter	RB	Rosemount 1153GD9

HELB/LOCA MASTER LIST

System Additional Accident Monitoring Equipment

TER No.	Plant ID No.	Description	Location	Device Manufacturer
-	PT-963	RC Pressure Transmitter	RB	Rosemount 1153GD9
-	RC-4A-TE1	RC T_{Hot} RTD	RB	Rosemount 117GY-2
-	RC-4A-TE4	RC T_{Hot} RTD	RB	Rosemount 177GY-2
-	RC-4B-TE1	RC T_{Hot} RTD	RB	Rosemount 177HW-2
-	RC-4B-TE4	RC T_{Hot} RTD	RB	Rosemount 177HW-2
-	E-958	RC T_{Hot} RTD	RB	Weed 1A0D/612D-1B-D-6-C-20-0-0
-	TE-960	RC T_{Hot} RTD	RB	Weed 1A0D/612D-1B-D-6-C-20-0-0
-	TE-959	RC T_{Cold} RTD	RB	Weed 1A0D/612D-1B-C-6-C-20-0-0
-	TE-961	RC T_{Cold} RTD	RB	Weed 1A0D/612D-1B-C-6-C-20-0-0
-	PT-981A	RB Pressure Transmitter	RB	Rosemount 1153GD7
-	PT-981B	RB Pressure Transmitter	RB	Rosemount 1153GD5
-	PT-982A	RB Pressure Transmitter	RB	Rosemount 1153GD7
-	PT-982B	RB Pressure Transmitter	RB	Rosemount 1153GD5
-	LT-775	OTSG Level Transmitter	RB	Rosemount 1153DD5
-	LT-776	OTSG Level Transmitter	RB	Rosemount 1153DD5
-	LT-788	OTSG Level Transmitter	RB	Rosemount 1153DD5
-	LT-789	OTSG Level Transmitter	RB	Rosemount 1153DD5

HELB/LOCA MASTER LIST

System Hydrogen Recombiner

TER No.	Plant ID No.	Description	Location	Device Manufacturer
-	HR-V22A/B, 23A/B	RB Isolation Solenoid	RB	Target Rock 80Z-14-003
-	HR-R-1/2	Hydrogen Recombiner	AB	Rockwell Int'l. 190MM23001

HELB/LOCA MASTER LIST

System Common Equipment

TER No.	Plant ID No.	Description	Location	Device Manufacturer
108	--	Heat Shrink Tubing	RB/AB/IB	Raychem WCSFN, WCSF-200-N
110	--	Terminal Block	RB/AB/IB	States # NT
109	--	Electrical Penetration	RB	GE #F01
107	--	Instrument Cable	RB/AB/IB	Continental (CC-2193) (Anaconda)
106	--	Power & Control Cable	RB/AB/IB	Kerite 600V (EK-3A) Kerite 5KV HTK Insulation
115	--	Press Seal Modules	RB/AB/IB	Conax PL Series
114	--	Press Seal Modules	RB/AB/IB	Conax 7590-100000-01 thru 23
116	--	Suppression Diode	AB	General Semiconductor TransZorb JTXIN6071A
112	--	Terminal Block	AB/IB	GE #CR-151
111	--	Terminal Block	AB/IB	GE #EB-25
-	--	Instrument Cable (FREP)	IB	Continental (EK 15E) (Anconda)
-	--	Instrument Cable	IB	Boston Insul. Wire EK 15A
-	--	Splice (5kV)	IB	Kerite S-5NS-NUC-DISC
-	--	Instrument Cable	IB	Samuel Moore

MASTER LIST (RG1.97)

Plant ID No.	Description	Location	Device Manufacturer
System Containment H_2			
AE-42A/B	H_2 Analyzer	IB	Comsip K-III
HM-V03A/B, 4A/B	PA Sampling Solenoid	RB	Valcor V526-5296
System Decay Heat			
DH2-TE1&2	DH Heat Exchanger Outlet	AB	Bailey B3032685F
System Safety & Relief Valve Flow			
DPT-921, 922, 923	Flow Transmitter PORV Safety	RB	Foxboro NE-13DM
System Incore Thermocouple			
-	Incore Detector Assy	RB	B&W DA7L-1B-1T-1C-128
-	Elec. Connector	RB	Bendix JT07A-14-19P(302)
-	Cable	RB	Continental GAI B/M EK15L
TE-952C, 953C 954C, 955C	Incore T/C Penet. RTD	RB	Weed Inst. Co. 1AOD/611-1B-C-4-C-2-A2-0
TE-952A, 953A 954A, 955A	Incore T/C Penet. RTD	RB	Rosemount 139U

MASTER LIST (RG1.97)

Plant ID No.	Description	Location	Device Manufacturer
System Containment Sump			
LT-804, 805 806 & 807	Containment Level	RB	Delaval (GEM) XM54854 XM54852-90-1500
System Radiation Monitors			
RMG22&23	Containment Hi Range	RB	Victoreen 877-1

Master List (NUREG 0737)

TER NO.	PLANT ID NO.	DESCRIPTION	LOCATION	DEVICE MANF.
--	DPT 1079, 1080 1081, 1082	Pzr/Loop/Head Vent Transmitter	RB	Foxboro N-E13-DH
--	RC-V-40A/B, 41A/B, 44	Pzr/Loop Vent Solenoid	RB	Target Rock 80Z-14-005 80Z-14-006

Attachment 4

Changes to the FRC/TER

Master List

An Explanation

TER vs. Current Master List

TER No.	TER Components Components	Current ML	Comments
1.	WDGV-3	Y	
2.	AHV-1B+C	Y	
3.	DHV-1+2	Y	
4.	CFV-1A/B	N	Exempt (III.A)
5.	NSV-35	Y	
6.	CFV-3A/B+2B	Y	CFV-3A/B deleted (Note1)
7.	ICV-2, CAV-4A/B, CAV-3 CAV-1, CFV-2A	Y	
8.	FWV-5A	N	Out of Scope (III.B)
9.	FWV-92A	N	Out of Scope (III.B)
10.	FWV-5B	Y	
11.	EFV-2A/B	Y	
12.	RRV-4A, B,C&D, RRV-3A,B&C	N	Out of Scope (III.B)
13.	RBV-2A/B	N	Out of Scope (III.B)
14.	FWV-92B	Y	
15.	EFV-1A/B	Y	
16.	RBV-7	N	Out of Scope (III.B)
17.	MUV-16 A, B, C, D	Y	
18.	BSV-1A/B, MUV-14A/B	Y	
19.	DHV-5A/B	N	Exempt (Note 2)
20.	DHV-4A/B	Y	
21.	DHV-6A/B	Y	
22.	DHV-3	Y	
23.	NSV-32, 15&4	Y	Exempt NSV32 (Note 1)
24.	BSV-2A/B, 3A/B, MUV-12 DHV-7A/B, MUV-36 & 37	Y	Exempt MUV12 and MUV 36 & 37 (Note 2)
25.	SV 3&4/FWV-16A & 17A	N	Out of Scope (III.B)
26.	SV 3&4/FWV-16B & 17B	Y	
27.	SV 1 & 2/FWV-17B	Y	
28.	SV 1 & 2/EFV-30A/B	N	Exempt (Note 3)
29.	SV 1 & 2/FWV-16B	Y	
30.	SV 1 & 2/FWV-17A & 16A	N	Out of Scope (III.B)
31.	SV/EFV 8 A, B & C	N	Exempt (III.A) (Note 3)
32.	SV/MSV-13A/B	N	Exempt (5/10/84) (Note 1)
33.	SV/AHV-1A1, 2	Y	
34.	SV/AHV-1D1	N	Out of Scope (III.B)
35.	SV/ICV-3, 4	Y	Exempt ICV-4 (Note 4)
36.	SV/CAV-5A/B	N	Out of Scope (Note 4)
37.	SV/CMV-1, 2, 3 & 4	N	Out of Scope (III.B)
38.	SV/DCV-19A/B	N	Out of Scope (III.B)
39.	SV/WDLV-534, 535, 304, ICV-6 CAV-2, 189, MUV-3, 26	Y	Exempt ICV-6 (Note 4)
40.	SV/CFV 19A/B, CFV-20A/B	Y	
41.	SV/NSV-52 A,B,C, 53A,B,C	N	Out of Scope (III.B).
42.	SV/MUV-18 & 20	Y	

TER No.	TER Components Components	Current ML	Comments
43.	NSP-1 A, B, & C	N	Out of Scope (III.B)
44.	MUP-3 A, B, & C	Y	
45.	MUP-4 A, B, & C	N	Exempt (11/9/84 (Note 5)
46.	MUP-1 A, B, & C	Y	
47.	AH-E-1 A, B, & C	Y	
48.	DCP-1 A, B	N	Out of Scope (III.B)
49.	BSP-1 A, B	Y	
50.	DHP-1A/B	Y	
51.	2A/B	Y	
52.	NI-5, 6, 7 & 8	N	Exempt (Note 1)
53.	RMA-2, 5 & 6	N	Exempt (2/10/84) (Note 4)
54.	MU-24-DPT	N	Exempt (Note 6)
55.	NI-1, 2	N	Exempt (III.A)
56.	PS 672-675 (RBP)	Y	
57.	PS 600-607 (FW)	Y	
58.	PS 480 A, B, & C 745 A, B, & C (MUP)	Y	Exempt PS480 A,B,&C (11/9/84) (Note 5)
59.	PS 283, 284, 286, 287, 289, 290 (RBP)	Y	(Note 1 and Note 6)
60.	SPV-4A/B (MSV-4) SPV-5A/B (EFV30A)	Y	SPV-5A/B replaced 5/10/84 (Note 6) SPV-4A/B exempt (5/10/84) (Note 1)
61.	LSB (AHV-1B) & LSA (AHV-1D)	N	Out of Scope (III.B)
62.	LSB (ICV-6) LSB (ICV-4)	N	Exempt (Note 4)
63.	LSA/B (MUV-26) LSB (ICV-3) LSA/B (WDLV304) LSA/B (WDLV-534, 535) LSA/B (MUV-3) LSA/B (AHV-1A)	Y	
64.	LSA/B (MUV-18) LSA/B (MUV-20)	Y	
65.	LSA/B (DCV-19A/B)	N	Out of Scope (III.B)
66.	LSA/B (MSV-6)	N	Exempt (5/10/84) (Note 1)
67.	LSA/B (MSV-13A/B)	N	Exempt (5/10/84) (Note 1)
68.	LSA/B (CMV 1, 2, 3, 4)	N	Out of Scope (III.B)
69.	LSB (CAV-189), LSA/B (CAV-2)	Y	
70.	LSA/B (NSV-52 A,B,C & 53 A,B,C	N	Out of Scope (III.B)
71.	LSA (MSV-4A/B)	N	Exempt (5/10/84) (Note 1)
72.	LSA/B (WDGV-4) LSA/B (CFV 20A/B, 19A/B	Y Y	Removed LSA/B (WDGV-4) (Note 6)
73.	LSA/B (CAV 5A/B)	N	Out of Scope (III.B)
74.	RC 14A/B DPT 1, 2, 3, 4	N	Exempt (III.A)
75.	MU-17-PT	N	Exempt (III.A)
76.	RC 3A/B-PT 1 & 2	Y	
77.	FIS-77, 78, 79 (EFW)	N	Replaced by DPT 779, 782, 788, 791 (Note 6)
78.	RC 3A/B-PT 3&4	Y	
79.	DT282, 285 & 288 (RBP)	Y	
80.	CF-PT 1, 2, 3 & 4	N	Exempt (III.A)
81.	SP 6A/B-PT 1 & 2	Y	

TER No.	TER Components Components	Current ML	Comments
82.	RCDT PT 323	N	Exempt (III.A)
83.	SP-10A/B PT 1 & 2	N	Exempt (III.A)
84.	RC-3A PT5	N	Exempt (III.A)
85.	RC1-LT-1, 2, 3	Y	
86.	MU-14-LT	Y	Replaced (Note 6)
87.	BSI-DPT 1, 2	Y	
88.	SPI A/B-LT-4 & 2	Y	
89.	CF2-LT-1, 2, 3 & 4	N	Exempt (III.A)
90.	RC 4A/B-TE-2 & 3	Y	
91.	RC 5A/B-TE-1, 2, 3, 4	Y	
92.	RCDT-TF-605	N	Exempt (III.A)
93.	RBEC (Flow Out) FT 20-24	N	Exempt
94.	RBEC (Flow Error) DFA-23A, 24B, 25C	N	Exempt (III.A)
95.	RBEC (Flow Error) FC-23A, 24B, 25C	N	Exempt (III.A)
96.	RBEC (Temp Comp) FY-23A, 24B, 25C	N	Exempt (III.A)
97.	RCDT (LT-115)	N	Exempt (III.A)
98.	RB Sump (LS-116)	N	Exempt
99.	RBEC (Flow In) (FE-20A, 21B, 22C, 23A, 24B, 25C)	N	Exempt (III.A)
100.	RC-21-TE24, TE6	N	Exempt (III.A)
101.	RC-(5-8) TE2	N	Exempt (III.A)
102.	RC2-TE1	N	Exempt (III.A)
103.	RB-TE-655A-X	N	Exempt (III.A)
104.	CRPM 1-69	N	Exempt (III.A)
105.	RBEC (Flow Error) (FI-23A, 24B, & 25C)	N	Exempt (III.A)
106.	Kerite Cable	N	Exempt (III.A)
107.	Continental Cable	Y	
108.	Ray Chem	Y	
109.	GE Elect. Penetration	Y	
110.	States TB	Y	
111.	GE TB EB-25	Y	
112.	GE TB CR151	Y	
113.	Stanwich TB6	Y	
114.	Conax SA 1000	N	Exempt (Note 3)
115.	Conax PL14B2	Y	
116.	Thyrector CR2095200 PJA	Y	
117.	MCC 1ABC-ES VLV-CC	N	Replaced by Transzorb (Note 6)
118.	CAV 13	N	Out of Scope (III.B)
119.	MUV 2A	Y	
120.	WDLV-303, MUV-25	Y	

Notes - Deletions

1. These components are not required to perform a safety function during or following exposure to a harsh environment by a HELB/LOCA and failure of the equipment will not affect safety.

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

3. Equipment no longer installed or electrically disconnected.

4. Equipment located in a mild environment for post accident HELB/LOCA.

5. Backup equipment not required when employing single failure criteria for LOCA/HELB.

6. New equipment added to replace older equipment which has been deleted.

Additions/Replacements to the Master List Since the TER

Components	Comments
PT 950, 951, OTSG Press	GPUN Ltr dtd 8/23/84 (Note 1)
LT 775, 776, 788, 789 OTSG	GPUN Ltr dtd 8/23/84 (Note 1)
SP1A/B LT 3 & 5 OTSG	GPUN Ltr dtd 8/23/84 (Note 2)
RC-4A/B-TE 1 & 4 T Hot	GPUN Ltr dtd 8/23/84 (Note 2)
DH-1-DPT 1 & 2 LPI Flow	GPUN Ltr dtd 11/9/84 (Note 3)
MSV 2A/B	GPUN Ltr dtd 5/10/84 (Note 2)
TE-959, 961 T Cold WR	GPUN Ltr dtd 8/23/84 (Notes 1 & 3)
TE-955C, 954C	GPUN Ltr dtd 5/16/84 (Note 5)
TE-958, 960	GPUN Ltr dtd 8/23/84 (Note 5)
PT-949, 963 RCS(WR) Press	GPUN Ltr dtd 5/16/83 (Notes 1 & 3)
LT-777 Pzr Lvl	GPUN Ltr dtd 8/23/84 (Notes 1 & 2)
PT-981A/B, 982A/B RB Press	GPUN Ltr dtd 8/23/84 (Note 1)
LT-778 MUT Lvl	GPUN Ltr dtd 11/9/84 (Note 4)
FT 791, 779, 782,788 EFW	GPUN Ltr dtd 5/10/84 (Note 4)
COV-111A/B	GPUN Ltr 8/6/84 (Note 3)
COV-14A/B	GPUN Ltr 8/6/84 (Note 3)
MU-23DPT 1, 2, 3, & 4	GPUN Ltr dtd 11/9/84 (Note 3)
Cable Samuel Moore	GPUN Ltr dtd 5/31/84 (Note 5)
Cable BIW	GPUN Ltr dtd 5/10/84 (Note 5)
Kerite Splice	GPUN Ltr dtd 5/31/84 (Note 2)
PS 479 A, B, & C	GPUN Ltr dtd 11/9/84 (Note 6)
MUP 2 A, B, & C	GPUN Ltr dtd 11/9/84 (Note 6)
MU-42-DPT	GPUN Ltr dtd 11/9/84 (Note 4)
RCV-3	GPUN Ltr dtd 8/23/84 (Note 3)
RCV-4	GPUN Ltr dtd 8/23/84 (Note 3)
Diode Transorb	GPUN Ltr dtd 11/9/84 (Note 4)
HMV-3A/B & 4A/B	GPUN Ltr dtd 5/16/83 & 10/2/84 (Note 5)
AE-42A/B	GPUN Ltr dtd 5/16/83 & 10/2/84 (Note 5)
RMG 22 & 23	GPUN Ltr dtd 5/16/83 & 10/2/84 (Note 5)
LT 804-807 (RB Sump)	GPUN Ltr dtd 5/16/83 & 10/2/84 (Note 5)
PS 932-937	GPUN Ltr dtd 5/16/83 & 10/2/84 (Note 4)
TE 952A/C, 953A/C, 954A, 955A	GPUN Ltr dtd 5/16/83 & 10/2/84 (Note 3)
Incore T/C	GPUN Ltr dtd 5/16/83 & 10/2/84 (Note 3)
Incore T/C Connector	GPUN Ltr dtd 5/16/83 & 10/2/84 (Note 3)
DPT 921, 922 & 923	GPUN Ltr dtd 5/16/83 & 10/2/84 (Note 5)
Continental Cable GAI B/M EK15	GPUN Ltr 5/1/83 (Note 5)
DH2-TE 1 & 2	GPUN Ltr 10/2/84 (Note 5)
HM-V3A/B; 4A/B	GPUN Ltr dtd 5/16/83 (Note 5)
LSA/CAV-189	GPUN Ltr dtd 9/4/80 (Note 7)
MUV-2B	GPUN Ltr dtd 9/4/80 (Note 7)
RC-V40A/B, 41A/B	GPUN Ltr dtd 5/16/83 (Note 5)
DPT-1079-1082	GPUN Ltr dtd 5/16/83 (Note 5)
RCV-44	GPUN Ltr dtd 5/16/83 (Note 5)
HR-R-1/2	GPUN Ltr dtd 5/16/83 (Note 5)
HR-V22A/B & 23 A/B	GPUN Ltr dtd 5/16/83 (Note 5)
SV/WDGV-4	GPUN Ltr dtd 5/16/83 (Note 4)
FY-849A, 850A	GPUN Ltr dtd 5/10/84 (Note 4)

Notes - Additions/Replacements

1. New Equipment added for ICS/NNI independence.

2. Equipment added to prevent misleading to operator and are identical to other qualified items included in the master list.

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

4. New equipment added to replace other equipment deleted.

5. New equipment added by NUREG 0737 or RG1.97.

6. Redundant equipment needed for greater operational flexibility.

7. Item omitted by TER but on GPUN Master List.

GPU NUCLEAR CORPORATION
ATTACHMENT 5

TMI-1 EQ OPEN FILES STATUS

FILE NO.	MANUFACTURER/ MODEL NO./ COMPONENT	QUALIFICATION STATUS
EQ-T1-103	Limitorque Various (Containment) Valve Motor Operators	Qualified subject to confirmation of electrical interface, acceptability of plant specific application, and review/revision to resolve action items. The review of ICV-2 to perform its function prior to submergence is under review.
EQ-T1-105	Limitorque SMB-0, 0, -000, -1, -2, -3 Valve Actuators (Auxiliary Building)	Qualified subject to review and revision to resolve action items.
EQ-T1-113	ASCO 206-381-5RVF 206-381-7RVF NP 8316 66E Solenoid Valves	Qualified subject to verification of cycling time, and field verification of installation.
EQ-T1-114	ASCO 8316, 8321 Series Solenoid Valves	Qualified subject to confirmation of material's aging temperature, field verification of installation, and qualification of voltage suppression devices.
EQ-T1-115	Square D 9013-AMG-5 Pressure Switch	Qualified subject to verification of installation interface, and confirmation that lubricant used is not degraded by specified radiation.
EQ-T1-117	Static-O-Ring 9TA, 4N6 and 12N6 Series Pressure Switches	Qualified subject to completion of evaluation of variation in switch performance, demonstrated accuracy during LOCA testing and confirmation of vendor aging analysis.

EQ-T1-118	Rosemount 1153 Series D Pressure Transmitters	Qualified subject to completion of evaluation of demonstrated accuracy during testing. (Replace Baileys with Rosemount Transmitters (JIO-T1-84-1, 2, 3 & 4)
EQ-T1-119	Westinghouse Class 1E Large A.C. Pump Motors	Qualified subject to confirmation of electrical interface qualification.
EQ-T1-121	General Electric 5K37JG403 Pump Motor	Qualified subject to confirmation of electrical interface qualification.
EQ-T1-123	General Electric 5K810037A1 Pump Motors	Qualified subject to verification of type of terminal lugs utilized.
EQ-T1-124	Transamerica Delaval (GEMs) XM54852 Level Transmitter	Qualified subject to confirmation of suitability of qualified connecting cable, and documentation that the acceptance criteria for percent of full scale and submergence is acceptable for plant-specific application.
EQ-T1-127	Namco M8, D2400X and SL Series Limit Switches	Qualified subject to model number verification and confirmation of materials traceability.
EQ-T1-128	Bailey Meter BY 8B41X-A BY 3B40X-A Level Transmitter	Qualified subject to confirmation of orientation/mounting. (JIO-T1-84-2)
EQ-T1-129	Rosemount 1152 Pressure Transmitter	Qualified subject to review of short qualification life, test data, operating time, calculation methodology, and potential failure effects.
EQ-T1-130	Rosemount 177HW-2 177GY 139U	Qualified subject to audit of test data, verification of conduit seal installation, and confirmation that accuracy is compatible with plant specific application. Radiation qualification cannot be established for 139U. Replaced by Restart or JIO. (JIO-T1-84-7)

EQ-T1-131	Conax Modified PL Series/ 7590-10000-01 through 23 Conduit Connector	Qualified subject to clarification of post-accident operability and similarity and confirmation that configuration is not degraded by radiation.
EQ-T1-132	Micro Switch BZE6-2RN BTE6-2RN Limit Switches	Qualified subject to verification of type of terminal lugs utilized.
EQ-T1-133	General Semiconductor JTX1N6071A Voltage Suppression Diode	Radiation qualification cannot be established due to insufficient test data. Radiation testing being performed. See JIO-T1-84-8 (Attachment 6).
EQ-T1-134	Raychem WCSF-200-N Low Voltage Splice (1KV)	Qualified. This is a revision to existing EFW file to account for worst case environmental conditions for non-EFW components.
EQ-T1-135	Target Rock 80Z-14-003, 80Z-14-005, 80Z-14-008 Solenoid Valves	Qualified subject to field verification of termination temperature rating of the interfacing cable; confirmation that test cycles are conservative, internal heat rise has no affect on aging, and beta dose is reduced.
EQ-T1-137	General Electric F01 Series Containment Electrical Penetration	Qualification documentation being prepared. Interim letter report concludes that, based on a preliminary review of documents, there is a high degree of confidence that qualification will be documented.
EQ-T1-138	Ross 2676A4011 (Pilot and Solenoid Assembly, Part No. 233C93) Solenoid Assembly	Qualified subject to confirmation of interface, traceability of analyzed materials, and plant specific application effect on aging.

EQ-T1-139	Babcock & Wilcox Incore Monitoring System	Documentation is not available to demonstrate that the external extension teflon cable and connector are qualified. Qualification is being pursued through further analysis and testing. (J10-T1-84-6)
EQ-T1-141	Valcor V526-5296 Solenoid Valves	Qualified subject to verification of cycling time, field verification of installation configuration, and confirmation that of traceability of internal wiring, and internal heat rise has no affect on aging, and that test anomalies are adequately addressed.
EQ-T1-142	Rockwell International 190MM23001 Thermal Hydrogen Recombiner	Qualified subject to assurance of qualification of differential pressure transmitter, internal wiring and motor/gas cooler electrical interfaces; traceability of material; confirmation of percentage reduction in properties utilized; and confirmation of harsh environment parameters utilized.
EQ-T1-143	Compsip KIII/KIV Hydrogen Analyzer System	Qualified subject to confirmation of electrical interface qualification.
EQ-T1-144	Victoreen 877-1 Radiation Detector	Detector qualified. Documentation is not available to support qualification for the existing cable assembly. See J10-T1-84-9 (Attachment 6).
EQ-T1-147	ASCO SA21AR Pressure Switches	Qualified subject to confirmation of installation documentation.
EQ-T1-148	Bailey Meter B3032685F RTD	Not qualified. Replacement RTDs being purchased. See J10-T1-84-5 (Attachment 6).
EQ-T1-149	Rosemount 1153 Series B Pressure Transmitters	Qualified subject to completion of evaluation of demonstrated accuracy during testing.

Attachment 5

EQ File Index

EQ-T1-101 BIW Cable
EQ-T1-102 States Terminal Block
EQ-T1-103 Limitorque VMO (R/Bldg.)
MUV-2A/B; MUV-25; DHV-1, 2; CFV-2A/B, 3A/B; WDG-3; WDLV-303; NSV 35; ICV-2; CAV-1, 3, 13, 4A/B; AHV-1B, 1C; RCV-3, 4
EQ-T1-104 Limitorque VMO (Intermediate Bldg.)
EFV-1A/B, 2A/B; FWV-5B, 92B; MSV-2A/B;
COV-14A/B, 111A/B
EQ-T1-105 Limitorque VMO (Auxiliary Bldg.)
MUV14A/B, 16 ABC&D, 36, 37; DHV-3, 6A/B, 7A/B; BSV-2A/B, 3A/B, 1A/B; NSV-4, 15, DHV-4A/B
EQ-T1-106 Conoflow
FY 849A, 850A
EQ-T1-107 Westinghouse Motors
EFP-2A/B
EQ-T1-108 Continental Cable (FREP)
EQ-T1-109 Continental Cable (C-2193)
EQ-T1-110 Foxboro
DPT-1079-1082; DPT-921-923, FT-779, 782, 788, 791
EQ-T1-111 Kerite Cable
EQ-T1-112 G.E. Terminal Block
EQ-T1-113 ASCO Solenoid (588)
CFV-19A/B, 20A/B; FWV-16B, 17B
EQ-T1-114 ASCO (DOR)
MUV-3, 26; ICV-3; CAV-2, 189; WDLV-304, 534, 535
AHV-1A1, 1A2
EQ-T1-115 Square D Pressure Switch
PS-284, 286, 287, 289, 290, 293
EQ-T1-116 Static O-Ring Pressure Switch (DOR)
PS-932-937; 672-675
EQ-T1-117 Static O-Ring Pressure Switch (588)
PS-600-607; PS-745 A,B,C; PS 648 A,B,C
EQ-T1-118 Rosemount Transmitter (1153D)
LT 778, MU23-DPT 1-4; MU-14-LT, MU-42 DPT, LT-777, DH1-DPT 1 & 2, PT 949-951, LT 775, 776, 778, 789; PT 963, PT 981A/B, PT 982/B
EQ-T1-119 Westinghouse Motors
MUP-1 A,B,C; DHP 1 A/B; BSP-1 A/B
EQ-T1-120 Deleted
EQ-T1-121 General Electric Motors
MUP-2 A,B & C, 3 A,B, & C
EQ-T1-122 Foxboro Transmitters
SP6A/B-PT 1 & 2, RC3A-PT 3 & 4; RC3B-PT3; PT 282, 285, 288
EQ-T1-123 General Electric Motors
AHE-1, A,B,C
EQ-T1-124 Delaval (GEM) Transmitters
LT 804-807

EQ-T1-125	Delete
EQ-T1-126	Kerite 5KV Cable Splice
EQ-T1-127	NAMCO Limit Switch LSA/B (MUV-3, 18, 20, 26; CAV-2; ICV-3; WDLV-304, 534, 535 AHV-1A)
EQ-T1-128	Bailey Transmitters SP 1 A/BLT 2, 3, 4, 5; BS 1-DPT 1 & 2; RC1-LT 1 & 2 & 3
EQ-T1-129	Rosemount Transmitters RC 3A/B PT 1 & 2
EQ-T1-130	Rosemount RTD RC4A/BTE1-4, TE 959, 961; RC5A/BTE1-4; TE952A-955A
EQ-T1-131	Conax (PL & 75900)
EQ-T1-132	Microswitch CAV-189; CFV 19A/B, 20A/B
EQ-T1-133	Transorb Diode
EQ-T1-134	Raychem Heat Shrink Tubing
EQ-T1-135	Target Rock Solenoid RCV-40A/B, 41A/B, 44; HRV-22A/B, 23A/B; WDG V-4
EQ-T1-136	Weed RTD TE 952-955C; TE 958-961
EQ-T1-137	GE Penetration FO1
EQ-T1-138	Ross MUV-18 & 20
EQ-T1-139	Incore Detectors & Electrical Connectors & Cable
EQ-T1-140	Samuel Moore Cable
EQ-T1-141	Valcor HMV-3A/B, 4A/B
EQ-T1-142	Rockwell International HR-R-1, 2
EQ-T1-143	Comsip Delphi AE 42A/B
EQ-T1-144	Victoreen RMG -22, 23
EQ-T1-145	Delete
EQ-T1-146	Delete
EQ-T1-147	ASCO Pressure Switch PS 479 A,B,C
EQ-T1-148	Bailey RTD DH2-TE1, 2
EQ-T1-149	Rosemount 1153B