

Docket No. 50-289

DISTRIBUTION

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and Director - TMI-1
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Dear Mr. Hukill:

As you know, staff review of the TMI-1 environmental qualification program has been in progress for some time. Recent review activities have included meetings with members of your staff on October 5, 1983 and March 8, 1984, and review of your recent environmental qualification submittals dated February 10, 1984 and February 22, 1984. The focus of the staff's current review of your environmental qualification program has been to assure resolution of the deficiencies identified in the Technical Evaluation Report previously forwarded to you under letter dated December 10, 1982.

Concurrent with the overall program review, the staff has also been reviewing the environmental qualification of the TMI-1 emergency feedwater (EFW) system. This review has, to date, encompassed two meetings in Bethesda, MD, four days of audits at GPU Nuclear corporate headquarters in Parsippany, NJ, and the exchange of numerous letters. The staff expects to complete this review in the near future. However, this review has raised certain questions about the adequacy of the overall TMI-1 environmental qualification program principally related to the methodology used to identify equipment that must be environmentally qualified per 10 CFR 50.49.

Therefore, to enable the staff to complete its review of the TMI-1 environmental qualification program, we request, pursuant to 10 CFR 50.54(f), that you submit a response in writing under oath or affirmation that addresses each of the actions identified in the enclosed request for additional information. We request that you provide a response to us within 30 days of receipt of this letter.

Sincerely,

"ORIGINAL SIGNED BY:"

Darrell G. Eisenhut, Director
Division of Licensing

Enclosure:
Request for Additional
Information

cc w/enclosure: See next page

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REQUEST FOR ADDITIONAL INFORMATION

THREE MILE ISLAND, UNIT 1

DOCKET NO. 50-289

1. At the time of restart, all electrical equipment important to safety, as defined in 10 CFR 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. An acceptable JCO can be based on one or more of the following criteria:
 - a. The safety function can be accomplished by some other designated equipment that is qualified, and failure of the principal equipment as a result of the harsh environment will not degrade other safety functions or mislead the operator.
 - b. Partial test data that does not demonstrate full qualification, but provides a basis for concluding the equipment will perform its function. If it cannot be concluded from the available data that the equipment will not fail after completion of its safety function, then that failure must not result in significant degradation of any safety function or misleading information to the operator.
 - c. Limited use of administrative controls over equipment that has not been demonstrated to be fully qualified. For any equipment assumed to fail as a result of the accident environment, that failure must not result in significant degradation of any safety function or misleading information to the operator.
2. The licensee should reaffirm that in performing its review of the methodology to identify equipment within the scope of 10 CFR 50.49(b)(2) that the following steps have been addressed:
 1. A list was generated of safety-related electric equipment as defined in paragraph (b)(1) of 10 CFR 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;

2. 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 and;
 3. 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 systems descriptions in the FSAR.
 4. 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, NEMAN, ANSI, UL, and NEC) and the use of properly coordinated protective relays, circuit breakers, and fuses for electrical fault protection.
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 10 CFR 50.49(b)(1).
 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.
 5. Verify completeness of the list of equipment required to be environmentally qualified. Electrical equipment important to safety, as defined in 10 CFR 50.49, need not be environmentally qualified if one or more of the following criteria are satisfied:
 - a. Equipment is not required to perform a safety function during or following exposure to the harsh environment created by a design basis accident (DBA), and failure of the equipment will not adversely impact safety functions or mislead the operator.
 - b. Equipment is required to perform a safety function during or following a DBA, but is not subjected to a harsh environment as a result of the DBA.

- c. Equipment performs its function before its exposure to a harsh environment, and the adequacy of the time margin provided is justified; subsequent failure of the equipment as a result of the harsh environment will not degrade other safety functions or mislead the operator.
- d. The safety function can be accomplished by some other designated equipment that is qualified and satisfies the single-failure criterion; failure of the principal equipment as a result of the harsh environment will not degrade other safety functions or mislead the operator.

IV. Specific Equipment EQ Deficiencies (continued)

FRC Item Number	Description (Manufacturer, Model, Etc)	NRC Category	Deficiencies	Proposed Resolution
A. Electrical Cable (continued)				
93 66	General Electric cable; multipair thermocouple extension cable with overall shield	I.B	Documented evidence of qualification inadequate	Testing and analysis had not been performed on this cable at the time of the TER/SER review; therefore, qualification documentation was noted as being inadequate by FRC. Qualification deficiencies for qualification time, material aging, humidity, temperature, pressure, and radiation were identified. A review of the applications for this cable indicated its only use was with originally installed thermocouples. There are no safety-related applications for the thermocouples in the plant; therefore, the cable does not require qualification. Therefore, these components should be in NRC Category III.A, Equipment Exempt from Qualification.
90 64	General Electric cable; cross-linked poly- ethylene insulation with neoprene jacket	I.B	Documented evidence of qualification inadequate	Testing and analysis had not been performed on this cable at the time of the TER/SER review; therefore, qualification documentation was noted as being inadequate by FRC. Qualification deficiencies for qualification time, material aging, humidity, temperature, pressure, and radiation were identified. Review of the applications of this cable indicated its only use was in the radiation monitoring system, which is not a safety-related system. Therefore, all references to this cable were deleted from the qualification program after it was determined the cable is not used in safety-related applications. Therefore, these components should be in NRC Category III.A, Equipment Exempt from Qualification.
91 76	General Electric cable; rubber-insulated with a hypalon jacket	I.B	Documented evidence of qualification inadequate	Testing and analysis had not been performed on this cable at the time of the TER/SER review; therefore, qualification documentation was noted as being inadequate by FRC. Qualification deficiencies for qualification time, material aging, humidity, temperature, pressure, and radiation were identified. Review of the applications of this cable indicated its only use was in the radiation monitoring system, which is not a safety-related system. Therefore, all references to this cable were deleted from the qualification program after it was determined the cable is not used in safety-related applications. Therefore, these components should be in NRC Category III.A, Equipment Exempt from Qualification.

17. Specific Equipment EQ Deficiencies (continued)

FRC Item Number	Description (Manufacturer, Model, Etc)	NRC Category	Deficiencies	Proposed Resolution
G. FLOW SWITCHES				
Barton, 289	I.B Documented evidence of qualification inadequate	These components were scheduled for replacement; however, no qualified replacement was identified at the time of the TER/SER review. Therefore, documented evidence of qualification was indicated as inadequate. They will be replaced by qualified Rosemount Model 1153, Series B transmitters. Qualification is required for post-accident radiation only. Rosemount Test Report 108025, Rev B, dated February 1983, has been evaluated and found to qualify the Rosemount Model 1153, Series B transmitters for the normal service conditions and the postulated post-accident radiation at the operational life of the Model 1153, Series B has been determined by Rosemount to be 20 years; therefore, these components will require replacement at the end of this period. These qualified replacement components should be in NRC Category I.A, Equipment Qualified.		
Mergold, DA5333	I.B Documented evidence of qualification inadequate	These components were scheduled for shielding or replacement, and qualification was not available at the time of the TER/SER review. Therefore, the documented evidence of qualification was considered inadequate by FRC. Qualification was required for post-accident radiation only. The shielding design for these components has been completed, and the radiation environment is now mild. Therefore, these components should be in NRC Category III.B, Equipment Not in the Scope of the Review.		
H. FLOW TRANSMITTERS				
10,31 10,31	General Electric GE/MAC 553	I.B Documented evidence of qualification inadequate	At the time of TER/SER review, these components were scheduled for either testing or analysis. The decision was made to test the component for radiation because radiation caused by a design basis accident is the only harsh environment to which these components are ever subjected. Subsequently, the GE/MAC 553 transmitters were tested by Wyle Laboratories. Qualification was provided in Wyle Test Report 45917-1, July 30, 1982. Review and evaluation of the test report revealed that these components are qualified for the required conditions. Therefore, these qualified components should be in NRC Category I.A, Equipment Qualified.	
61	Leeds And Northrup 000-0300-0300	I.B Documented evidence of qualification inadequate	This component was originally scheduled for replacement; however, no qualified replacement was identified at the time of TER/SER review. Therefore, documented evidence of qualification was indicated as inadequate. Subsequently, it was determined that this component would perform no safety-related function. It provides only flow indication for the SGTS and does not provide any control function. The required control function for the system is provided by FSL 1/2-7541-BA,B and -33A,B. Therefore, this component should be in NRC Category III.A, Equipment Exempt from Qualification.	

SAMPLE

IV. Specific Equipment EQ Deficiencies (continued)

FRC Item Number	Description (Manufacturer, Model, Etc)	NRC Category	Deficiencies	Proposed Resolution
P. MOTOR CONTROL CENTERS				
83 62	General Electric 7700 Series	I.B	Documented evidence of qualification Inadequate	Qualification deficiency was identified as the radiation parameter and was originally to be resolved by analysis and/or testing. This deficiency was applicable because these MCCs had not been qualified to a harsh radiation environment. Later, the qualification was selected to be by the method of testing. A detailed walkdown of the MCCs was completed to identify the specific components of each MCC. An investigative study was undertaken to properly select the components to be included in the test program. These components, which were obtained from the stations with consideration for the vintage, were assembled into a test model designed to be representative of all MCCs. A radiation test was conducted for this model. Wyle Test Report 45917-30 was evaluated. The deficiency is resolved by this test report, and this item is fully qualified to all environmental parameters. Therefore, these qualified components should be in NRC Category 1.A, Equipment Qualified.
Q. MOTOR-DRIVEN PUMPS				
79	General Electric 5K633BXC23A	I.B	Documented evidence of qualification Inadequate	The qualification of these components was not established at the time of TER/SER review, and the components were slated to be qualified for radiation during a post-DBA operation only. General Electric has provided qualification documentation in its Report NEDC-30066/B3NED024 (February 1983) for the pump motors at Based on the evaluation of the data in these reports, these motors are qualified for the normal and the postulated post-DBA environmental conditions. Therefore, these qualified components should be in NRC Category 1.A, Equipment Qualified.
80 45	General Electric 5K6637XC71A	I.B	Documented evidence of qualification Inadequate	The qualification of these components was not established at the time of TER/SER review, and the components were slated to be qualified for radiation during a post-DBA operation only. General Electric has provided qualification documentation in its Report NEDC-30066/B3NED024 (February 1983) for the pump motors at Based on the evaluation of the data in these reports, these motors are qualified for the normal and the postulated post-DBA environmental conditions. Therefore, these qualified components should be in NRC Category 1.A, Equipment Qualified.
37	General Electric 5K633BXC23A 5K6637XC71A	II A	Documented evidence of qualification Inadequate	The qualification of these components was not established at the time of TER/SER review, and the components were slated to be qualified for radiation during a post-DBA operation only. General Electric has provided qualification documentation in its Report NEDC-30066/B3NED024 (February 1983) for the pump motors at Based on the evaluation of the data in these reports, these motors are qualified for the normal and the postulated post-DBA environmental conditions. Therefore, these qualified components should be in NRC Category 1.A, Equipment Qualified.

SAMPLE

IV. Specific Equipment EQ Deficiencies (continued)

FRC Item Number	Description (Manufacturer, Model, Etc)	NRC Category	Deficiencies	Proposed Resolution
U. Pressure Switches (continued)				
33 33	Static-O-Ring GNL-3	11.A	Documented evidence of qualification is inadequate	Not applicable because these components are not subjected to harsh environmental conditions; therefore, they are deleted from the qualification program. These components should be in NRC Category 111.B, Equipment Not in the Scope of the Review.
36 36	Static-O-Ring 12N-AA5-PP	11.A	Documented evidence of qualification is inadequate	Not applicable because these components are not subjected to harsh environmental conditions; therefore, they are deleted from the qualification program. These components should be in NRC Category 111.B, Equipment Not in the Scope of the Review.
None None	Barksdale B2T-A12SS	NA	None.	These components were located in mild environments at the time of the TER/SER review; therefore, no deficiency was identified. Subsequently, deficiencies were identified for pressure, temperature, and humidity only. Therefore, these Barksdale B2T-A12SS pressure switches will be replaced with qualified Rosemount Model 1153, Series B transmitters. Rosemount has tested its Model 1153, Series B transmitters and provided the qualified documentation in Test Report 108025, Rev B, dated February 1985. The report has been reviewed and evaluated and found to qualify the transmitters for the required conditions. The qualified life of the Model 1153, Series B transmitters has been determined by Rosemount to be 20 years; therefore, these components will require replacement after this period. These qualified replacement components should be placed in NRC Category 1.A, Equipment Qualified.

V. PRESSURE TRANSMITTERS

None None	Bailey, B&W KG556220BAAIWFE	NA	None	At the time of the TER/SER review, no deficiency was identified for these Bailey pressure transmitters. However, these transmitters are required to be qualified for post-accident radiation only. Wyle has conducted testing on these transmitters and provided qualification documentation in Test Report 45917-60, September 1983. The report has been reviewed and evaluated, and it has been determined that these transmitters are qualified for the required accident radiation dose. Therefore, these qualified components should be placed in NRC Category 1.A, Equipment Qualified.
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SAMPLE