

MAY 23 1984

Docket No. 50-289

MEMORANDUM FOR: File

FROM: James Van Vliet, Project Manager, Operating Reactors
Branch #4, DL

SUBJECT: TMI-1 ENVIRONMENTAL QUALIFICATION AUDIT DEFICIENCIES

The enclosed draft letter was telecopied to me by GPU Nuclear on May 17, 1984. The draft letter addresses resolution of comments from a staff audit of TMI-1 environmental qualification files on March 20-21, 1984. I understand that the draft letter is preliminary in nature in that GPU Nuclear management review of the draft letter had not been completed.

"ORIGINAL SIGNED BY:"

James Van Vliet, Project Manager
Operating Reactors Branch #4, DL

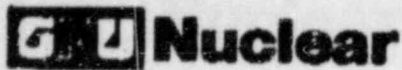
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May 17, 1984
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Office of Nuclear Reactor Regulation
Attn: John F. Stolz, Chief
Operating Reactors Branch No. 4
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Sir:

Three Mile Island Nuclear Station, Unit 1 (TMI-1)
Operating License NO. DPR-50
Docket No. 50-289
Environmental Qualification Audit

In response to the comments derived from the audit of the GPUN files on March 20 and 21, 1984 with regard to the EFW System environmental qualification, GPUN encloses information which we believe addresses the resolution of each item. Enclosure 1 entitled "Generic Environmental Qualification File Concerns" discusses the resolution of the three comments described in your letter of April 25, 1984. Enclosure 2 entitled "Specific EFW Environmental Qualification File Concerns" discusses the resolution of comments on EFW components. GPUN is continuing to upgrade the files to provide a more easily auditable trail. This response is being filed late based on discussions with you and members of your staff on May 7 and 8. Based on those discussions, additional items which were identified in our response of May 10, 1984 (84-2114) were audited and those comments are herein noted.

Sincerely,

R. F. Wilson
Vice President - Tech Functions

RFW:LWH:
Enclosure

cc: J. Van Vliet
R. Conte

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Generic Environmental Qualification File Concerns

Item 1. The EQ files contain no indication, other than SCEW sheets (some of which were in the process of being revised) and some brief handwritten sheets, that the documentation has been reviewed by GPU nor that it has been concluded by GPU that the equipment is qualified.

Response: The SCEW sheet is the official document that identifies equipment qualified to 10CFR50.49. Reference to reports on the SCEW sheets is confirmation that the document was reviewed for a specific application. This SCEW sheet format was mandated by the NRC and is the official GPUN position on each specific item shown.

Item 2. Most of the handwritten material in the files is not signed or dated and shows no indication that the statements/information contained on these sheets has ever been verified by a checker or approved.

Response: GPUN will review all material within the Environmental Qualification Files and insure that all material is signed and dated. It should be noted, however, that some of these documents referred to were specifically added to the file to aid in the NRC audit team's review. These included summary status type paragraphs.

Item 3. The files do not specify the required post-accident operating time for the equipment nor the duration of time the equipment has been demonstrated to be qualified. Specifying duration of accident on a SCEW sheet and referencing the FSAR is not adequate. Similarly, indicating on a SCEW sheet that qualification has been demonstrated for continuous operation or for the duration of time for which the equipment was tested is neither correct nor does it document why such a post-accident operating time is acceptable.

Response: The post-accident operating time and the duration of time the equipment has been demonstrated to be qualified will be added to each individual SCEW sheet.

Plant Specific Environmental Qualification File Concerns

A. Limitorque Motorized Valve Actuators

TER Items 11 & 15 [EF-V1A/B, EF-V2A/B]

1. The file should document the motor manufacturer, insulation class and current type for each actuator to establish applicability of the EQ documentation.

Response: The SCEW sheets are being updated and will be provided to the NRC in the fall submittal to show the motor manufacturer, insulation class and current type for each actuator. GPUN currently has this information.

2. The temperature profile used to evaluate the qualification of the actuators is a time history following a main steam line break for elevation 295 ft. of the Intermediate Building. However, the temperature profile resulting from a steam supply to EFWP turbine line break appears to be a more severe environment for approximately the first 800 seconds. The file needs to contain justification that establishes the adequacy of the EQ documentation for demonstrating qualification to this more limiting line break.

Response: The emergency feedwater motorized valve actuators qualification analysis is shown in Calculation C-1101-424-5350-011. The analysis documents that: (1) the thermal lag of SMB-0, SMB-00, and SMB-000 actuators will be the same because the ratio of mass to surface area is approximately equal; (2) Report 80027 documents that the included actuator limit switch is the limiting component; (3) the containment and out-of-containment limit switch construction and materials are identical except for the type of insulating phenolic; (4) the emergency feedwater motorized valve limit switch insulation is "DUREZ" phenolic manufactured by Hooker Chemical which has an Activation Energy of 1.02 eV. "UL-Recognized Components Director", dated March 1982, page 736, provides a temperature index of 150°C for DUREZ mechanical and electrical properties.

The analysis concludes that this limit switch is qualified (1) because of its similarity to the in-containment switch qualified per Report 600456; (2) extrapolated data from Report 80027 for

thermal lag shows that the switch temperature will remain below 300°F for either steam line break in the Intermediate Bldg; (3) the actuator was steam tested to 250°F for a period of 16 days as documented in Report B0003. The extrapolated data also shows that the motor insulation temperature will remain below 250°F. The SCEW sheet will be revised to reference this analysis.

3. GPU should review Equipment Environment Qualification Notice No. 24 of IE Information Notice 83-72, and document the results of their evaluation of that information in the file. (This comment was not provided to GPU during the audit.)

Response: GPUN has reviewed IE Notice 83-72 and has documented the results of this evaluation in the Licensing File. Results indicate that the equipment discussed is either not applicable, being replaced, or in a mild environment.

B. Westinghouse Motors

TER Item 51 [EF-P2A/B]

1. The file does not contain information to establish similarity between these motors and the motor, lead wires and insulation tested. A March 15, 1984 letter from GPU to Westinghouse requests the information needed to establish that similarity. A response to this letter should be pursued and placed in the file.

Response: Westinghouse has verbally advised GPUN that this report is applicable to these motors. The written confirmation requested is being pursued and will be placed in the file.

2. One of the EQ documents in the file, WCAP 7829, states that a motor without a heat exchanger is qualified for short term post-accident operation. The file should document whether the installation in TMI-1 includes a heat exchanger and, if not, the adequacy of the EQ documentation for demonstrating qualification of the motors for the period of time they are required to operate post-accident.

Response: The post-accident operating time of 7000 sec (accident profile 3) is enveloped by the Westinghouse Report WCAP 7829 LOCA test duration of 9 days. The motor has been demonstrated to be qualified and will be added to each individual SCEW sheets. The SCEW sheets will be updated and submitted in the fall of 1984. The EFW electric pump motors at TMI-1 do not have heat exchangers and the SCEW sheets will be modified to so state.

C. Anaconda (Continental Wire) Cable

TER Item 107 (Common Item)

1. The file contains no documentation to establish similarity between the cables tested and those installed. The files must contain either a letter from the manufacturer that establishes the applicability of the test report, or documentation describing how GPU has determined that the installed cable is similar to the specimens tested.

Response: Anaconda letter dated 2/15/84 establishes the applicability of the test report to GPUN purchase order (PO 40067). The letter was apparently not reviewed by the NRC at the time of the audit. The revised SCEW sheets will be submitted in the fall of 1984.

2. GPU should document in the file an aging calculation, using information from the test report, that establishes a qualified life for the cable.

Response: An Aging Calculation (GPUN Calculation 1101X-5350-77) establishes the cable qualified life and will be referenced on the SCEW sheet scheduled for the fall submittal of 1984.

D. Kerite Cable

TER Item 106 (Common Item)

1. The file contains no documentation to establish similarity between the cables tested and those installed. The files must contain either a letter from the manufacturer that establishes the applicability of the test report, or documentation describing how GPU has determined that the installed cable is similar to the specimens tested.

Response: This power and control cable was purchased on GPUN P.O. 97099 [GAI Bill of Material TMI-EK] which documents the qualification testing conducted by Franklin Institute in Reports Nos. F-C2770 and F-C2737.

2. GPU should document in the file an aging calculation, using information from the test report, that establishes a qualified life for the cable.

Response: The aging analysis on this ethylene propylene insulated cable was also identified on P.O. 97099. A copy of the report and applicability letter will be shown on the SCEW Sheets and documented within the Environmental Qualification files. New updated SCEW sheets are scheduled to be submitted in the fall of 1984.

E. Square D Diode (MIL S 19500/507)

TER Item 116 (Common Item)

1. EQ documentation currently in the file is not adequate to demonstrate qualification. However, these diodes are associated with ASCO DC solenoid valves and, according to GPU, there are no such valves associated with the EFW system that are required to be environmentally qualified. Therefore, these diodes would not be required to be demonstrated qualified. GPU should document the basis upon which these diodes are exempted from being qualified, and evaluate whether there are any DC solenoid valves and associated diodes in a harsh environment area that are required to be qualified.

Response: These diodes are suppression devices mounted across the DC solenoid valve coils at TMI-1. The NRC concern is that these diodes may not be qualified for a steam environment since no steam test was performed. These diodes are not required to function after a HELB in the Intermediate Bldg. Since some of these diodes are located in the Intermediate Bldg., GPUN has evaluated the effects on these diodes during a steam line break. Since the associate valves are normally deenergized, failure of the diode will not cause the valve to change position.

F. States Terminal Block

TER Item 110 [Model NT] (Common Item)

1. The file should document the specific equipment associated with these terminal blocks, and GPU must determine whether the IR readings documented in the test report are acceptable for the application(s) of these terminal blocks.

Response: The IR (Insulation Resistance) shown in the LOCA test (R.M. Schuster 11/5/73) for the States Terminal Blocks were reviewed. The analysis (Calculation C-1101-700-5350-001 and C-1101-611-5350-001) documented within the GPUN files demonstrates that the terminal blocks insulation under HELB conditions will not inhibit the operability of the Emergency Feedwater System.

G. Foxboro Transmitters

TER Item (none) (FT-779, 782, 788 & 791)

1. The EQ documentation, Wyle Test Report 45592-4, states that the end user must address specific accuracy requirements for each application and evaluate total loop error. GPU must document

such an evaluation using the demonstrated accuracies from the test report.

Response: Error analyses GPUN Calculations No. C1101-424-5350-8&9 have been performed using the transmitter errors documented in Wyle Test Report 45592-4. This was also done for other affected instruments using the data documented in the appropriate test reports. It was concluded that the total instrument loop errors associated with the Emergency Feedwater System are acceptable and will not seriously degrade the performance of the system.

2. Other than SCEW sheets indicating 23.62 years, the file contains no assessment of qualified life by GPU. The file should document GPU's qualified life determination.

Response: The SCEW sheet is the official document. The transmitter service life will be updated using data directly from Wyle Report 45592-4 page IX figure 1 "Qualified Life versus Service Temperature". The SCEW sheets are currently being updated and will be included in the fall of 1984 submittal.

3. The transmitters were tested with interfaces as described in the test reports, e.g., with a Conax electrical conductor seal assembly with integral electrical junction box, flexible conduit with holes drilled in it, etc. The file should document that the transmitters in TMI-1 are either installed as tested, or a description of their installation provided and the applicability of the test report to their installed condition justified.

Response: The pressure boundary for these transmitters at TMI-1 is formed by the CONAX seal assemblies only. The installation at TMI-1 does contain integral junction boxes and flexible conduit. However, the box connections are water tight and the conduit is covered with sheathing. Therefore, the installation at TMI-1 is better configured for a harsh environment than that tested.

4. Part of the test sequence is seismic qualification. GPU should document that the seismic testing performed is applicable to TMI-1.

Response: The report shows that the Wyle test program enveloped TMI-1 seismic conditions.

5. On page IX-22 of the test report it is stated that a formal report will be issued to answer anomaly NOA F37. Similarly, on page IX-25 it is stated that justification for a test interruption, anomaly NOA F42, will be provided in the final test report. Until the formal report addressing NOA F37 and the final

test reports addressing NOA F42 are reviewed by GPU and placed in the file, GPU should document its evaluation of the anomalies and their effect on the qualification of the transmitters.

Response: We have reviewed the anomalies regarding pressure leakage identified within the Wyle Report 45592-4 and have instructed the plant by memo to replace opened seals after all calibration or maintenance work. However, we will review the final Wyle report when it becomes available and take appropriate action.

H. Foxboro Transmitters (Not associated with EFW System)

TER Items 78, 79 & 81 [RC3A-PT3&4, RC3B-PT3; PT-282, 285 & 288; SP6A-PT1&2, SP6B-PT1&2]

1. The EQ documentation reviewed does not resolve the deficiencies identified in the TER for these transmitters. However, the SCEW sheets now reference the Wyle Test Report 45592-4, being used by GPU to establish qualification of transmitters FT-791, 779, 782 and 788 (Model NE13DM). GPU stated that the Wyle Report is referenced only to address aging and qualified life for these E11 models. In order to resolve all the deficiencies for these transmitters, including aging and qualified life GPU should determine the applicability of the Wyle Report for qualifying these transmitters. Regardless of whether the Wyle Report is used, GPU should document in the file the resolution of the TER deficiencies. If it is determined that the Wyle Report can be used, the following comments are applicable in addition to those above for the Model NE13DM transmitters.

Response: Wyle Report 45592-4 is not applicable in the qualification of these transmitters.

The post accident operating time of 19.5 hours is enveloped by the Foxboro Report Q9-6005 to a HELB (318°F at 90 psig) duration of 26 hours. Foxboro Report T2-1075 qualifies the transmitter to 2×10^7 rad limit set by the DOR Guidelines. The service life is based on the analysis provided in B&W report 77-1127001-00 and GPUN Calculation 1101X-5350-011 which demonstrates 12.8 years at 1000°F. SCEW sheets will be updated and submitted in the fall of 1984.

2. The file should document that the normal radiation simulated in the testing is applicable to the TMI-1 transmitters.

Response: See response to item 1 above.

3. On page iii, it is stated that additional testing is being performed by the manufacturer to extend the accident radiation qualification and to confirm the aging analysis for the silicone capsule O-rings of transmitters represented by test specimen F-1 (Model NE11). GPU should document whether the testing completed thus far adequately addresses aging for these transmitters since additional testing appears to be necessary. If it is determined that the results of the additional testing are needed to confirm the aging analysis, then GPU should review the test results and place them in the file when they become available.

Response: Wyle Report 45529-4 is not applicable in the qualification of these transmitters.

4. On page I-7 it is stated that Foxboro Report No. PER-81-106 provides justification for qualification of untested transmitters by similarity to those tested. Also, page I-171 refers to Foxboro document QQAAC012 for similarity information. GPU should procure these documents, review them, and place them in the file to address similarity and substantiate the applicability of the Wyle Report for these transmitters, particularly to Model E11AM.

Response: Wyle Report 45529-4 is not applicable in the qualification of these transmitters.

The following three items are those which were discussed with your staff on May 7 and 8.

J. Conoflow I/P Transducer

TER Item 60 (EF-V30A) (SP-V5A, B)

1. GPU has a Policy and Procedure Manual (EP-031) which provides guidance for review of equipment files. When used, this procedure would produce SCEW and summary sheets for each equipment item. The ITT Conoflow I/P transducer file does not contain SCEW or Summary Sheets of the GPU service condition parameters.

Response: This item is a modification currently being made to the plant. The SCEW and supporting documentation will be available for review by June 1, 1984. The GPUN conclusion that these devices are qualified is based upon Conoflow Reports 3021, 3419 and GPUN Calculation C-1101-424-5350-010. New SCEW sheets will be established and included in our fall 1984 submittal.

2. GPU has a letter dated 4-30-84 which states an Arrhenius Calculation @ 90°F and 0.79 eV results in a 51 year qualified life.

These calculations were not contained in the file.

Response: GPUN Calculation No. C-1101-424-5350-010 showing this analysis is kept in our corporate calculation files.

K. Boston Insulated Wire Cable

TER No. (None) (Common Item)

1. From the review of the file and its procedure, it becomes clear that GPU has not developed a checklist for the reviewer to review the equipment qualification file.

Response: This cable is a supporting item for the modification in process to comply with NUREG 0737 Item II.E.1.2. The SCEW and supporting documentation will be available for review when the equipment becomes operational June 1, 1984.

The GPUN Environmental Qualification Procedure (EP-031) is adequate and describes the methodology for qualification and review. Because of the uniqueness of each component, specific checklists are inappropriate. The important aspect is the methodology used.

2. Based on the review of the file it also becomes clear that GPU has not completed the supplementary SCEW sheet giving the status of qualification.

Response: The SCEW for this modification will be included with the Common Items Master List and will be included in our fall 1984 submittal.

3. Based on the GPU procedure the responsibilities for review lies with many different engineering disciplines, however, from the files it was not evident, how these review and comment resolution were documented.

Response: The applicable reviews for the BIW cable in this modification have been performed. Only the E.Q. documentation is placed in the Environmental Qualification file.

4. Test report document used for qualification is a summary document. A summary document by itself is not an acceptable way to document qualification. GPU should review the complete test report and place the review results in the file. Also the test report should be available either here at GPU or BIW for the life of the cable.

Response: The qualification testing for this cable purchased on Purchase Order 81115 is BIW Test No. 75A025. Summary Report B-915 was used to show submergence data. The applicability of B-915 was documented in a telecon record. The vendor has been requested to

supply written confirmation. GPUN will review the applicable test reports and ensure its availability for the life of the cable in the file.

5. In accordance with the summary document, submergence test was not done in sequence, however the SCEW sheet states it was sequential. No justification about the acceptability of such test on a cable unaged and without LOCA testing is provided in the file.

Response: Section II of Report 8-915 states that the type tests were in accordance with IEEE Std. 323-1974 which requires sequential testing. This report includes aging, thermal and radiation exposure, LOCA and water absorption tests.

6. Aging consideration should include the condition of the component, e.g., whether the component is energized or deenergized for the normal operating condition. In the case of cables include the heat rise due to the current flowing through the conductors.

Response: Cables are tested at 90°C which includes the consideration for heat rise due to current flow and also subjects the cable to thermal aging.

7. Figure 7 of the test report shows the LOCA profile extended to 367 days while the description and measurement indicate that the test was discontinued after 161 days. Explain.

Response: GPUN has reviewed the report and determined that Figure 7 is incorrect. It should show the test terminated after 161 days.

8. SCEW sheet for the component does not provide the required post accident operability requirement and qualification for the parameter.

Response: The post-accident operating time of 7000 seconds is enveloped by the 161 days qualification. These numbers will be included on the SCEW sheets.

9. Part No. on the SCEW sheet and telephone conversation with the field do not agree.

Response: BIW cable identification P/H 0836-H002 will be shown on the submitted SCEW.

L. Anaconda Cable

TER (None) (Common Item)

This cable is a support item for a modification currently being made to the plant. The SCEW and supporting documentation will be

available for review by June 1, 1984. The SCEW for this modification will be included with the Common Item Master List and will be included in our fall 1984 submittal.

1. TDR No. 542 - p. 4 of 6, questions are raised concerning qualification of Kerite Co.

Response: These reports had been received for the Kerite cable, but they were misplaced. This is the reason that TDR 542 stated the reports were not available. Replacement copies of these reports are on file.

2. What is applicability of Anaconda-Ericsson Reports 80220-2 (11/81) and 81028-1 (11/81)?

Response: These reports do not apply to this cable. Anaconda Report 80282 dated July 1980 and Franklin Report F-C 4836-2 are used to qualify this cable.

3. File contains no specified operating time, no qualification time, and no indication that cable will have to operate submerged.

Response: The post-accident operating time of 7000 seconds is enveloped by the Franklin Report F-C4836-2 16 day LOCA test and six month 90°C water absorption test. Aging is included in water absorption test because of the temperature of the 90°C.

4. What is exact cable that must be qualified?

Response: Four conductor, #14 wire gauge with FR-EP insulation.

5. F-C4836-2 states that specimens were passed to the outside of the test vessel through metal tubes and sealed with epoxy putting compound. How are these cables installed in TMI-1 and why does testing performed demonstrate they are qualified?

Response: The epoxy seal on the test vessel was used to prevent the escape of the atmosphere from the vessel to the surroundings. This is not applicable to the plant installation which is in cable trays or conduit.

6. F-C4836-1 cables thermally aged at 150°C (302°F) for 168 hours - what is qualified life?

Response: Aging analysis is being performed via GPUN Calculation C-1101-424-5350-012. The expected result of at least a 40 year qualified life is based on previous analysis of other FR-EP insulated cable.

7. File contains no discussion of accelerated water absorption test for demonstrating qualification for submergence, e.g., no pre-aging, had not gone through HELB, etc.

Response: The SCEW sheet will show the applicability of Anaconda Report 77087 for submergence and FRC Report F-C 4836-2 for aging, HELB, LOCA, etc.