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May 31, 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

This letter is in response to your letter of April 25, 1984 transmitting NRC staff comments resulting from the audit of GPUN files on March 20 and 21. Our responses to staff comments resulting from the audit on May 7 and 8 are also included. As a result of these audits and further review by GPUN we have taken the following actions to reconfigure and improve the documentation of the environmental qualification of electrical equipment for the EFW and necessary supporting systems:

1. Files have been restructured to ensure all relevant documentation is readily identifiable for each component. This restructuring provides improved control, greater assurance of documentation completeness and improved auditability of records.
2. System Component Evaluation Worksheets (SCEW) have been updated (and reviewed/approved). These sheets will now be subject to the same control as plant drawings.

For environmental qualification of the remaining plant systems, the following additional actions are in process and are expected to be completed by June 25, 1984:

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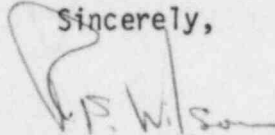
1. Items 1 and 2 above.
2. Entering all SCEW sheets (including the EFW System) into our computerized configuration control system to assure all portions of the GPUN organization have ready access to the latest version of the data.
3. An outside consultant, expert in the field of environmental qualification, has been engaged to review the overall program and provide recommendations as appropriate.

The following enclosures contain our responses to the specific comments in your April 25 letter and those resulting from the May 7 and 8 audit.

1. Enclosure 1 entitled "Generic Environmental Qualification File Concerns" discusses the resolution of the three general comments provided in your 4/25/84 letter.
2. Enclosure 2 entitled "Specific EFW Environmental Qualification File Concerns" discusses resolution of specific comments on system components.

In connection with this formal response we would like to point out that the draft audit response that we telecopied to the staff, at their request, on May 17, 1984, does not reflect the official GPUN response to the staff's audit. The unsigned draft response was transmitted for the sole purpose of apprising the staff of our current audit response status. It was not our intent that the staff rely in any way on that draft in arriving at conclusions with respect to the TMI-1 environmental qualification program.

Sincerely,

  
R. F. Wilson  
Vice President  
Technical Functions

RFW:JW  
Enclosure

cc: J. Van Vliet  
R. Conte

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 EQ files have been completely restructured for EFW and supporting system components and are similarly being restructured for the balance of system components. These files will contain an index of all documents relevant to qualification of a specific component. The file includes a sign-off by a cognizant engineer confirming documents associated with any changes have been reviewed and found to be acceptable. We will continue to also use the SCEW sheet as the mechanism to communicate changes or new information to other portions of the GPUN organization. The SCEW sheet format as previously mandated by the NRC will continue to be used except that it will include formal review/approval signatures and will be a controlled engineering document consistent with the program established for other engineering documents such as drawings, specifications, etc. All SCEW sheets will be annotated to describe the level of qualification (i.e., DOR Guidelines or NUREG 0588, Category 1 or 2).

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 has reverified all material in the EQ files for EFW and supporting system components and is in the process of doing so for the balance of system components. To the extent there are extraneous documents they are being removed from the files. To the extent there is handwritten material which is relevant, it is being signed, dated and approved. It should be noted, however, that some of these documents referred to, which included status summaries, were specifically added to the file temporarily to aid in the NRC audit team's review. These handwritten documents are being purged from the files.

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: As part of the reverification process these SCEW sheets for the EFW and supporting system components have been revised to clarify the required accident and post-accident operating time for the equipment and the duration of time, both accident and post accident, for which the equipment has been demonstrated to be qualified. Supporting documentation or references to the same on required operating and qualification duration are also being included in the files. SCEW sheets for the balance of systems components are in the process of being revised with scheduled completion of June 15, 1984. Upgrading of these files is scheduled for completion in June, 1984.

Plant Specific Environmental Qualification File Concerns

## A. Limitorque Motorized Valve Actuators

EF-VIA&B, Model SMB-000, TER Item No. 15  
 EF-V2A&B, Model SMB-0, TER Item No. 11

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

Response: Existing information was used to revise the SCEW sheets to show motor manufacturer, insulation class and current type for each actuator. Additionally all supporting qualification documentation has been reviewed for applicability to all EFW and supporting system valve actuators. A similar review is in process for all other valve actuators within the scope of the EQ Program.

Item 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 EFW 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 temperature profile resulting from a break in the steam supply line to the EFW Pump Turbine has been evaluated. This environment does not completely fall within the temperature profile of the test which was conducted for the out-of-containment Limitorque operator. It has been concluded, however, by means of a combination of test results, material analysis, operating data and analysis of test data, that these operators are qualified for both the main steam line break and a break in the steam supply line to the EFW Pump Turbine. This is documented in GPUN Calculation C-1101-424-5350-011 which is contained in the EQ file.

Item 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 concluded that the relevant items are Item 22 (Static-O-Ring) Pressure Switches and Item 24 (Under-rated terminal blocks on Limitorque operators). The Static-O-Ring pressure switches which are used for Main Steam Line Break Detection have been replaced by qualified devices. SCEW sheets and qualification data for these are included in the EQ file. It has been determined that the under-rated terminal blocks referred to in Item 24 had been installed in the Midland plant by a service engineer. We do not have these blocks in TMI-1. Copies of the IE Notice and response to it are contained in the EQ files.

B. Westinghouse Pumps

EF-P2A&B, Model HP 450, TER Item No. 51

Item 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 letter GPU-84-503, S. P. Swigart to D. K. Croneberger, dated May 21, 1984 states that the lead wire insulation is silicone rubber which is identical to that used for the motor tested for LOCA conditions and documented in WCAP-7829. The letter also concluded that because of design differences in the motors the test data of WCAP-7829 is not directly applicable to the TMI-1 motors. This latest information is contrary to previous oral communication.

GPUN has concluded, however, by means of a combination of test results and analysis that the motors are qualified subject to redoing terminations as described below.

This conclusion is based on the following:

1. The motor insulation which is identical (Thermalastic Epoxy) to that used for the aforementioned test has been shown to be able to withstand the high temperature conditions from the LOCA test results of WCAP-7829. This is further substantiated by analysis contained in Westinghouse Report "Motor Insulation Life Analysis Emergency Feedwater Pump Motors EF-P-2A, EF-P-2B Three Mile Island Nuclear Station", dated 1/81, which is in our files.
2. The motor insulation has been shown to be able to withstand the moisture conditions due to the steam environment because the insulation system is impervious to moisture. This is demonstrated by immersion tests which are documented in WCAP-8754 in the file.
3. The integrity of the bearings is demonstrated by a GPUN analysis contained in the file.

All of the above is documented in GPUN Calculation C-1101-424-5350-014 which is contained in the file.

In addition, Westinghouse is preparing a report based upon additional data and information in their files to further review the integrity of the motor in a steam environment. This report will be completed by June 8, 1984.

Our review further concluded that the terminations on the EFW motors have not been documented as qualified for the MSLB environment. Consequently, we are in the process of redoing the connections with qualified terminations.

Item 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 pumps for the period of time they are required to operate post-accident.

Response: WCAP 7829 includes test data for motors with and without heat exchangers. The TMI-1 motors do not include heat exchangers. For applicability of WCAP 7829 test data, see item #1 above and GPUN Calculation C-1101-424-5350-014 which is in the files.

#### C. Anaconda (Continental Wire) Cable

##### TER Item 107 (Common Item)

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 February 15, 1984, which was not in the EQ file at the time of the March, 1984 audit, documents their determination of the applicability of their test report to the installed cable (GPU PO 40067). We have reviewed the Anaconda letter and concur in their determination. The letter is included in our EQ file.

Item 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) is included in the EQ file. This calculation establishes the cable qualification life as being satisfactory for plant life and has been referenced on the revised SCEW sheet.

#### D. Kerite Cable

##### TER Item 106 (Common Item)

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: A letter from Kerite, dated 5/16/84, is contained in the EQ file which establishes the applicability of the Kerite Report dated 8/21/81 to TMI-1 cable. This report contains qualification documentation for all plant parameters except submergence, which is addressed in a separate letter.

Item 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 qualification for this ethylene propylene insulated cable is documented on Kerite Confidential Report for TMI Cables, dated August 21, 1981. The qualified life for TMI-1 is shown as 40 years. We have reviewed the basis for aging qualification and concur in the determination. The Kerite Report is contained in the EQ files.

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

TER Item 116 (Common Item)

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 coils on ASCO DC solenoid valves. ASCO DC solenoid valves are no longer used for EFW and supporting system components. For other applications where these diodes are utilized in the Intermediate Building and qualification is not required, GPUN has evaluated the results of a failed diode. Since the associated valves are normally deenergized, failure of the diode would not cause the valve to change position nor will it adversely affect the power source for the solenoid valves. Therefore, it is concluded that a failed diode will not adversely affect the EFW or supporting systems.

There are ASCO DC solenoid valves for other than EFW and supporting systems requiring qualification, but the relevant environmental parameters do not include the HELB environment. These valves are qualified for thermal and radiation aging effects. Demonstration of qualification will be contained in the EQ file.

#### F. States Terminal Block

TER Item 110 [Model NT] (Common Item)

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) readings documented in the test report were reviewed for acceptability under the most severe HELB condition. This analysis (Calculation C-1101-424-5350-008, C-1101-700-5350-001 and C-1101-611-5350-001) demonstrates that the potential errors associated with terminal block insulation are acceptable under HELB conditions.

G. Foxboro Transmitters

FT-791, 779, 782 & 788, Model NE 13DM, TER Item No. (None)

Item 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 Calculation C1101-424-5350-9) were performed using the transmitter error documented in WYLE Test Report 45592-4. Analyses were performed for other affected instruments using the data documented in the appropriate test reports. The conclusion of these analyses is that the total instrument loop error associated with the Emergency Feedwater System is acceptable. This calculation has been documented in the appropriate EQ files.

Item 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: Transmitter service life is developed using data directly from WYLE Report 45592-4 Page IX, Figure 1 "Qualified Life vs. Service Temperature". The determination of qualified life for each component and a reference to the aforementioned WYLE Report Figure 1 are reflected on the respective SCEW sheets. The updated SCEW sheets are contained in the EQ file.

Item 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 interfaces for the transmitters at TMI-1 includes a junction box supplied by Foxboro. The installation is in accordance with the manufacturer's recommendations and is similar to the test configuration. Foxboro's certification with respect to the qualification of the transmitters to IEEE standards 323-1974, and 344-1975 is contained in the EQ file. GPUN reviewed the Foxboro test documentation against the plant equipment and its installation to ensure similarity to the tested configuration. The results of this review is also documented in the EQ file.
- Item 4 Part of the test sequence is seismic qualification. GPU should document that the seismic testing performed is applicable to TMI-1.
- Response: The aforementioned WLE Test Report, Figure 1, identified the seismic test profile for the qualification of these transmitters. This test profile envelops the governing TMI-1 seismic response spectra.
- Item 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 X-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 report 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 identified in WYLE Report 45592-4. Our evaluation is documented in memorandum dated 8/3/83 contained in the EQ files and referenced on the SCEW sheet. As a result of this evaluation, we will be replacing opened seals after calibration or maintenance work on the transmitters is completed.

H. Foxboro Transmitters (Not associated with EFW System)

RC3A-PT3 & 4, RC3B-PT3, Model E11GH, TER Item No. 78  
 PT-282, 285 & 288, Model E11AM, TER Item No. 79  
 SP6A-PT1&2, SP6B-PT1&2, Model E11GM, TER Item No. 81

- Item 1 The EQ documentation reviewed does not resolve the deficiencies identified in the TER for these transmitters. However, the SCEW sheets now reference the WLE 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 WLE 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 WLE Report for qualifying these transmitters. Regardless of whether the WLE Report is used, GPU should document in the file the resolution of the TER deficiencies. If it is determined that the WLE Report can be used, the following comments are applicable in addition to those above for the Model NE13DM transmitters.

Response: These transmitters are qualified based upon Foxboro Reports Q9-6005 and T2-1075. The post accident operating time is enveloped by the test duration covered by Report Q9-6005 which dealt with a high energy line break (318F at 90 psig) for a duration of 26 hours. Report T2-1075 qualified transmitters to  $2 \times 10^7$  rad. This limit bounds the required limit for the TMI-1 applications for these transmitters. The service life is based upon the analysis provided in B&W Report 77-1127001-00 and GPUN Calculation 1101X-5350-011 which results in a calculated life of 12.8 years at 100°F. The SCEW sheets are being updated to reflect the foregoing reports and calculations and will be contained in the EQ file.

WYLE Report 45592-4 is applicable to the Foxboro transmitters for Item G but not for transmitters covered by this item.

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

Response: The 40 year background integrated dose for TMI-1 is  $3.5 \times 10^4$  rads. Foxboro Report T2-1075 qualified the transmitters to a TID of  $2 \times 10^7$  rad. This limit is consistent with that set forth in the DOR Guidelines. The SCEW sheet indicates the origin of the limit.

Item 3 On page iii [WYLE Test Report 45592-4] 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: When additional test results are obtained they will be reviewed and placed in the appropriate file. Since WYLE Report 45529-4 is not applicable in the qualification of these transmitters, it will be evaluated and placed in the file associated with the transmitters identified in Item G.

Item 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: We will procure these documents and evaluate them to determine applicability to these transmitters and will place them in the appropriate EQ file if applicable.

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)

Item 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 transducer was part of the upgrade of the I/P converter recently committed for implementation by June 1, 1984. A new SCEW sheet has been generated and included in the EQ file. The GPUN conclusion that these devices are qualified is based upon Conoflow Reports 3021, 3419 and GPUN Calculation C-1101-424-5350-010 all of which are included in the EQ file.

Item 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 contains this analysis. A copy of the calculation is now included in the EQ file.

K. Boston Insulated Wire Cable

TER No. (None) (Common Item)

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: The GPUN Technical Function: Procedure EP-031 entitled Environmental Qualification does not presently require a checklist. A checklist has been developed to ensure file completeness and has been used in the EQ file restructuring and GPUN review of the EQ file. This form will be addressed in a revision to the aforementioned procedure to be issued in June 1984.

Item 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 sheet for the BIW cable has been developed and is included in the EQ file. This cable will be included with the Common Items Master List.

It should be noted that this cable is a supporting item for the modification of the flow element provided to measure EFW flow. The originally installed Controlatron has recently been replaced with an annubar installation and qualification of associated components has been appropriately addressed.

Item 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: Review and comment resolution is controlled by Technical Functions Procedure EP-008. This procedure applies to reviews of all engineering documentation. It has not been our practice to retain the completed forms although their completion is a prerequisite to approval of the engineering document.

EP-031 will be revised to clarify what interdisciplinary reviews must be conducted and how they are documented. "TMI-1 Equipment and Environments" (TDR-282) provides environmental qualification parameters. This document was subjected to an interdisciplinary review. To the extent this document requires future revision, it will again be subjected to interdisciplinary reviews.

Item 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: Qualification testing for this cable is documented by BIW Test #75A025. Because this cable is subjected to submergence, which was not addressed by the aforementioned test report, Summary Report B-915 was used to establish qualification for submergence. The applicability of Report B-915 has been confirmed with the Vendor. The test data, upon which Report B-915 was developed will be obtained and reviewed for inclusion in the EQ file. In accordance with EP-031 this record will be maintained for the life of the cable.

Item 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: The submergence test was performed in a sequence appropriate for the accident which will cause flooding (FWLB). The justification for this position has been added to the file..

Item 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: This cable was preaged for 168 hours at 121°C as part of the IEEE 323-1974 test sequence (BIW Report 754025). Using Arrhenius methodology, this has been determined to be equivalent to 40 years at 119°F (GPUN Calc C-1101-424-5350-013). Determination of the qualified life at the 90°C rating of the cable is not necessary since these circuits will be carrying small current loads (4-20 ma) which will not cause significant ohmic heating.

Item 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 the indicated tabulated test data only extends to 161 days and that the Figure 7 duration of 367 days was not covered by the test. Refer to Item 8. which demonstrates that accident time is bounded by the 161 day test.

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

Response: The duration of the accident conditions for this cable is 7,000 seconds. The required post-accident operating duration is seven days. This duration is bounded by the test duration of 161 days. The required post accident operating time and qualification duration are included in the SCEW sheet.

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

Response: BIW cable identification 10836-H002 is the correct part number, therefore, the information obtained from the field is correct and the SCEW sheet has been revised accordingly.

#### L. Anaconda Cable

TER (None) (Common Item)

Note: This cable is a support item for the recently installed modification for the qualified I/P converter. The SCEW sheet and supporting documentation are now available in the EQ file. This item will be included in the Common Item Master List.

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

Response: The open questions identified in GPUN report TDR 542 resulted from unavailability of the Kerite test reports to the report preparer. Replacement copies of these test reports have been obtained and are included in the EQ file.

Item 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 and have been removed from the associated EQ file. Anaconda Report 80282, dated July, 1980, and Franklin Report F-C483-62 are the bases for qualification of this equipment. These reports are included in the EQ file.

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

Response: The required post accident operating time in a steam environment is 7,000 seconds. This duration is enveloped by the 16 day LOCA test. The six month 90°C water absorption test bounds the required duration for operating time submerged of seven days. The required duration and qualification durations are included on the SCEW sheets. An evaluation of the adequacy of the test for the steam environment followed by submergence is included in the file.

Item 4. What is exact cable that must be qualified?

Response: Four conductor, #14 wire gauge with FR-EP insulation, shielded, 600V, with Hypalon jacket is the cable installed. We have reviewed the report and concluded it applicable to this cable configuration.

Item 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 test configuration used epoxy seals on the vessel to complete the pressure boundary for testing purposes only. The test was to qualify the cable including the insulation only. To the extent cable terminations or splices are utilized on the actual installation, qualified connections are used.

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

Response: Aging qualification is documented on attachment AT-1 to FIRL Technical Report No. F-4836. The qualified life for TMI-1 usage is 40 years. The qualification and required durations are on the SCEW sheets. GPUN has reviewed the test report and concurs in its applicability to TMI-1 for thermal aging.

Item 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: Anaconda Data Sheet No. 77087 attached to Anaconda Report No. 80282 addresses submergence. FRC Report F-C4836-2 addresses HELB, LOCA, etc. These are referenced on the SCEW sheet.