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**UNION OF
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UNITED STATES OF AMERICA

BEFORE THE NUCLEAR REGULATORY COMMISSION

DOCKET NUMBER
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50-289

(2.206)

SUPPLEMENT TO UNION OF CONCERNED SCIENTISTS' PETITION
FOR SHOW CAUSE CONCERNING TMI-1 EMERGENCY FEEDWATER SYSTEM

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Dated: May 9, 1984

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SUPPLEMENT TO UNION OF CONCERNED SCIENTISTS' PETITION
FOR SHOW CAUSE CONCERNING TMI-1 EMERGENCY FEEDWATER SYSTEM

Introduction

On January 20, 1984, the Union of Concerned Scientists petitioned the Nuclear Regulatory Commission for an order suspending the operating license for Three Mile Island Nuclear Station Unit No. 1 (TMI-1) unless and until the plant's Emergency Feedwater (EFW) System complies with the NRC rules applicable to systems important to safety (including safety-grade, safety-related, and engineered safety feature systems). Union of Concerned Scientists' Petition for Show Cause Concerning TMI-1 Emergency feedwater System, January 20, 1984. The Commission declined to take jurisdiction and referred the petition to the NRC staff because "[t]he Commission does not believe the plant specific challenges raised in the UCS petition warrant direct Commission action in the first instance," Samuel J. Chilk, Secretary of the Commission, to Ellyn R. Weiss, General Counsel, UCS, April 24, 1984, p. 1.

On May 4, 1984, UCS received a copy of a letter dated April 25, 1984, sent to GPU Nuclear by the NRC staff which discloses, as UCS alleged, that vital components of the TMI-1 EFW system are not environmentally qualified as required by 10 CFR 50.49 and General Design Criterion 4 of Appendix A to 10 CFR Part 50. As discussed below, the information contained in the staff's letter is the basis for UCS supplementing the action requested in our original petition. Furthermore, since the additional relief requested is directed in part against the NRC staff, UCS requests that the Commission itself take jurisdiction in the first instance with regard to this supplement.

Discussion

On March 20-21, 1984, the NRC staff performed an audit of the environmental qualification files for TMI-1. According to the staff, "[t]he primary purpose of the audit was to review the environmental qualification documentation . . . for the emergency feedwater system." This is being done in order for the staff to prepare a response to the January 20, 1984, UCS Petition for Show Cause Concerning TMI-1 Emergency Feedwater System. The audit results were sent to the Commissioners and the parties to the TMI-1 restart proceeding as an enclosure to a one-page letter from John F. Stolz to Henry D. Hukill, April 25, 1984. A copy of the letter and its enclosure are attached. Because the cover letter transmitting the audit results is misleading and deceptive, and because there is no indication that the staff intends to properly follow-up the results of this audit, UCS believes it is necessary to put the results on the decisional record, to place them in perspective, and to supplement the relief requested in our January 20, 1984, Show Cause Petition.

The audit reviewed the environmental qualification documentation for eight component types, seven in the EFW system. Results of Electrical Equipment Environmental Qualification Audit, GPU Nuclear Corporation, Three Mile Island, Unit 1, Docket No. 50-289, (hereinafter "Audit Results"), p. 1. The cover letter from Mr. Stolz states:

In general, we believe that the files contain documentation that can be utilized to provide the basis for demonstrating that the EFW equipment is qualified, with one exception.

The innocent reader (or a busy Commissioner) might reasonably conclude from this that the audit turned up satisfactory documentation of environmental qualification in all but one case. The cover letter neglects to mention what is found only by reading the enclosed audit results: that in none of the eight files audited was the documentation in fact even close to adequate. It is a

feat of true Orwellian newspeak, if not an outright falsehood, to twist these remarkable negative results into the rosy conclusion offered in the cover letter. The equipment audited were not minor components. They included the emergency feedwater pumps, EPW system valves, electrical cables, terminal blocks, and flow transmitters (instruments).

To begin with, three widespread deficiencies were identified which apply "to all the files reviewed." First there was no evidence that GPU had reviewed the documentation or concluded that that the equipment is qualified. Second, 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." Third, the files specify neither the duration of time for which the equipment has been qualified nor the post-accident period of time for which it is required to function. Audit Results, p. 1.

These three deficiencies, which applied to every type of component audited, would be enough in themselves to lead one to conclude that GPU's claims that the equipment is environmentally qualified are without foundation. However, the specific component-by-component deficiencies are even worse.

For the motorized valve actuators in the EPW system which were audited, the file did not even document the motor manufacturer, the insulation class, and the current type despite the fact that the November 5, 1982, Technical Evaluation Report ("TER") for TMI-1, sent to GPU on December 10, 1982, specifically noted these omissions as deficiencies. Copies of the pertinent TER pages are enclosed. They clearly document that in 1982, GPU was told that it had failed to establish that the EPW valve actuators in TMI-1 were sufficiently similar to the components which had actually been tested so as to make reliance on the tests valid. GPU never submitted a justification for continued operation (JCO)

with these components; it simply continued to assert that they were qualified. However, over 15 months later, the documentation still does not exist to support these claims.

The TER prepared by Franklin Research Center concluded with respect to Equipment Item 15 (EPW system valves EF-VIA&B) as follows at page 5i:

C. The licensee has cited Limitorque reports B0027 and B0003 as evidence of qualification for this equipment item. Similarity has not been established between the installed equipment and the test specimens in either report. Several points should also be noted about the licensee's qualification package for this equipment item:

1. B0027 tested a class RH insulated MVA [motorized valve actuator] and the licensee has a class B insulated MVA installed. Because of this, B0027 cannot be used to demonstrate the functional capability of the installed equipment to withstand a temperature transient to the levels stipulated in the report.
2. The heat transfer analysis presented in B0027 could be applicable, however, B0027 tested a model SMB-00 which is of a different size and mass than the installed equipment [which is model SMB-000]. The licensee has not provided an analysis of these differences.

These precise deficiencies still exist.

Moreover, the staff audit of March 20-21 shows that the temperature profile used by GPU to claim qualification was less severe than would result from a break of the pipe which supplies steam to the turbine-driven pump. GPU has provided no justification for using a less severe environment. Again, this is not a newly-discovered deficiency. The 1982 TER found:

3. The licensee claims that the MVA temperature will not exceed 250F, the qualification level established in B0003 [the test report relied on]. The licensee has not provided an adequate technical rationale to support the statement made on page 3a. The data presented in B0027 [the second test report relied on] was for a specific size and mass MVA exposed to a specific temperature transient, all of which are different from the licensee's parameters. For the licensee to draw conclusions with no additional analysis is not valid. Other heat transfer analysis [sic] have been performed on this size MVA which show that an exposure to 350F for 60 sec. and 300F for 180 sec. results in a limit switch surface temperature of 291F. This heat transfer analysis more closely simulates the licensee's postulated

accident transient and indicates that the MVA temperature would rise above the level reported in B0003, which it should be noted again has not been demonstrated to be applicable to this equipment item because of similarity. Id. at 5i and 5j.

That fundamental deficiency still exists.

The sad truth is that, almost five years after IE Bulletin 79-013 required all licensees to document the environmental qualification of electrical safety equipment and 15 months after the TER was issued, GPU did not have documentation to adequately support that any of the eight types of components audited is environmentally qualified.

The next example is the two motor-driven emergency feedwater pumps, certainly basic components needed for decay heat removal following a postulated design basis accident -- and particularly important in the case of TMI-1 where the staff appears intent on supporting GPU's position that the turbine-driven EFW pump need not meet the Commission's rules prior to restart. See Safety Evaluation by the Office of Nuclear Reactor Regulation Supporting Director's Interim Decision Under 10 CFR 2.206 (Seismic Capability of Emergency Feedwater), April 27, 1984. The first deficiency noted by the staff is that the "file does not contain information to establish similarity between these motors and the motor, lead wires and insulation tested." Audit Results, p. 2. Indeed, GPU did not even seek such information until March 15, 1984! Once again, this precise problem was brought to GPU's attention in the 1982 TER:

The licensee has not provided evidence of similarity for the installed motors to the tested motors or insulation systems. TER, Equipment Item 51, p. 5f.

In fact, the environmental qualification deficiencies of the TMI-1 EFW pump motors were identified much earlier in the staff's "Partial Review, Equipment Qualification Report by the Office of Nuclear Reactor Regulation" (hereinafter, "1981 Review") for TMI-1, transmitted to GPU by letter from

Thomas M. Novak to H. D. Hukill, February 25, 1981. See 1981 Review at B-2, motors EF-P2A and EF-P2B. The staff's February 25, 1981, letter directed GPU to "provide within 10 days of receipt of this letter, a written statement, signed under oath or affirmation supporting the safe operation of your facility, that takes into account the NRC staff's preliminary list of deficiencies."

The sum total of GPU's response to this was a letter dated March 12, 1981, from H. D. Hukill to T. M. Novak which stated in its entirety:

This letter is in response to your request of February 25, 1981 regarding environmental qualification of electrical equipment. Our staff has reviewed the preliminary list of deficiencies set forth in your letter of February 25, 1981, taking into account the information contained in our submittals of October 31, 1980 and January 30, 1981. Based on our review of these submittals and the planned activities underway for the restart of TMI-1, there will be adequate assurance that TMI-1 will operate safely following authorization for restart.

Based upon this entirely conclusory letter, the staff wrote a safety evaluation report which stated that GPU had "completed a preliminary review review of the identified deficiencies and has determined that, after due consideration of the deficiencies and their ramifications, continued safe operation would not be adversely affected." TMI Restart Hearing, Tr. 21,966-7. The fact is that the staff had then no basis for judging whether GPU's sweeping, unsupported claims were true and, even worse, now has facts that GPU's claims were and continue to be false.

The list of fundamental deficiencies disclosed by the recent staff audit goes on and on. For example, the files for electrical cable contain "no documentation to establish similarity between the cables tested and those installed." Audit Results, pp. 2, 3. No qualified life for the cables has been established. Id. at 3. We will not go into the deficiencies in each

component type in detail; a copy of the Audit Results is enclosed. They establish beyond reasonable question that the files do not establish the qualification of any of the components.

Under these circumstances, Mr. Stolz's assertion that the "files contain documentation that can be utilized to provide the basis for demonstrating that the EPW equipment is qualified," is at best a deceptive semantic circumlocution and at worst a patent falsehood.

In addition, the Commission should be aware that TMI-1 was one of the plants which the staff assured you had no environmental qualification deficiencies as of June 30, 1982 -- that each component had either been demonstrated to be environmentally qualified or a valid justification for continued operation (JCO) had been provided. On the contrary, for the components audited by the staff, no JCOs were provided and qualification is still not established. Despite the staff's 1982 assurance to the Commission that there were no environmental qualification problems at TMI-1, the staff had to request an extension of time to respond the environmental qualification aspects of UCS's Show Cause Petition, which the Commission granted.

Moreover, although the staff recommended restart of TMI-1 on December 5, 1983, when the staff began belatedly to pursue this issue in order to respond to UCS's Show Cause Petition, it informed GPU that its "principal concern with the petition would be at time of restart will the plant meet the existing regulations?" Transcript of March 9, 1984, Meeting with GPU, TMI-1 Environmental Qualifications, p. 142. During that meeting, GPU solemnly assured the staff that the environmental qualification files had undergone an "independent" review by GPU quality assurance personnel and that they fully supported GPU's claims of qualification.

MR. LE [NRC]: Any deficiency identified in this [TER], page by page, we expect that you have answer to those deficiencies. When the inspector goes out there, the TER will serve as a guide to inspect.

MR. MAUS [GPU]: That has been our premise. That is what we tried to do, to be sure we had the information in the file.

MR. LE: Did you make that commitment? If you made that commitment, then we will proceed.

MR. MAUS: We even had a trial assessment on our file by our own QA to make sure that this kind of information is in there. We had independent verification if you will.

MR. HARDING [GPU]: I am not sure how independent.

MR. MAUS: It is independent, believe me. We even had a trial run to make sure. We might say yes, we have it, but we are prejudiced so we let somebody else take a look at it, saying hey, do they really have it. Okay?

Id., pp. 25-26.

It is now manifest that GPU either lacks the competence to evaluate environmental qualification or is untruthful. (Indeed, since the "independent review" was done by GPU quality assurance personnel, we must question their competence or integrity.) As recently as February 24, 1984, GPU stated that it had "responded to the outstanding concerns" raised in the environmental qualification review. Licensee's Response to Union of Concerned Scientists' Petition for Show Cause Concerning TMI-1 Emergency Feedwater System, p. 17. The Audit Results demonstrate that they have not done so; the same deficiencies identified by the NRC's contractor in 1982 are still outstanding. See also, GPU Nuclear Technical Response to Union of Concerned Scientists' Petition for Show Cause Concerning TMI-1 Emergency Feedwater System, February 24, 1984, signed under oath by Richard F. Wilson, Vice President for Technical Functions, who claims that GPU "documented the resolution of outstanding qualification items...." Id., p. 4, emphasis added. These assertions were not withdrawn in the two subsequent "revised" responses to UCS's petition filed by GPU, the

latest being dated April 26, 1984, one month after the staff's audit. In either case, whether rooted in ineptness or dishonesty, GPU's claims are utterly untrustworthy and there is thus no basis for concluding that vital safety equipment in the emergency feedwater or any other safety system is either environmentally qualified or that a valid justification for continued operation has been provided.

The final question is where the NRC proceeds from here. Despite the facts that all eight of the eight component files audited were deficient in fundamental ways, and that the Staff has concluded that the audit comments are "generally applicable to all TMI-1 environmental qualification files" (letter from Stoiz to Nukill, April 25, 1984), the staff apparently has no plans to go further. It directs GPU to respond only to the specific items audited. Although it is suggested that GPU "consider" the broader implications, no response is required. This makes a mockery of the "audit" method of regulation. When an audit of only a small fraction of safety equipment shows 100% non-compliance, the staff surely cannot continue to operate as if everything not audited is in compliance. Suggesting that GPU "consider" the incredible implications of this audit is hardly sufficient. The NRC must have a rational basis for concluding that operation of TMI-1 would be safe; that it manifestly does not have.

Relief Requested

The information contained in the Audit Results and discussed herein provides compelling support for UCS's Show Cause Petition. There is not reasonable assurance that the TMI-1 emergency feedwater system would function in circumstances when it is needed for decay heat removal.

Perhaps the most disturbing aspect of this situation is that CPU, with the NRC staff's support, claimed that all of these components were fully qualified (or had a valid justification for continued operation) and that the documentation to prove it was in GPU's files. If UCS had not filed a Show Cause Petition, the staff might never have discovered otherwise, and certainly not prior to restart. How can the Commission have any confidence in the accuracy of the assertions made by its own regulatory staff when it is apparent that the staff has simply been echoing the unsupported assertions of GPU? One is forced to conclude that the regulatory process is institutionally unable to cope with an intransigent or incompetent licensee. As Chairman Palladino has remarked, quality cannot be regulated in, it must be built in. The sorry situation at TMI-1 provides a dramatic illustration of the reason why management competence and integrity are such crucial requirements for a nuclear licensee. It is ironic that at this moment, with GPU's competence and integrity one of the central issues in question in the restart proceeding, the staff has given no indication that it perceives the connection between its Audit Results and that issue, much less that it intends to take the appropriate action.

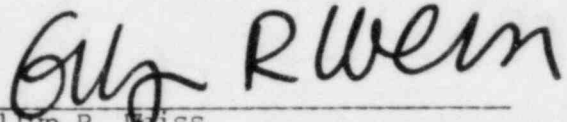
It is UCS's position that the facts described herein call for the following relief (in addition to that requested in our January 20, 1984 Show Cause Petition):

1. As a precondition to restart, the staff should be directed to independently verify that documentation exists and that it is technically sufficient to demonstrate environmental qualification of each and every electrical component in the emergency feedwater system and in every other system required for proper operation of the emergency feedwater system.

2. The Office of Investigations should be directed to immediately investigate whether GPU has made material false statements to NRC in connection with the environmental qualification program. Because this issue bears directly on GPU's competence and integrity, the investigation should be completed before a vote on restart.

3. The Office of Inspector and Auditor should be directed to investigate and determine whether the NRC staff has provided false or misleading information to the Boards or to the Commission, or has been derelict in its duty in connection with the issue of environmental qualification in TMI-1.

Submitted by,

A handwritten signature in black ink, appearing to read "Elyn R. Weiss". The signature is written in a cursive, flowing style.

Elyn R. Weiss
General Counsel
Union of Concerned Scientists

Harmon, Weiss & Jordan
2001 S Street, N.W., Suite 430
Washington, DC 20009

Dated: May 9, 1984



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

April 25, 1984

Docket No. 50-289

Mr. Henry D. Hukill, Vice President
and Director - TMI-1
GPU Nuclear Corporation
P. O. Box 480
Middletown, Pennsylvania 17057

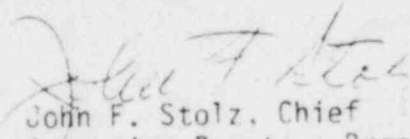
Dear Mr. Hukill:

As you know, the NRC staff and a consultant audited the Three Mile Island, Unit 1 (TMI-1) electrical equipment environmental qualification files on March 20-21, 1984. The primary purpose of the audit was to review the environmental qualification documentation relied upon to demonstrate qualification of electrical equipment within the scope of 10 CFR 50.49 for the emergency feedwater (EFW) system.

In general, we believe that the files contain documentation that can be utilized to provide the basis for demonstrating that the EFW equipment is qualified, with one exception. The exception, the Square D Diodes, is further discussed in enclosure (1) which contains our detailed audit comments. Most of these detailed comments were provided to GPU staff during the audit or at the exit interview. We believe that the comments pertaining to the EFW system should be expeditiously resolved. Therefore, we request that you provide a detailed submittal addressing your disposition of all comments pertaining to the EFW system within 14 days of receipt of this letter.

Although the audit focused specifically on the EFW system, we believe the audit comments to be generally applicable to all TMI-1 environmental qualification files. You should consider them accordingly.

Sincerely,


John F. Stolz, Chief
Operating Reactors Branch #4
Division of Licensing

Enclosure:
TMI-1 EQ Audit Comments

cc w/enclosure:
See next page

Results of Electrical Equipment
Environmental Qualification Audit
GPU Nuclear Corporation
Three Mile Island, Unit 1
Docket No. 50-289

On March 20 and 21, 1984, the NRC staff and a consultant from EG&G, Idaho, audited the electrical equipment environmental qualification files for Three Mile Island, Unit 1. The primary purpose of the audit was to review the environmental qualification documentation relied upon to demonstrate qualification of electrical equipment within the scope of 10 CFR 50.49 that is associated with the Emergency Feedwater (EFW) System. A total of seven files containing EFW equipment qualification documentation were reviewed. One additional file for equipment not associated with the EFW system was reviewed.

During the course of the audit, the staff and its consultant asked questions of and provided comments to GPU concerning the files and documentation reviewed. Some of the comments are applicable to all the files the staff and its consultant audited, and are very likely to be applicable to all GPU EQ files. In addition, comments on the specific files audited may also be applicable to many other files. Therefore, GPU should review all EQ files and update them, as necessary, in accordance with the comments identified below. The comments made by the staff and its consultant which are applicable to all the files reviewed are listed first, followed by the comments made on specific equipment files.

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.
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.
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.

Limitorque Motorized Valve Actuators

EF-V1A&B, Model SMB-000, TER Item No. 15

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

- 1000
1. The file should document the motor manufacturer, insulation class and current type for each actuator to establish applicability of the EQ documentation.
 2. The temperature profile used to evaluate the qualification of the actuators is a time history following a main steam line break for evaluation 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.
 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.)

Westinghouse Pumps

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

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.
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.

Continental Wire and Cable Co. Cable

TER Item No. 107

1. The file contains no documentation to establish similarity between the cables tested and those installed. The file 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.

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

Kerite Cable

TER Item No. 106

Same two comments made for Continental Wire and Cable Co. Cable.

Square D Diode

Model JTXIN6071A, TER Item No. 116

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.

States Terminal Block

Model NT, TER Item No. 110

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.

Foxboro Transmitters

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

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.

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

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

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

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.
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 Q0AAC012 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.



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NRC Contract No. NRC-03-79-118
FRC Project No. C5257
FRC Assignment No. 13
FRC Task No. 492

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1a

EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 15

EQUIPMENT ITEM NO. 15
MOTORIZED VALVE ACTUATOR LOCATED IN THE INTERMEDIATE BUILDING
LIMITORQUE MODEL SMB000 WITH CLASS B INSULATION
REQUIRED OPERATING TIME: CONTINUOUS
TER CHECKSHEET NO. 15
LICENSEE REFERENCE(S): 662, 2876
FUNCTION (PLANT ID): EMERGENCY FEEDWATER PUMP SUCTION LOFW/MSLB MITIGATION
(EF-V-1A, 1B)
LICENSEE SUBMITTAL: SCEW(S): 3, 4 OF 30

DESIGNATION FOR DEFICIENCY IDENTIFIED BY THE NRC SER - CIRCLED ITEM(S) ONLY:
(See Section 3 of this TER for Legend)

R, (T), QT, RT, P, H, CS, (A), S, (R), M, I, QM, RPN, EXN, SEN, QI, RPS, None,

Not stated, Not applicable

LISTING OF APPLICABLE CHECKSHEETS:

<u>Contents</u>	<u>Checksheet Page No.</u>
Equipment Item	1a
Summary of Licensee Responses to the NRC SER	1b
Equipment Environmental Qualification Summary Forms	2
Licensee Response to NRC SER	3a, 3b, 3c, 3d
System Consideration Review	4a, 4b, 4c, 4d, 4e, 4f
Equipment Environmental Qualification Review	5a, 5b, 5c, 5d, 5e, 5f, 5g, 5h, 5i, 5j
Installed TMI Lessons Learned Implementation Equipment Summary	6a, 6b
Maintenance and Replacement Schedule Summary	7a, 7b, 7c



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NRC Contract No. NRC-03-79-118
FRC Project No. C5257
FRC Assignment No. 13
FRC Task No. 492

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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 15

SUMMARY OF LICENSEE RESPONSES TO THE NRC SER - ONLY CHECKED ITEMS ARE APPLICABLE:

- ☒ The Licensee (has/~~has not~~) provided a response to the SER concerns.
- ☒ The Licensee (~~has~~/has not) specifically stated that the equipment is qualified and/or will function when exposed to the applicable DBE environmental service conditions.
- ☒ The Licensee has presented information which shows there are no outstanding qualification deficiencies.
- ☐ The Licensee (has/has not) proposed a corrective action for this equipment item whose qualification has not been fully established.
- ☐ Justification for interim operation (has/has not) been provided by the Licensee for this equipment item.
- ☐ Corrective action specified by the Licensee:
- ☐ Equipment replacement with qualified equipment
 - ☐ Equipment modification
 - ☐ Equipment relocation above submergence level
 - ☐ Relocate or shield equipment from radiation source
 - ☐ Verify qualification by additional (testing/analysis)
 - ☐ Equipment relocation to a mild environment
 - ☐ Qualification testing of equipment in progress
 - ☐ Other (_____)
- ☐ The Licensee has provided other information for this equipment item that can be construed as a basis for justification for interim operation.
- ☐ The Licensee (has/has not) provided a schedule for the proposed corrective action. (Schedule for accomplishing the corrective action _____.)
- ☐ The Licensee states that the equipment item does not require qualification and/or should be exempted from environmental qualification.

DESIGNATION OF RESULTANT NRC QUALIFICATION EVALUATION CATEGORY BASED ON REVIEW - CIRCLED ITEM ONLY: (See Section 3 of this TER for Legend)

- | | |
|---|--------------------------------|
| I.a Qualified | II.c Qualified Life Deficiency |
| I.b Modification | III.a Exempt |
| <u>II.a Qualification Not Established</u> | III.b Not in Scope |
| II.b Not Qualified | IV Documentation Not Available |



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 15

EQUIPMENT ENVIRONMENTAL QUALIFICATION SUMMARY FORM

NRC REQUIREMENTS

DESIGNATION:
X = DEFICIENCY

Documented Evidence of Qualification Adequate	<u>X</u>
Adequate Similarity Between Equipment and Test Specimen Established	<u>X</u>
Aging Degradation Evaluated Adequately	<u>X</u>
Qualified Life or Replacement Schedule Established (If Required)	<u>X</u>
Program Established to Identify Aging Degradation	<u> </u>
Criteria Regarding Aging Simulation Satisfied (If Required)	<u> </u>
Criteria Regarding Temperature/Pressure Exposure:	<u> </u>
o Peak Temperature Adequate	<u>X</u>
o Peak Pressure Adequate	<u> </u>
o Duration Adequate	<u> </u>
o Required Profile Enveloped Adequately	<u> </u>
o Steam Exposure (If Required) Adequate	<u> </u>
Criteria Regarding Spray Satisfied	<u> </u>
Criteria Regarding Submergence Satisfied	<u> </u>
Criteria Regarding Radiation Satisfied	<u> </u>
Criteria Regarding Test Sequence Satisfied	<u> </u>
Criteria Regarding Test Failures or Severe Anomalies	<u> </u>
(If Any) Satisfied	<u> </u>
Criteria Regarding Functional Testing Satisfied	<u> </u>
Criteria Regarding Instrument Accuracy Satisfied	<u> </u>
Test Duration Margin (1 hour + Function Time) Satisfied	<u> </u>
Criteria Regarding Margins Satisfied (NUREG-0588, Cat. I)	<u> </u>

NRC QUALIFICATION CATEGORY

DESIGNATION:
X = CATEGORY

I.a	Equipment Qualified	<u> </u>
I.b	Equipment Qualification Pending Modification	<u> </u>
II.a	Equipment Qualification Not Established	<u>X</u>
II.b	Equipment Not Qualified	<u> </u>
II.c	Equipment Satisfies All Requirements Except Qualified Life	<u> </u>
	or Replacement Schedule Justified	<u> </u>
III.a	Equipment Exempt From Qualification	<u> </u>
III.b	Equipment Not in the Scope of the Qualification Review	<u> </u>
IV	Documentation Not Made Available	<u> </u>

See Evaluation on Page 5f.



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 15

ELECTRICAL COMPONENT EVALUATION

Assessment:

- This Limitorque valve motor operator was not tested to the postulated temperature for the accident environment, however, as shown in Limitorque Report No. 8-0027, Limitorque motor housings have sufficient thermal inertia to withstand 117°F for 20 seconds followed by a gradual decline to 250°F after approximately 500 seconds and a further decline to 200°F in about 1 hour without allowing the temperature of the motor and internals to exceed 250°F. This particular type operator was tested to 250°F for 22.5 hours. Therefore, this operator will function properly in the postulated temperature environment to complete its safety function with the operating time specified.

Safety Impact:

- None.



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 15

NOTES:

"X" DENOTES APPROPRIATE NOTES

- X 1. The Licensee has not provided documentation from the manufacturer which establishes similarity between the installed equipment and the test specimen in the referenced document(s). (NOTE A, C)
- _____ 2. The Licensee has not identified the class of the insulation system used for the motor in the motorized valve actuator.
- _____ 3. The Licensee has not identified whether or not this motorized valve actuator incorporates a motor-brake assembly.
- _____ 4. The Licensee has not identified the class of the insulation system used for the motor-brake assembly (if applicable).
- X 5. The Licensee has not identified the motor manufacturer for this motorized valve actuator.
- _____ 6. The Licensee has not identified the manufacturer of the motor-brake assembly (if applicable).
- X 7. The Licensee has not identified the type of current used in the motorized valve actuator.
- _____ 8. The Licensee has not identified the type of current used in the motor-brake assembly (if applicable).
- X 9. The Licensee has not established a qualified life estimate for this motorized valve actuator based on technically justifiable methods and conservative assumptions. (NOTE B)
- _____ 10. The Licensee has stated that the only harsh parameter that this motorized valve actuator is exposed to is radiation.
- _____ 11. Since radiation is stated to be the only harsh parameter and considering the extensive radiation testing of the motors used in this type of motorized valve actuator, the specified radiation dose of _____ is considered to be of sufficiently low value as to not affect this equipment item. This equipment item is considered qualified for this parameter.
- _____ 12. The Licensee has committed to replace this equipment item. The Licensee has stated the following:



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 15

NOTES:

A. The licensee has submitted two letters from Limitorque to EDS which were not referenced on the System Component Evaluation Worksheets (SCEWs).

These letters were dated: 12-10-80 (PSR # 21) and 1-7-81 (in PSR # 7).

Neither of these letters however establishes the necessary similarity for this equipment item. In PSR # 7, Attachment #1, the licensee has listed the following documents which were neither submitted or referenced on the SCEWs. The one exception to this being Limitorque Test Report B0027.

Limitorque

Limitorque Test Report B-0027

EDS Letter to Limitorque, dated 1/26/81

EDS Letter to Limitorque, dated 2/24/81

ROC, Limitorque and EDS, dated 3/10/81

Limitorque Letter to EDS, dated 3/11/81

Limitorque Letter to EDS, dated 4/1/81

Telex from Limitorque to EDS, dated 5/12/81

ROC, Limitorque and EDS, dated 5/12/81

ROC, Limitorque and EDS, dated 6/2/81

EDS Letter to Limitorque, dated 6/5/81

ROC, Limitorque and EDS, dated 6/10/81

EDS Letter to Limitorque, dated 6/18/81

Because these documents were not submitted, their applicability or importance to the review cannot be determined.

The licensee has also referenced a letter dated 8-12-80 from Limitorque to EDS. This document was not submitted.



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 15

NOTES:

B. The licensee has not provided any technical basis to support the claim of a 40 year qualified life. If this equipment item is similar to the test specimens in the referenced report(s), it should be noted that the actual accelerated thermal aging that was performed does not simulate 40 years. Also, from the log-life data provided in PGR # 659, it is not clear whether the activation energy (or the constants in the log-life equation) is only for the motor insulation (i.e. varnish) or for the entire motor insulation system (i.e. varnish, motor lead insulation...). The licensee should investigate this issue with the manufacturer and address the thermal aging of any other organic materials identified.



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 15

NOTES:

C. The licensee has cited Limitorque reports B0027 and B0003 as evidence of qualification for this equipment item. Similarity has not been established between the installed equipment and the test specimens in either report. Several points should also be noted about the licensee's qualification package for this equipment item:

1. B0027 tested a class RH insulated MVA and the licensee has a class B insulated MVA installed. Because of this, B0027 cannot be used to demonstrate the functional capability of the installed equipment to withstand a temperature transient to the levels stipulated in the report.
2. The heat transfer analysis presented in B0027 could be applicable, however, B0027 tested a model SMB-00 which is of a different size and mass than the installed equipment. The licensee has not provided an analysis of these differences.
3. The licensee claims that the MVA temperature will not exceed 250F, the qualification level established in B0003. The licensee has not provided an adequate technical rationale to support the statement made on page 3a. The data presented in B0027 was for a specific size and mass MVA exposed to a specific temperature transient, all of which are different from the licensee's parameters. For the licensee to draw conclusions with no additional analysis is not valid. Other heat transfer analysis have been performed on this size MVA which show that an exposure to 350F for 60 sec. and 300F for 180 sec. results in a limit switch surface temperature of 291F. This heat transfer analysis more closely simulates the licensee's postulated accident



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EQUIPMENT ENVIRONMENTAL QUALIFICATION REVIEW OF EQUIPMENT ITEM NO. 15

NOTES:

transient and indicates that the MVA temperature would rise above the level
reported in B0003, which it should be noted again has not been determined to
be applicable to this equipment item because of similarity.

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CERTIFICATE OF SERVICE

I hereby certify that copies of "Supplement to Union of Concerned Scientists' Petition for Show Cause Concerning TMI-1 Emergency Feedwater System" have been served on the following persons by hand delivery to 1717 H Street, N.W., Washington, D.C., or where indicated by an asterisk, by deposit in the United States mail, first class postage prepaid, this 9th day of May 1984.

Nunzio Palladino, Chairman
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Victor Gilinsky, Commissioner
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

James Asselstine, Commissioner
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Frederick Bernthal, Commissioner
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