



September 26, 1984

POLICY ISSUE
(Commission Meeting)

SECY-84-378

For: The Commissioners

From: William J. Dircks
Executive Director for Operations

Subject: THREE MILE ISLAND, UNIT 1 (TMI-1) - DIRECTOR'S DECISION
ON THE UNION OF CONCERNED SCIENTISTS' 10 CFR 2.206 PETITION
ON THE EMERGENCY FEEDWATER SYSTEM

Purpose: To advise the Commission that the Director, Office of Nuclear Reactor Regulation has issued a final decision regarding the Union of Concerned Scientists' (UCS) 10 CFR 2.206 petition on the TMI-1 emergency feedwater (EFW) system and to highlight certain aspects of that decision.

Background: By petition dated January 20, 1984, UCS identified five alleged deficiencies with the TMI-1 EFW system which it sought to have resolved prior to the resumption of power operation. The petitioner also contended that, when considered in the aggregate, the deficiencies it had identified with the EFW system compromised that system's reliability. One of the alleged deficiencies pertained to environmental qualification of the EFW system. By supplemental petition dated May 9, 1984, UCS requested additional relief regarding environmental qualification. The specific additional relief requested was (1) independent staff verification of the existence and technical sufficiency of licensee's environmental qualification documentation for the EFW system and other components required for proper operation of the EFW system, (2) an investigation by OI, to be completed before a vote on restart, into whether licensee has made material false statements in connection with the environmental qualification program, and (3) an investigation by the Office of Inspector and Auditor (OIA) into whether the NRC staff has provided false or misleading environmental qualification information to the Boards or the Commission, or has been "derelict in its duty in connection with the issue of environmental qualification in TMI-1."

In an interim decision dated April 27, 1984 (DD-84-12 19 NRC 1128), the Director, Office of Nuclear Reactor Regulation, tentatively denied the UCS request with respect to four of the five allegations raised in the original petition, and deferred

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resolution of the fifth issue, environmental qualification, pending further staff review.

Discussion: The enclosed Director's decision (DD-84-22) resolves the remaining issues raised in the January petition regarding environmental qualification of the TMI-1 EFW system and aggregate deficiencies, and otherwise concludes the staff activity on the items of additional relief from the supplemental petition. As requested by the Commission, the decision also provides UCS with the information it requested in a letter dated February 13, 1984 addressed to the Commission. Among its other findings, the decision concludes that the TMI-1 EFW system is environmentally qualified and therefore denies the relief requested in the original petition. The Director's decision also describes the staff's actions regarding the requests for additional relief from the supplemental petition. These items of additional relief have been substantially satisfied, as described below.

The supplemental petition requested that OI investigate whether licensee has made material false statements concerning environmental qualification and that the investigation be completed before a vote on restart. Upon review, the staff has identified what it believes to be invalid licensee statements. This information has been provided to OI and OI has agreed to perform a preliminary evaluation to determine whether a full scale investigation is warranted. Consequently, the staff has satisfied the UCS request to the extent that it has referred the matter to OI. The question of whether any resulting investigation must be completed before a vote on restart can only be addressed after OI completes its preliminary evaluation. The staff assumes, therefore, that OI will complete its preliminary evaluation on a timely schedule that would preserve the option of considering any subsequent investigation results prior to a restart decision.

The supplemental petition also requested that OIA investigate whether the staff has made false or misleading environmental qualification statements to the Boards or the Commission or has been "derelict in its duty." The staff has substantially satisfied this request to the extent that the supplemental petition has been referred to OIA.

An additional item of note is that during the staff review of environmental qualification of the EFW system, the staff identified a number of programmatic deficiencies in the licensee's environmental qualification program. These deficiencies extend beyond the EFW system and pertain to the licensee's overall program for achieving compliance with 10 CFR 50.49. The licensee has now corrected these deficiencies for the EFW system and is working on the remainder of the systems. The staff is continuing its 10 CFR 50.49 environmental qualification review for TMI-1 on an expedited basis to determine whether further action is necessary. This review will include additional auditing of licensee's environmental qualification files.

The staff is also continuing its review of environmental qualification for radiation for certain systems and components as set forth by CLI-84-11. The staff audited the appropriate licensee files on September 6 - 7, 1984, and is currently awaiting licensees resolution of certain issues prior to making the required certification.



William J. Dircks
Executive Director for Operations

Enclosure:
Director's Decision Under
10 CFR 2.206 (DD-84-22)

This paper is tentatively scheduled for discussion at an Open Meeting on Tuesday, October 2, 1984. Please refer to the appropriate Weekly Commission Schedule, when published, for a specific date and time.

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555
September 25, 1984

Docket No. 50-289
(10 CFR 2.206)

Ellyn R. Weiss, Esq.
Harmon, Weiss & Jordan
20001 S Street, N.W., Suite 430
Washington, D.C. 20009

Dear Ms. Weiss:

This is in response to your petition of January 20, 1984, as supplemented on May 9, 1984 requesting that show cause or further enforcement proceedings be initiated, and the staff take certain actions, with respect to the Three Mile Island Nuclear Station, Unit 1 Emergency Feedwater System. For the reasons set forth in the enclosed "Director's Decision Under 10 CFR 2.206", DD-84-22, your request to initiate such proceedings is denied. As described in the decision, the staff has substantially satisfied the requests made in your supplemental petition seeking certification of the environmental qualification of EFW system components and initiation of an investigation by the NRC Office of Investigations. As requested by the Commission, the decision also provides the information you requested in your letter of February 13, 1984 addressed to the Commissioners.

A copy of this decision will be referred to the Secretary for the Commission's review in accordance with 10 CFR 2.206(c). I have also enclosed for your information a copy of the notice that is being filed with the Office of the Federal Register.

Sincerely,

A handwritten signature in dark ink, appearing to read "HR Denton".

Harold R. Denton, Director
Office of Nuclear Reactor Regulation

Enclosures:

1. Director's Decision
2. Federal Register Notice
3. Safety Evaluation

cc:

H.D. Hukill
GPU Nuclear Corp.
Thomas A. Baxter, Esq.
Shaw, Pittman, Potts & Trowbridge

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

OFFICE OF NUCLEAR REACTOR REGULATION
Harold R. Denton, Director

In the Matter of)	
)	Docket No. 50-289
GPU NUCLEAR CORPORATION)	
)	(10 CFR 2.206)
(Three Mile Island Nuclear Station, Unit 1))	

DIRECTOR'S DECISION UNDER 10 CFR 2.206

I. INTRODUCTION

In a petition dated January 20, 1984, the Union of Concerned Scientists (hereinafter referred to as UCS or petitioner) identified five alleged deficiencies with the Three Mile Island Nuclear Station, Unit 1 (TMI-1) Emergency Feedwater (EFW) system which it sought to have resolved prior to resumption of power operation at the facility.¹ In addition, the petitioner contended that in the aggregate, the deficiencies it had identified with the EFW system compromised that system's reliability. In an "Interim Director's Decision Under 10 CFR 2.206", DD-84-12, 19 NRC 1128, issued on April 27, 1984, the staff tentatively resolved four of the five issues raised by petitioner, and deferred resolution of the fifth issue, concerning environmental qualification

¹ UCS identified the following deficiencies with the EFW system in its January 20, 1984 petition:

1. failure of the EFW system to be environmentally qualified
2. failure of the EFW system to be seismically qualified
3. inability of the EFW system to withstand a single component failure
4. inaccuracy of the EFW flow instruments
5. inadequacy of the Main Steam Line Rupture Detection System

See Petition at 1; DD-84-12 at 1.

of the EFW system, as well as the aggregate deficiency issue, pending further review by the staff. Concurrent with issuance of the interim decision, the Commission requested that the staff provide three categories of information requested by UCS in a letter of February 13, 1984, to the Commissioners. In addition, the petitioner filed a supplemental petition on May 9, 1984 based on the results of an NRC audit of the licensee's environmental qualification records. UCS specifically requested that the Commission: 1) direct the staff to independently verify the existence and technical sufficiency of the licensee's environmental qualification documentation for all electrical components in the EFW system and all other systems required for proper operation of the EFW system; 2) direct the NRC Office of Investigations (OI) to investigate whether the licensee made material false statements to the NRC in connection with the environmental qualification program; and 3) direct the NRC Office of Inspector and Auditor (OIA) to investigate whether the staff provided false or misleading information to the Boards or Commission, or has been "derelict in its duty" with respect to the environmental qualification program at TMI-1. The supplemental petition was referred to the staff for treatment as part of the pending petition. The licensee amended its February 24, 1984 response to the January petition by submittals dated March 26, April 26, May 16, and May 31, 1984. The licensee similarly responded to the supplemental petition pursuant to the staff's request under 10 CFR 50.54(f) on June 11, 1984.

The staff has now completed its review of all alleged EFW system deficiencies cited in the petition and the matters identified in the supplemental petition. Accordingly, this decision: (1) updates with respect to seismic qualification, and otherwise affirms the interim Director's Decision; (2) provides the staff's basis for denying the petition with respect to the environmental qualification and "aggregate" deficiency issues raised by UCS; (3) describes the staff's disposition of the items of additional relief requested in the supplemental petition, and (4) provides the information requested by UCS in its letter of February 13, 1984.

II. INTERIM DIRECTOR'S DECISION

The interim Director's Decision provided the staff's review for three of the five issues identified by the petitioner with respect to the TMI-1 EFW system: (1) the failure of the EFW system to be seismically qualified, (2) the inability of the EFW system to withstand a single component failure, and (3) the inadequacy of the Main Steam Line Rupture Detection System (MSLRDS).² For each of these alleged deficiencies the staff concluded,

² As explained in the interim decision, I declined to consider the petitioner's request with respect to the accuracy of EFW flow instrumentation, as that issue had been fully explored in the TMI-1 restart proceeding. See DD-84-12, 19 NRC at 1130-31. Moreover, the precise issue raised by the petitioner, EFW flow instrumentation accuracy, was the subject of responses filed before the Commission, as well as a Board Notification within the context of the restart proceeding. Subsequent to issuance of the interim Director's Decision, the Commission issued its decision on TMI-1 Restart proceeding design issues. See Metropolitan Edison Company (Three Mile Island, Unit 1), CLI 84-11, NRC (July 25, 1984). That decision was silent with respect to the flow indicators, leaving undisturbed the staff's determination, as expressed in Board Notification 84-088, that the existing TMI-1 EFW flow instruments were acceptable. See also DD 84-12, 19 NRC at 1130-31.

for reasons set forth in the interim decision, that the requested action was not warranted at that time. Upon further consideration, the staff's view with respect to these issues remains as stated in the interim decision. In this regard, no new information pertaining to the alleged single component failure and MSLRDS deficiencies has been identified since the time of issuance of the interim decision which would persuade me to reach conclusions different from those expressed in DD-84-12.

New information has, however, developed regarding the seismic capability of the EFW system. This new information, described below, generally pertains to assuring operator access to the intermediate building for required manual actions for the interim period of operation until system upgrades are complete, and provides additional support for the previous findings in this area.

Seismic Qualification of the Emergency Feedwater System

The licensee plans to perform a number of modifications to, among other things, upgrade the seismic capability of the EFW system during the first refueling outage following restart.³ Upon completion of these modifications, the TMI-1 EFW system will be capable of totally remote operation following a safe shutdown earthquake (SSE), even if that SSE should lead to an intermediate building harsh environment due to a postulated failure of any non-seismically qualified high energy line. To assure EFW system operability following an SSE in the interim, the licensee, if necessary, would dispatch an operator to the intermediate building to perform local manual actions.⁴

³ See Letter from H. D. Hukill (GPU) to J. F. Stolz (NRC) (August 23, 1983); Letter from R. F. Wilson (GPU) to D. G. Eisenhut (NRC) (May 10, 1984); Summary of April 27, 1984 meeting with GPU Nuclear regarding the Three Mile Island, Unit 1 Emergency Feedwater System (May 2, 1984).

⁴ 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), Three Mile Island Nuclear Station, Unit No. 1 (April 27, 1984).

The petition alleges, among other things, that operator access to the intermediate building may not be possible following an SSE because of a harsh environment created by the postulated failure of non-seismically qualified intermediate building systems.

Petitioner specifically postulated the failure of non-seismically qualified vent stacks from safety relief valves (MSV-22A, B) and atmospheric dump valves (MSV-4A, B). Failure of these vent stacks while steam is flowing through them could result in an intermediate building harsh environment that would prevent operator access. The staff addressed this matter in the interim Director's Decision and concluded, based primarily on probabilistic arguments, that reasonable assurance existed that intermediate building local manual actions would not be precluded because of a harsh environment resulting from vent stack failure following an SSE for the interim period of operation until system upgrades are complete. See DD-84-12, 19 NRC at 1132 (referencing Safety Evaluation of the Office of Nuclear Reactor Regulation Supporting Interim Director's Decision Under 10 CFR 2.206 (Seismic Capability of Emergency Feedwater)). However, in a meeting with the staff on April 27, 1984, the day of issuance of the interim Director's Decision, and in its third amended response to the petition, the licensee committed to install seismically qualified restraints on those vent stacks prior to any restart, thus eliminating any possible concern regarding vent stack failure following a seismic event and the possible resultant intermediate building harsh environment.⁵

⁵ See Summary of April 27, 1984 meeting with GPU Nuclear regarding the Three Mile Island, Unit 1 Emergency Feedwater System, (May 2, 1984); Licensee's Amended Response to Union of Concerned Scientist's Petition For Show Cause Concerning TMI-1 Emergency Feedwater System (May 16, 1984).

Prior to this commitment, the licensee had planned for the vent stack modification to be completed during the Cycle 6 refueling outage. In addition, the licensee committed to upgrade the supports for the EFW pump recirculation lines to seismic class I prior to restart. This modification had previously been scheduled for completion during the Cycle 6 refueling outage. See id.

The licensee has since completed installation of these seismic restraints and the modification has been inspected and found acceptable by NRC regional inspectors. See Inspection Report 50-289/84-22.

Since the petition addressed only the potential failure of the non-seismically qualified vent stacks, the interim decision was directed only to this occurrence. However, there are other non-seismically qualified intermediate building systems whose failure following an SSE could result in a harsh environment. Since the issuance of the interim Director's Decision, the staff has continued its review in this regard to evaluate the potential interactions from all non-seismically qualified intermediate building systems whose failure following an SSE could create an intermediate building harsh environment.

Of particular concern to the staff was the non-seismic class I main feedwater line that crosses the intermediate building. Failure of this line during a seismic event would create a harsh environment and prevent access to the intermediate building.⁶ In its Amended Response to Union of Concerned Scientists' Petition For Show Cause Concerning TMI-1 Emergency Feedwater System (May 16, 1984), the licensee references the TMI-1 Final Safety Analysis Report (Updated Version), which indicates that the maximum intermediate building main feedwater line primary and secondary stress (including deadweight, thermal, internal pressure and seismic stresses) is 46.5% of the stress level at which a high energy pipe break should be postulated.⁷ However, these calculations were based upon an operating base earthquake (OBE), which is of lesser severity

⁶ Failure of this main feedwater line would also result in intermediate building flooding which would threaten EFW system operability since the EFW system is low in the building. Although arguably not cited by petitioner as a basis for its request, the staff has, nevertheless, pursued this matter See Section III. infra.

⁷ See also Letter from H. D. Hukill (GPU) to J. F. Stolz (NRC) (April 13, 1984).

than an SSE. Consequently, the licensee subsequently provided, by letter dated June 4, 1984, the results of additional stress calculations indicating that the maximum main feedwater line pipe stress, based on an SSE, is also well within the stress level at which a high energy pipe break should be postulated. The staff has reviewed the results of these calculations and is able to conclude that an adequate margin exists for the intermediate building main feedwater line, and accordingly, reasonable assurance exists that the line would withstand an SSE without rupture. In addition, further EFW system upgrades will be complete in the long-term which will make operator access unnecessary.

In response to a staff request, the licensee also performed similar analyses of the other non-seismic class I intermediate building lines whose failure could result in harsh environments.⁸ Staff review of the results of these stress analyses lead to the conclusion that the stresses are within acceptable limits so as to provide reasonable assurance that the non-seismic class I intermediate building lines would withstand an SSE without rupture. Based upon these calculations for intermediate building main feedwater and non-seismic class I lines, the staff is able to conclude that there is reasonable assurance that a harsh environment in the intermediate building will not result following an SSE. Accordingly, intermediate building operator access for local manual EFW system operation following an SSE would not be precluded for the interim period of operation until system upgrades are complete.

⁸ See Letters from J. F. Stolz (NRC) to H. D. Hukill (GPU) (June 25, July 24, and August 8, 1984) and Letters from H. D. Hukill (GPU) to J. F. Stolz (NRC) (July 16, July 30, and September 7, 1984).

Although not specifically cited as a deficiency by petitioner, the staff has also reviewed whether non-seismically mounted intermediate building components or equipment, such as ventilation ducts, could fail following an SSE so as to inhibit operator access to the EFW equipment or otherwise impair EFW system operation. This review included a staff walkdown of the TMI-1 intermediate building on May 22, 1984, and a later walkdown by the licensee.⁹ The licensee, in a July 16, 1984 letter, provides the disposition of the potential deficiencies identified during the walkdowns. That letter also provides some indication of the thoroughness of the walkdown. The two minor modifications identified as necessary by the licensee during its walkdown (anchoring radiation monitor RMA-2, and replacing ladder mounting bolts) have been completed by licensee and will be inspected by NRC regional inspectors. Based upon a review of the information provided in licensee's submittal, and the knowledge gained by the staff during its walkdown of the TMI-1 intermediate building, the staff concludes that there is reasonable assurance that operator access to the intermediate building and the vicinity of the EFW system will not be impaired by the failure of non-seismically mounted components and equipment following the occurrence of an SSE for the interim period of operation until system upgrades are complete. Similarly, the staff concludes that there is reasonable assurance that EFW system operation will not be impaired as a result of an SSE event. Accordingly, the staff finds that, for the reasons set forth in the interim Director's Decision and as supplemented herein, no further action need be taken prior to restart with respect to the seismic qualification of the EFW system.

⁹ See Letter from H. D. Hukill (GPU) to J. F. Stolz (NRC) (July 16, 1984).

III. ENVIRONMENTAL QUALIFICATION OF THE TMI-1 EFW SYSTEM

The petition alleges, among other things, that the TMI-1 EFW system is not environmentally qualified as required by NRC regulations. Petitioner's specific concern rests with the environmental qualification of electrical equipment as required by 10 CFR §50.49.¹⁰ To support its request, petitioner cites a December 10, 1982 staff safety evaluation report addressing TMI-1 environmental qualification, a November 5, 1982 technical evaluation

¹⁰ The petition specifically cites General Design Criterion 4 from 10 CFR Part 50, Appendix A "Environmental and missile design bases" which applies to structures, systems and components important to safety. However, it is clear from the petition that UCS's concerns rest solely with the environmental qualification of electrical equipment.

In the restart proceeding, the Licensing and Appeal Boards held that the issue of environmental qualification of electrical equipment was removed from the restart proceeding by the Commission's generic rulemaking on the subject. By order dated January 27, 1984, the Commission took review of these decisions. Petitioner's position in response to the January 27 order was that the Licensing and Appeal Boards erred in these decisions and that the issue of environmental qualification of electrical equipment should be addressed in the restart proceeding. See Union of Concerned Scientists' Brief on the Commissions Review of ALAB-729 (March 19, 1984) at 2-9. Staff's position was that the Licensing and Appeal Boards did not err and that the issue was, in fact, removed by the Commission's generic rulemaking. See NRC Staff's Brief Concerning the Commissions Review of Specific Design Issues in ALAB-729 (March 19, 1984) at 3-13.

By CLI-84-11, dated July 26, 1984, the Commission decided that the generic rulemaking had not entirely removed the issue of environmental qualification from the restart proceeding. The Commission decided that environmental qualification encompassing the environments, locations and equipment with a nexus to the TMI-2 accident is within the proceeding. The Commission therefore directed the staff to certify that TMI-1 electrical equipment which is required to mitigate small break loss of coolant accidents and loss of feedwater transients and which is located in containment and the auxiliary building is environmentally qualified for radiation. Since the TMI-1 EFW system electrical components subject to environmental qualification are located in the intermediate building, and not in containment or the auxiliary building, petitioner's allegation does not duplicate restart proceeding issues.

report prepared by Franklin Research Center (FRC TER) on the same subject, and two meetings between the licensee and the staff, which petitioner attended, on October 5 and December 16, 1983.¹¹ The petition provides no information that was not previously known to the staff.

There are three aspects that must be considered in making environmental qualification determinations: (1) defining harsh environments in which electrical equipment may be required to operate, (2) defining which electrical equipment may be required to operate in the harsh environment, and (3) demonstrating that the required equipment is qualified to operate in the harsh environment. Although the petition focuses on the third aspect of environmental qualification cited above, the staff's review led it to address, in varying degrees, all three aspects of environmental qualification for the TMI-1 EFW system. For reasons as set forth below and presented in detail in the attached Safety Evaluation Report dated September 13, 1984, the staff concludes that the TMI-1 EFW system is environmentally qualified as required by NRC regulations.

¹¹ The safety evaluation and technical evaluation reports were issued under letter dated December 10, 1982. See Letter from J. F. Stolz (NRC) to H. D. Hukill (GPU). The October 5, 1983 meeting is documented by licensee submittal dated February 10, 1984. See Letter from H. D. Hukill (GPU) to J. F. Stolz (NRC). The December 16, 1983 meeting is documented by Summary of Afternoon Meeting With GPU Nuclear Corporation on December 16, 1983 (December 22, 1983).

Definition of Harsh Environment

In its initial response to the Petition,¹² the licensee stated that:

[T]he intermediate building environmental qualification program has utilized two specific main steam line breaks (24 inch and 12 inch), which produce the most severe environment for electrical equipment. Other breaks in the feedwater lines produce a much less severe environment and are not the basis for qualification.

This statement is correct with respect to intermediate building pressure, temperature and humidity. However, a main feedwater line break in the intermediate building would also create a flooding hazard that would not be provided by a main steam line break. In this regard, in GPU Nuclear Technical Data Report (TDR) No. 250, Revision 1, "Review of Intermediate Building Flooding Following a Feedwater Line Break in the Intermediate Building of TMI-1", dated January 9, 1984, the licensee concluded that adequate time may not be available for operator action to mitigate intermediate building flooding from a main feedwater line break before the flood level reaches the EFW pumps, which are the lowest EFW system electrical components not qualified for submergence. The staff was provided a copy of TDR No. 250 during a March 20-21, 1984 environmental qualification audit¹³ and, by letter dated March 29, 1984, raised this concern with licensee and also requested additional, clarifying

¹² See Licensee's Response to Union of Concerned Scientists' Petition for Show Cause Concerning TMI-1 Emergency Feedwater System (February 24, 1984), attachment at 3.

¹³ A complete discussion of the purpose of the file audits is provided below and in the attached Safety Evaluation.

information. The licensee responded by letter dated April 13, 1984 and subsequently provided "Licensee's Amended Response to Union of Concerned Scientists' Petition for Show Cause Concerning TMI-1 Emergency Feedwater System", dated April 26, 1984, in which the licensee committed to perform intermediate building modifications that would increase the time available for operator action from approximately five minutes to 25 minutes.¹⁴ These modifications have subsequently been completed by the licensee¹⁵, and will be inspected by NRC regional inspectors. The staff considers the 25 minute time frame to be adequate time for an operator to diagnose the event and take the necessary mitigating actions. Neither the petition nor the staff's review identified any other areas for concern with respect to the definition of intermediate building harsh environments.

Electrical Equipment Required to Operate in Harsh Environment

With respect to defining which EFW electrical equipment would be required to operate in a harsh environment, and therefore would be subject to the requirements of 10 CFR 50.49, the staff requested that the licensee provide such a list during a March 8, 1984 meeting.¹⁶ The licensee

¹⁴ These modifications had previously been planned for the Cycle 6 refueling outage. See letter from H. D. Hukill (GPU) to J. F. Stolz (NRC) (August 23, 1983).

¹⁵ See Letter from H. D. Hukill (GPU) to J. F. Stolz (NRC) (August 1, 1984).

¹⁶ See Summary of Meeting With GPU Nuclear Corporation on Environmental Qualification (March 19, 1984).

provided a working list for staff use during the March 20-21 environmental qualification file audit and subsequently presented and discussed a list at an April 27, 1984 meeting with the staff.¹⁷ At the April meeting the staff expressed certain reservations as to the methodology used by licensee to develop the list and shortly thereafter requested licensee to provide clarification.¹⁸ The principal staff concerns focused on (1) whether the licensee had used a systematic approach in developing the list, and (2) whether the licensee had properly documented its review, particularly with respect to the bases for excluding equipment from environmental qualification. This issue was further discussed with the licensee during the May 7-8, 1984 environmental qualification file audit. During these discussions it became apparent that the licensee's methodology for identifying equipment subject to environmental qualification may not have given adequate consideration to electrical equipment from non-safety related systems whose operation may be needed for, or whose spurious operation might jeopardize, operation of a safety-related system.¹⁹ With respect to emergency feedwater, the methodology did not consider whether certain interfacing main steam or condensate system (non-safety related) components would be required to operate to assure EFW system operability for the events in question. The licensee fully addressed this matter and provided additional information in its response to the staff's May 3, 1984 letter.²⁰

¹⁷ See Summary of April 27, 1984 Meeting with GPU Nuclear Regarding the Three Mile Island, Unit 1 Emergency Feedwater System (May 2, 1984).

¹⁸ See Letter from D. G. Eisenhut (NRC) to H. D. Hukill (GPU) (May 3, 1984).

¹⁹ The staff viewed these deficiencies as programmatic ones not limited to the EFW system. This information prompted the staff's May 25, 1984 letter to the licensee requesting information on the overall TMI-1 environmental qualification program.

²⁰ See Letter from R. F. Wilson (GPU) to D. G. Eisenhut (NRC) (May 10, 1984).

Upon review, the staff concluded that the licensee had identified those electrical components of the EFW system required to be environmentally qualified, with the exception of the licensee's exemption of condensate system valves from environmental qualification (i.e., COV-14A,B and COV-111A,B). The staff would require that these valves be environmentally qualified, because operation of these valves in a harsh environment may be necessary as backup to postulated single failures. The staff subsequently advised the licensee of its position, and the licensee agreed to include the valves in its environmental qualification program.²¹

Therefore, based upon the review activities described above, the staff concludes that licensee's environmental qualification program encompasses that electrical equipment located in a harsh environment whose operation may be necessary to assure EFW system operability in a harsh environment. A complete list of components is provided in the attached safety evaluation.²²

Qualification of Electrical Equipment

The third and final aspect of the staff's review, and the true focus of the petition's environmental qualification allegation, addresses the issue of whether the specific electrical equipment subject to environmental qualification has been adequately demonstrated to remain operable in the prescribed harsh

²¹ See Letter from J. F. Stolz (NRC) to H. D. Hukill (GPU) (June 25, 1984), and Letter from H. D. Hukill (GPU) to J. F. Stolz (NRC) (August 6, 1984).

²² The staff's activities did not, however, include a rigorous review of whether licensee had adequately identified equipment at the sub-component level (e.g. the identification of splices, terminal blocks and motors within a valve operator). The petition makes no allegations in this regard and the staff identified no basis for pursuing this matter during its review.

environment, and whether adequate documentation of any such demonstration exists.²³ The petition draws heavily from the Franklin Research Center technical evaluation report (FRC TER) which contained a number of environmental qualification issues that were unresolved at the time of its issuance in November 1982. The staff was continuing its review of the licensee's resolution of the FRC TER deficiencies at the time of receipt of the petition.

To address this allegation the staff performed an initial audit of the TMI-1 EFW system environmental qualification files on March 20-21, 1984. Audit results were provided to the licensee by letter dated April 25, 1984.²⁴ As described in the April 25 letter, the staff concluded that the files did not adequately demonstrate environmental qualification of EFW system electrical components and that the deficiencies were both general in nature and component-specific. The licensee endeavored to address the deficiencies and the staff subsequently performed a second audit on May 7-8, 1984 with similar results. Additional audits were performed on May 24, June 25, and August 6, 1984. Comments were provided to the licensee at the conclusion of each audit session.²⁵ Based upon the findings from the August 6, 1984 audit, the staff is able to conclude that the TMI-1 environmental qualification files

²³ In the most fundamental sense, a component is considered environmentally qualified if (1) it has been successfully tested for a harsh environment (e.g. pressure, temperature, radiation, chemical spray) that is more severe than what it would see in the plant and (2) a similarity is established between the tested component and the component installed in the plant.

²⁴ See Letter from J. F. Stolz (NRC) to H. D. Hukill (GPU) (April 25, 1984).

²⁵ Audit notes were provided to the petitioner in a letter from J. F. Stolz (NRC) to E. R. Weiss (UCS) (August 7, 1984).

adequately demonstrate the environmental qualification of EFW system electrical equipment.

The specific details of the audits and file deficiencies are described in the attached safety evaluation. However, two components warranting special mention are the converters for the EFW flow control valves. The licensee had initially proposed a justification for continued operation for these components since no qualification testing data was available.²⁶ The justifications were based upon probabilistic arguments and the availability of feed and bleed cooling as a backup for core cooling.²⁷ At the March 8, 1984 meeting, the staff advised the licensee that it could not accept the proposed justification without substantial additional review. The licensee subsequently committed to replace the converters with environmentally qualified components,²⁸ and regional inspectors have verified that this modification is complete. Other required equipment replacements, as described in the safety evaluation, have been verified by regional inspectors. See Inspection Report 50-289/84-22.

In view of the foregoing discussion, the staff concludes for reasons set forth above, that the appropriate harsh environments are defined, that the electrical equipment essential for EFW operation are properly identified, and that adequate documentation exists to demonstrate the qualification of all essential equipment. Adequate actions have been taken to assure that the TMI-1 EFW system is environmentally qualified in accordance with NRC regulations. No further action need be taken before restart.

²⁶ See Licensee's Response to Union of Concerned Scientists' Petition for Show Cause Concerning TMI-1 Emergency Feedwater System (February 24, 1984).

²⁷ The feed and bleed core cooling mode does not rely upon the steam generators for decay heat removal. The staff believes that there is a high probability that feed and bleed is a viable means of core cooling, but it has not been reviewed from the standpoint of a design basis event.

²⁸ See Licensee's Amended Response to Union of Concerned Scientists' Petition for Show Cause concerning TMI-1 Emergency Feedwater System (March 26, 1984).

Notwithstanding this conclusion, however, the staff's initial audit findings regarding the unacceptability of the licensee's environmental qualification files for EFW components, and the deficiencies identified in licensee's methodology for identifying components required to be qualified, raised questions as to the adequacy of licensee's overall environmental qualification program. Therefore, the staff, by letter dated May 25, 1984, requested that the licensee reaffirm the adequacy of its overall environmental qualification program in several specific areas.²⁹ The licensee's response is pending.³⁰ However, with respect to the environmental qualification of electrical equipment within the scope of the TMI-1 restart proceeding (equipment required to mitigate small break loss of coolant accidents and loss of feedwater transients) the Commission has directed the staff to certify such equipment with respect to radiation. See Metropolitan Edison Company (Three Mile Island Nuclear Station, Unit 1) CLI-84-11, ___ NRC ___ (July 26, 1984). Thus, in addition to the environmental qualification required by the Commission under the restart proceeding, the staff is continuing its 10 CFR 50.49 environmental qualification review for TMI-1, which will include further auditing, on an expedited basis.³¹ Should the staff develop information from these audits indicating further action with respect to the TMI-1 environmental qualification program is necessary, appropriate action would be taken at that time.

²⁹ See Letter from D. G. Eisenhut (NRC) to H. D. Hukill (GPU) (May 25, 1984).

³⁰ The staff expects to receive a response from the licensee in October 1984.

³¹ Environmental Qualification file audits are routinely performed for nuclear power plants in the licensing phase. The staff plans to conduct similar audits for all operating reactors.

IV. THE SUPPLEMENTAL PETITION

By supplemental petition dated May 9, 1984 (supplemental petition), the petitioner requested further relief in connection with the EFW system. UCS based its request upon information contained in the staff's April 25, 1984 letter to the licensee expressing concerns regarding the environmental qualification of the TMI-1 EFW system as a result of the findings of the first TMI-1 environmental qualification file audit. See Section III, supra. Petitioner compares this information with previous information and statements in correspondence and points out apparent inconsistencies and contradictory statements that it attributes to both the licensee and the NRC staff.³² Based upon these apparent inconsistencies, petitioner requests three additional specific items of relief:

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.

³² By filing dated July 31, 1984, petitioner responds to an earlier licensee response regarding the supplemental petition. In this filing petitioner notes apparent inconsistencies between licensee's response to the supplemental petition and other correspondence and information. Petitioner appears to have provided this filing to reinforce its earlier allegations since it explicitly requests no additional relief. However, the filing does imply that the staff should expand its audit activities beyond the EFW system. The staff intends to conduct this review as explained in Section III, supra.

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.

See Supplemental petition at 10-11.

With respect to the first request, the staff, by virtue of the review activities described herein and in the attached safety evaluation, has performed the independent verification requested by petitioner and concluded that the documentation is technically sufficient to demonstrate the environmental qualification of each electrical component in the EFW system and in every other system required for proper operation of the EFW system. Accordingly, the first request has been substantially satisfied by the review activities undertaken by the staff.

In considering petitioner's second request, the technical staff reviewed the documentation related to the licensee's environmental qualification program and identified certain statements made by licensee in connection with the TMI-1 environmental qualification program which the staff believed to be invalid. These statements were forwarded to the Office of Investigation (OI). After reviewing the statements identified by the technical staff, OI initiated an evaluation to determine whether the matter warrants a full investigation. Accordingly, the staff has satisfied petitioner's request to the extent that OI is examining the TMI-1 environmental qualification issue. Should OI decide to conduct a full investigation of the matter, the staff would take appropriate action based upon the results of that investigation.

Upon its receipt, the supplemental petition was referred to the Office of Inspector and Auditor to determine whether the staff acted improperly with

respect to the issue of equipment qualification at TMI-1. This action essentially satisfies the petitioner's request.³³

V. AGGREGATE DEFICIENCIES

Background

Each of the five basic deficiencies alleged in the petition have either been addressed herein or in the interim Director's Decision. However, in its January 20 petition, UCS further contends that "one or more of the identified deficiencies, when viewed individually, would not necessarily pose an 'intolerable risk'", but that "[i]n the aggregate...[the deficiencies] thoroughly compromise the reliability of" the EFW system. Petitioner provides further clarification of its aggregate deficiencies concern in its letter of May 1, 1984 directed to the Director, Office of Nuclear Reactor Regulation. The petitioner described its concern as depending "largely upon the findings regarding the specific EFW deficiencies; to the extent that the specific deficiencies we note in the petition are borne out, the point about the 'aggregate effect' is strengthened and vice versa. Therefore, the major issue is certainly whether the specific deficiencies we cite exist and/or have been corrected."

To properly focus the petitioner's concern about aggregate deficiencies, a brief review of staff's findings regarding each of the five alleged basic deficiencies is necessary. First, as discussed in this decision, the staff

³³ It should be noted that a request for an investigation by OIA of internal NRC personnel matters does not fall squarely within the class of requests contemplated by 10 CFR 2.206. Section 2.206 permits interested members of the public to request initiation of enforcement proceedings with respect to any license.

concludes herein that the TMI-1 EFW system is environmentally qualified. Second, the staff concluded in the interim Director's Decision that there are no MSLRDS deficiencies. Third, as the staff concluded in Board Notification BN 84-088, dated April 24, 1984, the EFW flow instrumentation is sufficiently accurate for its intended purpose. Fourth, as stated in the interim Director's Decision, the TMI-1 EFW system may be susceptible to single failures which could, for certain accidents, prevent it from performing its intended safety function. Fifth, the staff concluded in the interim Director's Decision as modified herein, that the TMI-1 EFW System would be capable of performing its intended safety function following an SSE, but that conclusion relies, in part, upon operator access to the intermediate building for local manual actions. Accordingly, the valid deficiencies to be considered in a review for aggregate deficiencies are (1) potential EFW system single failure vulnerabilities, and (2) EFW system seismic limitations to the extent that intermediate building access for local manual action may be necessary.

There is also a time element to the aggregate deficiencies issue. That is, licensee is committed to upgrading the EFW system after one cycle of operation. See Section VI, infra. This upgrade will correct both the potential single failure vulnerabilities and the seismic limitations. The possibility of aggregate deficiencies poses, therefore, a concern only for one cycle of operation. The issue then becomes one of whether, in light of potential single failure vulnerabilities and seismic limitations, the TMI-1 EFW system would be capable of performing its intended safety function for the one cycle of operation until such time as system upgrades are complete.

The staff believes that the specific review of each individual deficiency as presented herein and in the interim Director's Decision, which was performed in accordance with normal review practice, has shown that an aggregate deficiency does not exist in the EFW system. The following description is provided, nevertheless, to explain the basis for the staff's conclusion and to conveniently summarize the capabilities and limitations of the TMI-1 EFW system expected at the time of restart.

The staff has reviewed, using current licensing criteria, those event or accident scenarios necessary to determine the integrated effect of all valid EFW system deficiencies within the scope of the petition. For example, staff reviews of the EFW system for seismic and environmental qualification acceptability concurrently considered postulated single failures for each of these reviews. These reviews also included, where appropriate, the potential interaction from other intermediate building systems such as postulated failures that could cause a harsh environment or a seismic failure that would adversely affect the EFW system function. In that staff reviews have included limiting accident scenarios and the potential effects of failures and interactions, the staff reviews provide a basis for assessing the overall capability of the EFW system in an aggregate sense. The conclusion of these reviews is that the TMI-1 EFW system, as configured at the time of restart, will be capable of performing its intended safety function for the one cycle of operation, i.e., until the system upgrades are complete.³⁴

³⁴ The staff acknowledges that the differences between the EFW system at the time of restart versus after the cycle 6 refueling do present a difference in system reliability which might, if compounded in many small ways, give rise to an aggregate concern of the kind suggested in the petition. However, the aggregate deficiencies in this instance include only two of the many circumstances in which the EFW system could be called upon to function, and the staff considers these instances of compounded effect to be acceptable. See Section VI, *infra*.

The event scenarios of interest are seismic events, and intermediate building high energy line breaks which expose EFW system single failure vulnerabilities and also create harsh environments. Although the staff has concluded herein that the TMI-1 EFW system is environmentally qualified, that issue was nevertheless considered in these scenario reviews so as to provide a means of verifying that all components required for EFW system operation (i.e., EFW system components as well as components from other systems) that could be subjected to an intermediate building harsh environment were identified and included in the environmental qualification program. Moreover, each event was analyzed individually as prescribed by staff licensing criteria. Associated consequences, such as a harsh environment resulting from a high energy line break, were assumed with the initiating event. A concurrent random single failure was also assumed.

With respect to intermediate building high energy line breaks, the staff considered whether operability of the EFW system could be affected by common-mode component failures due to harsh environments. With respect to seismic events, the principal concern of the staff was whether the failure of non-seismically qualified intermediate building component(s) could create intermediate building environments during seismic events which would preclude operator access to perform required local manual actions.

EFW System Response During High Energy Line Breaks

All four main steam lines and one of the two main feedwater lines transit the intermediate building. The intermediate building also houses all active EFW system components that could be subjected to a harsh environment. As indicated in the interim Director's Decision, a non-mechanistic rupture of either the intermediate building main steam line or main feedwater line would create an event in which the EFW system must operate and a harsh environment for the EFW. Therefore, the possibility of potential common mode failures due to a harsh environment must be considered. As noted in Section III, supra, all electrical components situated in the intermediate building whose operability is essential for proper operation of the EFW system are environmentally qualified. In particular, the staff notes that the electric motor driven EFW pumps, the EFW pump suction and the discharge cross-connect valves, the EFW flow control valves and the EFW flow indicators are qualified for an intermediate building harsh environment. All intermediate building condensate or main steam system electrical components required to operate to assure EFW initiation and operation following a non-mechanistic intermediate building main steam or feedwater line break are environmentally qualified. The staff further notes that the failure of any unqualified main steam, condensate and/or EFW system electrical components due to an intermediate building harsh environment from a main steam line or feedwater line break will not jeopardize EFW system operation.

If a postulated concurrent single random failure of the flow control valve in the EFW feedwater header to the opposite steam generator were to

occur in this situation, the EFW system could be rendered ineffective.³⁵ The staff considers this to be an acceptable situation for one cycle of operation as a result of the interim modifications described in the interim's Directors Decision. See DD-84-12, 19 NRC at 1133-34. See also Section VI, infra. Therefore, the staff concludes that the aggregate deficiencies of the TMI-1 EFW system will not jeopardize system operability due to harsh environments following an intermediate building main steam or feedwater line rupture.

EFW System Response During Seismic Events

The staff previously concluded in the interim Director's Decision that reasonable assurance exists that the TMI-1 EFW system would be able to perform its intended safety function following the occurrence of a safe shutdown earthquake (SSE) and concurrent single active failure. See DD-84-12, 19 NRC at 1131-32. In reaching that conclusion, the staff concluded that there is also reasonable assurance that required-local manual actions would not be precluded by an intermediate building harsh environment resulting from a postulated failure of non-seismic portions of other systems, namely, the vent stacks relief valves (MSV-22A, B) and the atmospheric dump valves (MSV-4A,B) for the interim period of Cycle 5 operation. However, as described in Section II, supra, the licensee has installed seismically qualified restraints on those vent stacks, thus eliminating any concern regarding vent stack failure.

³⁵ Occurrence of the postulated event would not, however, necessarily mean that the affected steam generator must be isolated. In this regard, The TMI-1 abnormal transient operator guidance (ATOG) program contains provisions for feeding an affected steam generator under certain circumstances.

Based upon the licensee's action and the additional seismic interaction review set forth in Section II, supra, the staff is able to conclude that there is reasonable assurance that no intermediate building high energy lines will fail during an SSE, and that operator access to perform required local manual actions to assure EFW system operability for the interim period of operation until system upgrades are complete is therefore assured.

In that staff reviews have included the applicable accident scenarios coupled with both potential effects of failures and interactions, the staff reviews provide an adequate basis for assessing the capability of the EFW system in an aggregate sense. Based upon these reviews, the staff finds there is reasonable assurance that the TMI-1 EFW system will perform its intended safety function for the postulated events within the scope of the petition, with one exception. The exception involves the postulated situation of a postulated main steam line or main feedwater line break accident requiring isolation of the affected steam generator compounded by the worst cause single random failure. This exception has been previously addressed in the interim Director's Decision and found acceptable for one cycle of operation. See also Section VI, infra. Therefore, the staff's previous conclusion regarding the acceptability of the TMI-1 EFW system for the interim period of operation until such time as system upgrades are complete remains unchanged, and the staff contemplates no further action prior to restart.

VI. PETITIONER'S LETTER OF FEBRUARY 13, 1984

By letter to the Commission dated February 13, 1984, the petitioner, among other things, recommended that the Commission direct the staff to answer three specific questions regarding the TMI-1 EFW system. The Commission subsequently requested that the staff respond to these questions when it considered the petitioner's request for relief.³⁶

The first question posed by UCS asked the staff to:

Identify each specific aspect of the TMI-1 EFW system which does not comply or is not known to comply with the regulations applicable to systems important [sic] to safety (including safety-grade, safety-related, and engineered safety feature systems).

At the time of licensing of TMI-1, EFW systems were not considered safety related systems. Consequently, relatively few regulations and standards applied.³⁷ Moreover, the applicability of regulations, absent any backfitting requirements, is established at the time of plant licensing. Within this framework, the TMI-1 EFW system complied with all regulations and standards applicable to that system, and this continues to be the case today. However, EFW systems are now considered safety-related such that EFW systems for new plants must meet safety-related system criteria in accordance with the staff's Standard Review Plan (NUREG-0800).³⁸ In this regard, the staff has reviewed

³⁶ See Memorandum from S. J. Chilk (NRC) to W. J. Dircks (NRC) (April 24, 1984).

³⁷ See also Safety Evaluation by the Office of Nuclear Reactor Regulation Supporting Interim Director's Decision under 10 CFR 2.206 (Seismic Capability of Emergency Feedwater), Three Mile Island Nuclear Station, Unit No. 1 (April 27, 1984.)

³⁸ See Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants, (NUREG-0800), (July 1981), Section 10.4.9. Standard Review Plans provide guidance for the Office of Nuclear Reactor Regulation staff responsible for the review of applications to construct and operate nuclear power plants. A system in conformance with the Standard Review Plan is generally considered to also be in conformance with the applicable regulations.

the TMI-1 EFW system, as it will be configured at the time of restart. This review identified that the TMI-1 EFW system does not meet the regulations applicable to plants currently being licensed in one respect.³⁹ That is, the TMI-1 EFW system, as configured at the time of restart, will not meet the single failure criterion for certain events.⁴⁰

Specifically, the TMI-1 EFW system at the time of restart will have a single flow control valve in each of the feedwater headers to the two steam generators.⁴¹ Therefore, for those events which may, under certain circumstances, require isolation of one steam generator, such as a main steam line break, steam generator tube rupture or a feedwater line break, failure of the flow control valve to open in the EFW header to the intact steam generator could result in an inability to deliver emergency feedwater flow for decay heat removal through the intact steam generator. Further, a single failure in the Integrated Control System (ICS), which currently controls the EFW flow control valves, could also result in an inability to deliver EFW flow by preventing the flow control valves from opening. Evaluation of these deficiencies is discussed in the response to Question 2, infra.

³⁹ The staff had previously performed and submitted into testimony such a review during the TMI-1 Restart Proceeding. See NRC Staff Supplemental Testimony of J. Wermiel and J. Curry Regarding Emergency Feedwater System Reliability (Board Question 6). TMI-1 Restart Proceeding Transcript (TR) at 16,718. The staff notes that the TMI-1 EFW system currently complies with 10 CFR §50.49 (Environmental Qualification of Electrical Equipment) by virtue of the fact that licensee has completed replacement of certain components and performed Intermediate Building flooding modifications as described in Section III, supra.

⁴⁰ See 10 CFR Part 50 Appendix A, Criterion 44.

⁴¹ This discussion was previously provided in the Interim Director's Decision, but it is repeated here nevertheless for completeness. See Interim Director's Decision Under 10 CFR 2.206, DD-84-12, 19 NRC 1128, 1133-34 (April 27, 1984).

The second question raised by UCS asks that:

[F]or each deficiency or potential deficiency identified in response to item 1 above, explain whether and why the staff believes that TMI-1 can be operated without undue risk to public health and safety before correction of the deficiency or potential deficiency.

The staff has been aware of the system deficiencies identified in response to UCS question 1 for some time, and the issue has been fully explored during the restart proceeding. The staff considers the TMI-1 EFW system to be acceptable, provided that certain short-term modifications are completed prior to restart.⁴² Among these modifications is a change in failure mode for the flow control valves. These valves will fail so as to permit full EFW flow on either loss of instrument air or loss of control power.⁴³ Further, a separate remote manual control station independent of the ICS has been provided in the control room. This modification will permit the operator to remotely open the EFW flow control valves should they fail closed due to an ICS malfunction. The flow control valves could also be manually opened locally by means of a hand wheel.⁴⁴

In the long-term, the licensee will install redundant EFW flow control and block valves and provide safety-grade automatic steam generator level

⁴² See NUREG-0680, TMI-1 Restart (June 1980) and Supplement 3 to NUREG-0680 (April 1981).

⁴³ The restart proceeding record shows that the flow control valves fail to the mid position on loss of control signal. However, by filing dated March 26, 1984, counsel for licensee indicated that the existing flow control valve converters would be replaced with environmentally and seismically qualified converters by June 1984, and that with these new converters the flow control valves would fail to the open position on loss of control power.

⁴⁴ In accordance with a decision of the Atomic Safety and Licensing Board, the TMI-1 operating license will be conditioned to require that an auxiliary operator be dispatched to the EFW flow control valve area, upon any EFW auto-start condition, until the EFW system is made fully safety-grade. See Metropolitan Edison Company (Three Mile Island Nuclear Station, Unit 1) ALAB-729, 17 NRC 814, 833 (1983). Admittedly, access would most probably be precluded following an intermediate building high energy line break.

control by no later than the first refueling outage following restart (Cycle 6 refueling).⁴⁵ Completion of these modifications prior to startup following Cycle 6 refueling is a specific Board-imposed condition from the restart proceeding.⁴⁶ The licensee is also performing a number of additional long-term EFW system modifications beyond those described above.⁴⁷ These additional modifications are generally intended to improve EFW system reliability pursuant to NUREG-0737, Items II.E.1.1 "Auxiliary Feedwater System Evaluation" and II.E.1.2 "Auxiliary Feedwater System Automatic Initiation and Flow Indicator" and to alleviate the need to rely upon compensatory operator action to assure system operability following a seismic event.

The petitioner's third question focuses on the need for modifications after one cycle of operation. UCS asks that:

[F]or each deficiency or potential deficiency which the staff believes need not be corrected before the first refueling outage after restart, explain why that deficiency ever needs to be corrected. In other words, if the staff believes that the plant can be operated without undue risk to public health and safety until the first refueling, why would modifications be needed to assure public health and safety after the first refueling?

The staff concludes that the short-term modifications cited above provide reasonable assurance that the TMI-1 EFW system will be adequately reliable to protect the public health and safety. The staff further concludes that the

⁴⁵ See Summary of April 27, 1984 Meeting with GPU Nuclear Regarding the Three Mile Island, Unit 1 Emergency Feedwater System, Docket 50-289 (May 2, 1984), and letter from R. F. Wilson (GPU) to D. G. Eisenhut (NRC) (May 10, 1984).

⁴⁶ See Metropolitan Edison Company (Three Mile Island Nuclear Station, Unit 1), LBP-81-59, 14 NRC 1211, 1363, 1373 at ¶ 1036, 1037, 1059 (1981); NUREG-0680, at C8-36 and Supplement 3, at 36-38; Metropolitan Edison Company (Three Mile Island Nuclear Station, Unit 1), LBP-82-27, 15 NRC 747 (1982) and Staff's Response to Licensing Board's Directive to Report Details of its Enforcement Plan in the Form of a Supplemental Initial Decision (February 1, 1982).

⁴⁷ See Summary of April 27, 1984 Meeting with GPU Nuclear Regarding the Three Mile Island, Unit 1 Emergency Feedwater System, Docket 50-289 (May 2, 1984), and letter from R. F. Wilson (GPU) to D. G. Eisenhut (NRC) (May 10, 1984).

long-term modifications (Cycle 6 modifications) will provide an additional improvement in safety. This approach of short and long-term modifications is consistent with general staff practice regarding safety improvements insofar as the short-term modifications provide an acceptable means for addressing a safety concern for the interim period of time until the preferred, long-term solution can be designed and implemented.⁴⁸

Specifically, with respect to the single failure vulnerabilities of the flow control valves, the staff considers the short-term modification to be acceptable essentially because the valves have been modified so that they fail open, permitting full flow, on either a loss of control signal or air. Upon completion of the long-term modification, however, the availability of redundant flow control valves to each steam generator will permit continued flow of emergency feedwater even with an assumed single failure. Similarly, the short-term control system modifications provide an acceptable means of mitigating the consequences of an ICS failure, while the long-term modification will result in a control system that will not be disabled by a single failure.

⁴⁸ The thrust of petitioner's question three, and the staff's response thereto, generally parallel the respective parties positions on this matter in the TMI-1 Restart Proceeding. The Staff's position in that proceeding was upheld by the Licensing Board and Appeal Board. See NRC Staff Testimony of Denwood F. Ross, Jr. Relative to the Sufficiency of the Proposed Additional Requirements (Board Question 2); TR at 15,555; Metropolitan Edison Company (Three Mile Island Nuclear Station, Unit 1), LBP-81-54, 14 NRC 1211, 1364 at ¶1138 (1981). See generally Metropolitan Edison Company (Three Mile Island Nuclear Station, Unit 1), ALAB-729, 17 NRC 814 (1983).

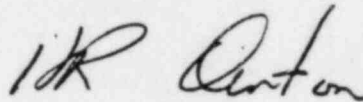
VII CONCLUSION

The staff has determined that it is unnecessary to institute show cause or further enforcement proceedings with respect to the TMI-1 EFW system. The petitioner's request to initiate such proceedings is denied. As described in this decision and the interim Director's Decision, DD-84-12, 19 NRC 1128 (1984), the staff has determined that the TMI-1 EFW system is environmentally qualified, that there is reasonable assurance with respect to single component failures that the system will be adequately reliable to perform its intended safety function, and that the main steam line rupture detection system (MSLRDS) is adequate. As the staff has maintained in the restart proceeding, it views the existing EFW flow instruments to be acceptable. The staff has also determined that, with the interim compensatory measures instituted by the licensee, there is reasonable assurance that the EFW system would remain operable following a safe shutdown earthquake (SSE). Upon considering in the aggregate those EFW system deficiencies identified by the petition, the staff has determined that the TMI-1 EFW system, as configured at the time of restart, will be capable of performing its intended safety function for the one cycle of operation until the system upgrades are complete.

Accordingly, the staff contemplates no further action with respect to the EFW system prior to restart. Moreover, the staff has substantially satisfied the requests made by petitioner in its supplemental petition by

conducting detailed audits of the TMI-1 environmental qualification file, and identifying and referring to the Office of Investigation statements in the licensee's submittals the staff views to be invalid. The staff by this decision, has also provided to petitioner the information requested in petitioner's letter of February 13, 1984.

A copy of this decision will be provided to the Secretary for the Commission's review in accordance with 10 CFR 2.206(c).



Harold R. Denton, Director
Office of Nuclear Reactor Regulation

Dated at Bethesda, Maryland
this 25th day of September 1984

7590-01

NUCLEAR REGULATORY COMMISSION

[Docket No. 50-289]

GENERAL PUBLIC UTILITIES NUCLEAR CORPORATION

(Three Mile Island Nuclear Station, Unit 1)

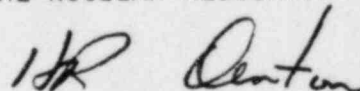
Issuance of Director's Decision Under 10 CFR 2.206

Notice is hereby given that the Director, Office of Nuclear Reactor Regulation, has issued a decision concerning a petition dated January 20, 1984, as supplemented on May 9, 1984, submitted by the Union of Concerned Scientists. The petitions request that the Commission initiate show cause or further enforcement proceedings to prevent restart of the Three Mile Island Nuclear Station, Unit 1, unless and until certain modifications are made to the facility's emergency feedwater system.

The Director, Office of Nuclear Reactor Regulation, has determined to deny the petitioner's request to initiate such proceedings. The reasons for this decision are explained in a "Director's Decision under 10 CFR 2.206" (DD-84-22) which is available for public inspection in the Commission's Public Document Room, 1717 H Street, N.W., Washington, D.C., and in the local Public Document Room for the TMI facility located in the Government Publications Section of the State Library of Pennsylvania, Education Building, Commonwealth and Walnut Streets, Harrisburg, Pennsylvania 17126. A copy of this decision will be filed with the Secretary for the Commission's review.

Dated at Bethesda, Maryland this 25th day of September, 1984.

FOR THE NUCLEAR REGULATORY COMMISSION



Harold R. Denton, Director
Office of Nuclear Reactor Regulation



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING DIRECTOR'S DECISION

UNDER 10 CFR 2.206 (ENVIRONMENTAL QUALIFICATION OF EMERGENCY FEEDWATER)

METROPOLITAN EDISON COMPANY
JERSEY CENTRAL POWER COMPANY
PENNSYLVANIA ELECTRIC COMPANY
GPU NUCLEAR CORPORATION

THREE MILE ISLAND UNIT NO. 1

FACILITY OPERATING LICENSE NO. DPR-50

DOCKET NO. 50-289

INTRODUCTION

The Union of Concerned Scientists (UCS) filed a petition, dated January 20, 1984, pursuant to 10 CFR 2.206 requesting that the NRC suspend the operating license for Three Mile Island Unit 1 (TMI-1) unless and until the plant's emergency feedwater (EFW) system complies with the NRC rules applicable to systems important to safety. One of the issues addressed in the UCS petition concerns the environmental qualification of the EFW system. The UCS states that the TMI-1 EFW system is not environmentally qualified as required by NRC regulations. To support this statement, the UCS cites 1) the enclosure to an August 23, 1983 letter from GPU which states that EFW system equipment shall either be upgraded to be qualified, replaced or relocated, 2) a December 10, 1982 staff SER addressing environmental qualification and the November 5, 1982 Franklin Research Center (FRC) Technical

Evaluation Report (TER) attached to that SER which identifies certain deficiencies regarding the qualification of EFW system equipment, 3) an October 5, 1983 meeting between the licensee and staff during which the licensee was unable to resolve the deficiencies identified in the FRC TER, and 4) a December 16, 1983 meeting between GPU and the staff during which environmental qualification was briefly discussed.

BACKGROUND/DISCUSSION

The staff issued to GPU an SER, dated March 24, 1981, addressing the environmental qualification of safety-related electrical equipment for TMI-1. In response to that SER, the licensee submitted additional information regarding the qualification of safety-related electrical equipment. This information was evaluated for the staff by the Franklin Research Center (FRC) and a Technical Evaluation Report (TER) for TMI-1, dated November 5, 1982, was prepared by FRC to document the results of that evaluation. A safety evaluation report was subsequently issued to GPU on December 10, 1982, with the FRC TER as an attachment. As with equipment associated with other systems, the FRC TER identifies qualification deficiencies for EFW system equipment. Shortly after the TMI-1 SER cited above was issued, a final rule on environmental qualification of electric equipment important to safety for nuclear power plants became effective on February 22, 1983. This rule, Section 50.49 of 10 CFR 50, specifies the requirements to be met for demonstrating the environmental qualification of electrical equipment important to safety located in a harsh environment. In accordance with this rule, equipment for TMI-1 may be qualified to the criteria specified in either the DOR Guidelines or NUREG-0588, except for replacement equipment. Replacement equipment

installed subsequent to February 22, 1983 must be qualified in accordance with the provisions of 10 CFR 50.49, using the guidance of Regulatory Guide 1.89, unless there are sound reasons to the contrary.

The staff met with GPU on October 5, 1983. The staff intended to discuss with the licensee its proposed resolutions for the deficiencies identified for all the equipment evaluated in the FRC TER. However, the licensee was not prepared at that time to discuss resolution of the deficiencies. The staff subsequently requested the licensee to meet with the staff again to discuss, among other EQ issues, the licensee's resolution of the deficiencies identified in the TER. That meeting took place on March 8, 1984.

By letters dated February 10 and 22, 1984, GPU provided its proposed resolutions for the qualification deficiencies identified in the FRC TER, and a justification for continued operation (JCO) for equipment whose qualification is not yet complete. The attachments to those letters indicated that, in the licensee's opinion, all electrical equipment evaluated in the FRC TER was either environmentally qualified, with the exception of the Bailey E/P converters for the EFW control valves, or was not required to be qualified. Therefore, except for the Bailey E/P converters all electrical equipment associated with the EFW system that was evaluated in the FRC TER was, in the licensee opinion, either qualified or was not required to be qualified. In its February 24, 1984 response to the subject petition, the licensee stated that the TMI-1 EFW system would be environmentally qualified by June, 1984, except for the E/P converters. For the Bailey E/P converters, the licensee provided a JCO in the attachment to its February 22, 1984 letter and in its petition response.

The staff reviewed the attachments to the licensee's February 10 and 22, 1984 letters and could not conclude, solely on the basis of the information in these submittals, that the EFW equipment was environmentally qualified. In the staff's opinion a meeting with GPU was necessary to discuss these submittals, and a staff review of the EFW equipment qualification documentation would also be required. As a result of a March 7, 1984 meeting of NRC staff members, it was also concluded that more information was needed from the licensee and that significant staff review effort would be required before the staff could determine the acceptability of the licensee's JCO for the Bailey E/P converters. This would be one of the items discussed at the meeting with GPU.

The staff met with GPU on March 8, 1984 to discuss the TMI-1 environmental qualification program, including qualification of the EFW equipment and the JCO for the Bailey E/P converters. At the meeting the staff informed GPU of the information that would be required to be provided before the acceptability of the JCO for the Bailey E/P converters could be determined. GPU was also requested to provide the staff as soon as possible with a complete list of all EFW equipment required to be environmentally qualified.

GPU subsequently provided the staff with a list of EFW equipment within the scope of 10 CFR 50.49 and required to be environmentally qualified.

On March 20 and 21, 1984, the staff and a consultant from EG&G, Idaho, performed an audit of the TMI-1 electrical equipment environmental qualification (EQ) files. During that audit, the staff and its consultant reviewed the documentation in the EQ files for all EFW system electrical equipment that had been identified by GPU as required to be environmentally qualified.

At the time of the audit cited above, the licensee identified to the staff seven items of EFW system electrical equipment that, in the licensee's opinion, were not within the scope of 10 CFR 50.49, i.e., the equipment was not required to be environmentally qualified. Justification for not requiring qualification of NAMCO limit switches, some ASCO solenoid valves and Barton D/P switches had been documented in the licensee's February 10, 1984 submittal. For the remaining ASCO solenoid valves associated with the EFW system, justification for not requiring qualification had previously been submitted by the licensee in response to the staff's March 24, 1981 SER. Justification for not requiring qualification of the Fisher limit switches had not been formally submitted.

The licensee next submitted a March 26, 1984 amended response to the UCS petition. In this revised response, it is stated that replacement of the Bailey E/P converters for the EFW control valves would be completed by June, 1984. GPU also submitted additional information regarding the environmental qualification of EFW system electrical equipment by letter dated March 29, 1984. In that letter, the licensee provided justification for not requiring qualification of the Fisher limit switches. That letter also stated that the information supplemented the visit to the GPUN corporate office on March 20 and 21, 1984 at which time this information was reviewed.

By letter dated April 25, 1984, the staff provided GPU with the results of its electrical equipment EQ file audit performed on March 20, and 21, 1984. The enclosure to that letter identified comments regarding the EQ files that were

made by the staff and its consultant during the audit. That letter requested the licensee to update the EQ files in accordance with those comments.

In an April 26, 1984 amended response to the UCS petition, the licensee stated it will complete structural modifications prior to restart that will extend the time available to the operator for terminating flooding in the Intermediate Building following a main feedwater line break. Such a break would then not result in submergence of EFW system equipment not demonstrated qualified for submergence.

By letter dated May 3, 1984, the staff requested GPU to identify and provide a complete list of all EFW system electrical equipment located in the Intermediate Building, and therefore subject to a harsh environment resulting from a high energy line break (HELB) in that building. That letter also requested additional information with respect to the items of EFW system electrical equipment, cited above, that were determined by the licensee as not requiring qualification.

On May 7 and 8, 1984, the staff and a consultant from EG&G, Idaho, again met with GPU at their corporate offices to discuss EFW system EQ. The staff discussed with GPU the broader issue of what electrical equipment, in addition to equipment which is part of the EFW system itself, is associated with the function of the EFW system. The licensee was requested to address this issue when it responded to the staff's letter of May 3, 1984, and to include justification for not requiring qualification of any additional equipment that is not part of the EFW system, but that is located in a harsh environment area and is associated with the function of the EFW system.

During the May 7 and 8, 1984 trip to GPU's corporate offices, the staff and its consultant also reviewed EQ documentation for three additional items of EFW system electrical equipment. One of the equipment items, BIW cable, had been identified by the licensee as EFW system equipment subsequent to the staff's previous audit on March 20 and 21, 1984. The other two items required to be qualified, Conoflow I/P converters and the Anaconda cable associated with it, resulted from the replacement of the Bailey E/P converter. The staff provided a copy of its comments on these files to GPU, and requested that they be addressed as part of the licensee's response to the staff's April 25, 1984 letter. These and all other audit comments were subsequently also provided to UCS by letter dated August 7, 1984.

A supplemental petition, dated May 9, 1984, was filed by the UCS pursuant to 10 CFR 2.206. In its supplemental petition, the UCS requests three additional items of relief from the Commission based essentially on the results of the staff's March 20 and 21, 1984 EQ file audit. The three additional items of relief requested are:

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.

By letter dated May 10, 1984, GPU provided its response to the staff's letter of May 3, 1984. In a May 16, 1984 amendment to its response to the UCS petition, the licensee cites this letter and other references as documenting its resolution of outstanding qualification items.

On May 24, 1984, the staff and a consultant from EG&G, Idaho, once again met with GPU at their corporate offices. At that meeting the licensee informed the staff that it had obtained the assistance of a consulting firm to revise the format of GPU's EQ files. Following an explanation of the new format by one of the licensee's consultants, the staff and its consultant examined several of the restructured EQ files associated with EFW system electrical equipment. The staff provided GPU with a copy of comments the staff and its consultant wrote down while reviewing the files. The staff also verbally provided GPU with comments concerning the new format of the files and requested some changes be made to that format. One of the licensee's consultants later responded to some of the staff's comments provided to the licensee earlier in the day.

Also during the May 24, 1984 meeting, the staff and its consultant provided verbal comments to GPU on a draft response to the staff's letter of April 25, 1984. Included in that discussion were the licensee's draft responses to the staff's comments resulting from the EQ file audit performed on May 7 and 8, 1984, which would be included in GPU's response to the staff's April 25, 1984 letter. The staff informed the licensee during that meeting that following receipt of GPU's formal response to the April 25, 1984 letter and a determination by GPU that restructuring of the EQ files for the EFW system and associated equipment was completed and that the files documented full qualification of the equipment, the staff would perform a review of those files.

By letter dated May 31, 1984, the licensee submitted its response to the staff's April 25, 1984 letter. In another amended response to the UCS petition, also dated May 31, 1984, the licensee stated that based on its further review the terminations on the EFW pump motors have not been documented as qualified. In this amended response the licensee stated that these terminations would be replaced with qualified terminations in June, 1984.

The licensee then submitted a response, dated June 11, 1984, to the UCS supplemental petition of May 9, 1984. The response concludes that the supplemental petition should be denied as unnecessary (Relief Item 1) and without basis (Relief Item 2).

After being informed by the licensee that the EQ files for the EFW system and associated electrical equipment were ready to be audited, the staff and a consultant from EG&G, Idaho, performed that audit on June 25, 1984. The staff and its consultant found that there were still deficiencies remaining in the EQ files. These remaining deficiencies, discussed below, were identified to the licensee prior to the staff's departure from the GPU office.

By letter dated June 25, 1984, the staff informed GPU that four motorized valve actuators that the licensee identified in its May 10, 1984 letter as not requiring environmental qualification should be included in its EQ program and demonstrated to be environmentally qualified.

The UCS filed a reply to GPU's June 11, 1984 response to the May 9, 1984 UCS supplemental petition. In its reply, dated July 31, 1984, the UCS reiterates its request that the Office of Investigations immediately investigate whether GPU has made material false statements to NRC in connection with the environmental qualification program.

The staff performed a final audit on August 6, 1984, shortly after being informed by the licensee that the EQ files for all EFW system electrical equipment, and electrical equipment associated with the function of the EFW system, were complete and that all deficiencies identified during the June 25, 1984 audit had been corrected. The results of that audit are presented later in this evaluation.

By letter dated August 6, 1984, the licensee provided its response to the staff's June 25, 1984 letter. In its response, the licensee stated its intention to include in its EQ program the four valve actuators the staff identified as requiring environmental qualification. GPU also stated its intention to replace the motors in two of these four actuators. Qualification of the four actuators is discussed later in this evaluation.

EVALUATION

In its petition, UCS states that the TMI-1 EFW system is not environmentally qualified as required by NRC regulations. Specifically, the UCS contends that EFW system electrical equipment is not qualified for the environment resulting from a high energy line break in the Intermediate Building. The UCS' supplemental petition cites the results of the staff's March 20 and 21, 1984 EQ file audit as a further basis to support the original petition.

NRC's Environmental Qualification Requirements

The Commission's requirements regarding environmental qualification of electrical equipment important to safety located in areas subject to harsh environmental conditions resulting from Design Basis Accidents are contained in Section 50.49 of 10 CFR Part 50. However, plants are allowed to operate prior to the deadline for qualification specified in 10 CFR 50.49, or any extension to that deadline granted by the staff or the Commission, with

equipment whose qualification has not been completed if it can be shown that such operation will not present undue risk to the public health and safety pending complete qualification. An analysis is required to be performed, called a justification for continued operation (JCO) in the case of an operating plant, that demonstrates the plant can be operated in a safe manner with the equipment not yet qualified.

Scope of Electrical Equipment

Some items of EFW system electrical equipment are identified in the petition. In order for the staff to determine the qualification status of all EFW system electrical equipment, GPU was requested to identify all EFW system electrical equipment located in a potentially harsh environment area, ie., the Intermediate Building. GPU was also requested to identify all electrical equipment, located in a harsh environment, associated with the function of the EFW System. Following is a list, provided by letter dated May 10, 1984 from GPU, that includes both EFW system electrical equipment, and electrical equipment associated with the function of the EFW system. (The May 10, 1984 letter incorrectly identified the model number of the Conoflow I/P converters. The correct model number, given below, is identified in the EQ file for this item of equipment and in the licensee's August 6, 1984 letter).

<u>Equipment</u>	<u>Manufacturer</u>	<u>Model</u>	<u>Tag No(s).</u>	<u>TER Item No.</u>
Motorized Valve Actuators	Limitorque	SMB0	EFV-2A&B	11
Motorized Valve Actuators	Limitorque	SMB000	EFV-1A&B	15
Pump Motors	Westinghouse	HP 450	EFP-2A&B	51
Cable	Continental Wire and Cable Co.			107
Cable	Kerite			106
Terminal Block	States	NT		110
Flow Transmitters	Foxboro	NE 13DM	FT-791, 779, 782 & 788	None
Cable	Anaconda			None
Cable	Boston Insulated Wire			None
Motorized Valve Actuators	Limitorque	SMB1	MSV-2A&B	None
I/P Converters	Conoflow	GT45CA1826		Replaced 60
Diodes	Square D	JTXIN6071A		Replaced 116
Limit Switches	NAMCO	D2400X2	LSA/MSV-6 LSB/MSV-6	66
Limit Switches	NAMCO	D1200G2	LSA/MSV-13A&B LSB/MSV-13A&B	67
Limit Switches	Fisher		LS/EFV-30A&B	None
Solenoid Valves	ASCO	LB8210C94	SV3/EFV-30A&B SV4/EFV-30A&B	26

<u>Equipment</u>	<u>Manufacturer</u>	<u>Model</u>	<u>Tag No(s).</u>	<u>TER Item No.</u>
Solenoid Valves	ASCO	8300C68G	SV1/EFV-30A&B SV2/EFV-30A&B	28
Solenoid Valves	ASCO	LB83146	SV/EFV-8A,B&C	31
D/P Switches	Barton	277A	FIS-77,78&79	77
Motorized Valve Actuators			COV-14A&B	None
Motorized Valve Actuators	Limitorque	SMB1	MSV-2A&B	None
Motorized Valve Actuators			COV-111A&B	None
Motorized Valve Actuator			ASV-4	None
Turbine Driven Pump			EFP-1	None
Motorized Valve Actuators			EFV-4&5	None
Pneumatic Valve Actuators			MSV-4A&B	None
Pneumatic Valve Actuator			MSV-6	None
Motorized Valve Actuators			MSV-1A,B,C&D	None
Motorized Valve Actuators			MSV-10A&B	None

<u>Equipment</u>	<u>Manufacturer</u>	<u>Model</u>	<u>Tag No(s).</u>	<u>TER Item No.</u>
Pneumatic Valve Actuators			MSV-13A&B	None
Pressure Transmitters			PT-65,71&75	None
Temperature Element			TE-230	None
Pneumatic Valve Actuators			EFV-15A&B	None
Speed Indicating Transmitter			ST-8	None
Motorized Valve Actuators			MSV-8A&B	None

The staff discussed with GPU the scope of equipment, both EFW system equipment and equipment associated with the function of the EFW system, i.e., interfacing equipment, in detail during the meeting at GPU's corporate offices on May 7 and 8, 1984. During that meeting, a flow diagram that identified all such equipment, both located inside and outside the Intermediate Building, was used for discussion purposes.

Subsequent to receipt of the licensee's May 10, 1984 letter and the meeting cited above, two additional items of equipment were added to the scope of this review, namely Kerite 5 kV cable splices and Raychem WCSF200N low voltage splices (1kV). Both of these equipment items are components of equipment listed above. The Kerite splices are replacements for the EFW pump motor terminations whose qualification could not be documented, as stated by the licensee in its May 31, 1984 amended petition response. The Raychem splices are being installed in Limitorque motorized valve actuators EFV-1A&B and COV-111A&B to replace splices found in them during an examination of these actuators in the plant.

Based on its review, the staff concurs that the above list of equipment together with the Kerite and Raychem splices includes all EFW system equipment and interfacing equipment located in the Intermediate Building, and therefore defines the proper scope of equipment for the purposes of this evaluation.

Qualification Status of the Equipment

Equipment Required to Be Qualified

The above equipment could be subjected to, and therefore must be qualified for, harsh environmental conditions resulting from high energy line breaks in the Intermediate Building. The most severe temperatures, pressures and relative humidity that the equipment could experience results from an envelope of the conditions created by a main steam line break and a steam supply to EFWP turbine line break. Additionally, some cable will become submerged as a result of a break in the main feedwater piping. The staff had previously verified that the environmental parameters identified by the licensee for the main steam line break are acceptable, as documented in the staff's March 24, 1981 SER for TMI-1.

In its May 10, 1984 letter, the licensee identified the first 11 items of equipment listed above as required to be environmentally qualified in accordance with the requirements of 10 CFR 50.49. For 23 of the remaining items above, the licensee provided justification for not requiring that the equipment be demonstrated to be environmentally qualified. The Square D diodes had been identified prior to the staff's March 20 and 21, 1984 EQ file audit as requiring qualification. The licensee subsequently provided justification for not requiring qualification of the diodes, discussed later in this evaluation.

The staff reviewed the list of equipment required to be qualified as identified by the licensee, and the justification provided for not requiring qualification of the remaining equipment within the scope of this review.

Based on that review, the staff determined that four additional Limitorque motorized valve actuators, COV-14A&B and COV-111A&B, required qualification and informed the licensee of this by letter dated June 25, 1984, as cited above. Therefore, the electrical equipment within the scope of this review that is required to be environmentally qualified consists of the 11 items of electrical equipment identified by the licensee in its May 10, 1984 submittal as required to be qualified, the four additional valve actuators identified above, and the Kerite and Raychem splices discussed above.

As stated previously, the staff met with GPU to discuss the environmental qualification of TMI-1 electrical equipment and their proposed resolutions for the deficiencies identified in the FRC TER. The staff then performed audits of the licensee's EQ files at the GPU corporate offices on March 20 and 21, May 7 and 8, May 24, June 25, and August 6, 1984. The audits involved a review by the staff and a consultant from EG&G, Idaho, of the EQ documentation relied upon by GPU to demonstrate environmental qualification of all electrical equipment required to be environmentally qualified. The staff's comments on the EQ documentation it reviewed during its March 20 and 21, 1984 audit are contained in the enclosure of the April 25, 1984 letter from the staff to GPU. The staff's comments on the documentation it reviewed on May 7 and 8, 1984 were provided to the licensee prior to the staff's departure from GPU's corporate offices on May 8, 1984. The staff provided written and verbal comments to the licensee at the time the staff reviewed the EQ files on May 24, and provided verbal comments to the licensee at the June 25, 1984 audit. Audit comments were also subsequently provided to UCS by letter dated August 7, 1984.

As indicated by the comments resulting from the staff's first two audits of EQ documentation, a significant amount of effort remained on the part of the licensee in order to document in a complete manner that the equipment is environmentally qualified. In that regard, the licensee was requested by the staff's April 25, 1984 letter to update the EQ files the staff audited in accordance with the comments identified in the letter's attachment. GPU was also requested to address the staff's comments resulting from the audit performed on May 7 and 8.

The comments the staff made on the EQ files it reviewed during the first two audits can be characterized as absence of complete documentation to demonstrate the equipment was environmentally qualified. The EQ documentation provided to the staff for review consisted essentially of reports documenting the results of testing that had been performed on the equipment. A test report, in and of itself, does not completely support a determination that the equipment is qualified. The user of the equipment, i.e., licensee or applicant, is required to review the report and document such things as required post-accident operating time compared to the duration of time the equipment has been demonstrated to be qualified, similarity of tested equipment to that installed in the plant (e.g., insulation class, materials of components of the equipment, tested configuration compared to installed configuration), evaluation of adequacy of test conditions, aging calculations for qualified life and replacement interval determination, effects of decreases in insulation resistance on equipment performance, adequacy of demonstrated accuracy, evaluation of test anomalies, and applicability of EQ problems reported in IE Information Notices and their resolution. The staff's comments concerned the lack of documentation to address these issues.

During the staff's third audit on May 24, 1984, the licensee was in the process of restructuring the EQ files. The staff reviewed some of these files containing EQ documentation for several of the same equipment items that it had reviewed documentation for during the first two audits. The written and verbal comments the staff provided the licensee consisted of questions regarding clarification of some of the documentation in the files and suggestions regarding the format of the restructured files.

The staff performed its fourth audit of the EQ files on June 25, 1984. At that audit the staff reviewed a total of 10 EQ files. Nine of these files contained EQ documentation for all 11 items of electrical equipment identified by the licensee in its May 10, 1984 submittal as required to be environmentally qualified. The remaining file contained the EQ documentation for the replacement EFW pump motor terminations, Kerite splices. The staff found one deficiency applicable to almost all of the files, i.e., the basis for the demonstrated post-accident operating time. For most of the equipment, the files showed that the basis for the length of time the equipment was qualified to operate post-accident was that the environmental conditions returned to normal approximately two hours following a high energy line break, and therefore the equipment would be operating in a mild environment and not subject to failure as a result of environmental conditions. The staff informed the licensee that this basis was technically inadequate and not acceptable. For one item of equipment, the Conoflow I/P converters, the licensee performed an Arrhenius calculation while the staff was reviewing the files that documented, in an acceptable manner, the demonstrated post-accident operating time. For all remaining affected files the staff requested the licensee to resolve this deficiency and document that resolution in the files.

The 10 files the staff reviewed and its findings as a result of the June 25, 1984 audit, in addition to the deficiency discussed above, were as follows:

1. GPU File EQ TM 104

Limatorque Motorized Valve Actuators

EFV-2A&B, Model SMBO, TER Item No. 11

EFV-1A&B, Model SMB000, TER Item No. 15

MSV-2A&B, Model SMB1, No TER Item No.

The documentation in the file was adequate to show that this equipment is environmentally qualified, with one exception. This exception concerned the disposition of IE Information Notice 83-72. Reference No. 10409 in the file stated that Limatorque informed GPU during a telecon that only one nuclear plant (not TMI-1) contained the valve motor operators with the underrated terminal blocks identified in the Information Notice. This document further stated that GPU will get a letter from Limatorque to confirm the telecon information. The staff informed the licensee that the terminal block in question had been found at another plant besides the one identified by Limatorque, and that this issue remained to be resolved for TMI-1. There was no other documentation in the file to address the other information concerning Limatorque Motorized Valve actuators in the IE Information Notice.

The UCS' May 9, 1984 supplemental petition cites certain findings from the staff's March 20 and 21, 1984 audit. One of the findings cited is that the file did not document the motor manufacturer, the insulation class and the current type for the valve actuators. These deficiencies had been resolved. The file contained a listing, generated using maintenance records, of valve actuators and motor manufacturers, insulation class and current type. Another of the staff's audit findings cited by UCS is 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. This deficiency had been addressed by an analysis contained in the file that shows the equipment is qualified for the more severe environments. The staff reviewed that analysis and found it acceptable to resolve this deficiency. Further, the file contained documentation that resolves all deficiencies identified in the 1982 FRC TER, including those cited by the UCS. It should be noted that TER deficiency C.3, cited by UCS, concerned the main steam line break (MSLB) temperature spike and not the temperature resulting from a steam supply to EFWP turbine line break. -

2. GPU File EQ TM 107

Westinghouse Pump Motors

EFP-2A&B, Model HP 450, TER Item No. 51

The documentation in this file supported a finding that this equipment is environmentally qualified, with the exception of the pump motor terminations. Qualification of the pump motor terminations is addressed later in this evaluation.

One of the staff's March 20 and 21, 1984 audit findings cited by UCS in its supplemental petition is that the file did not contain information to establish similarity between these motors and the motor, lead wires and insulation tested. The file contained a document, WCAP 10575, Rev. 0, "Evaluation of the Operation of Emergency Feedwater Pump Motors in a High Energy Line Break Environment for GPU's TMI Unit 1 Nuclear Power Plant," dated June 19, 1984, and other documentation that established similarity of the TMI-1 motors and motors, lead wire and insulation tested. Documentation describing these tests and the results were also included in this file.

3. GPU File EQ TM 108

Anaconda Cable

No TER Item No.

The documentation in this file provided adequate evidence that the cable is environmentally qualified, with one exception. The documentation did not completely establish similarity between the cable installed in TMI-1 and the cable tested. The licensee was requested to resolve this deficiency.

4. GPU File EQ TM 111

Kerite Cable

TER Item No. 106

The documentation in this file provided evidence that environmental qualification has been demonstrated. In its supplemental petition, the UCS cited the staff's March 20 and 21, 1984 audit findings at which time the staff found that this file did not contain documentation to establish similarity between the cables tested and those installed, nor did the file contain documentation to establish a qualified life for the cable. These deficiencies had been resolved. The file contained a letter from Kerite, dated May 16, 1984, that establishes the applicability of Kerite Report, "TMI-1 GPU Metropolitan Edison Co. Qualification Documentation for Kerite HTK/FR Power Cables," dated August 21, 1981, for establishing qualification of TMI-1 cables. This Kerite report was not in the file at the time of the staff's March 20 and 21 audit. The file also contained documentation describing the aging performed on the test cables that shows the cables have a qualified life of 40 years at 90°C.

5. GPU File EQ TM 102

States Terminal Blocks

Model NT, TER Item No. 110

The documentation in this file resolved all audit comments and provided adequate evidence that the equipment is environmentally qualified.

6. GPU File EQ TM 110

Foxboro Flow Transmitters

FT-791, 799, 782 & 788, Model NE 13DM, No TER Item No.

Documentation in this file was still deficient in that two anomalies that occurred during testing of these transmitters had not been adequately addressed. The staff reviewed a memorandum dated August 3, 1983 that the licensee, in its May 31, 1984 submittal, identified as documenting its evaluation of the anomalies. The staff did not find the evaluation to be adequate, and requested the licensee to resolve this deficiency.

7. GPU File TM EQ 106

Conoflow I/P Converters

Model GT45CA1826, Replaced TER Item No. 60

These converters are replacements for the Bailey E/P converters. During audit the staff found that the documentation in the file did not establish similarity between the tested equipment and the TMI-1 converters. The

licensee discussed the issue with the equipment manufacturer at the time the staff was conducting its audit in order to confirm that the test documentation was applicable to the TMI-1 equipment. The licensee informed the staff that the manufacturer stated that the tested equipment was a different model than that installed in TMI-1, but that the equipment was identical except for the range of pressure the current is converted to. The licensee committed to get a letter from the manufacturer stating the above and stated that the letter would be placed in the file.

With regard to the post-accident operating time deficiency, cited above as being applicable to almost all the files, the licensee performed an analysis during the time the staff was conducting its audit to justify the post-accident operating time identified in the file for this equipment. The staff reviewed that analysis and found it acceptable.

8. GPU File EQ TM 109

Continental Wire & Cable Co. Cable

TER Item No. 107

The documentation in this file provided adequate evidence that the cable is environmentally qualified, with one exception. The documentation did not completely establish similarity between the cable installed in TMI-1 and the cable tested. The licensee was requested to resolve this deficiency. This

was a deficiency the staff identified as a result of its March 20 and 21, 1984 audit, and is cited by the UCS in its supplemental petition. Another finding from that audit cited by the UCS was that the file did not contain documentation to establish a qualified life for the cable. The file contained a June 4, 1984 letter from Continental Wire and Cable Co. that provided an Arrhenius plot that establishes a qualified life of 40 years at 114°C for the cable tested. This deficiency would therefore be resolved if similarity was established.

9. GPU File EQ TM 101

Boston Insulated Wire Cable

No TER Item No.

The documentation in this file resolved all audit comments and provided adequate evidence that the cable is environmentally qualified.

10. GPU File EQ TM 126

Kerite Splices

No TER Item No.

These splices are the replacement EFW pump motor terminations. The documentation in the file did not support qualification of these splices. The test report identified failures of some cable/splice samples that were not evaluated. The licensee was requested to resolve this.

The staff's final audit of the EQ files took place on August 6, 1984. The staff again reviewed the 10 files it audited on June 25, 1984, plus a file for Raychem splices that had been assembled subsequent to that audit. The purpose of the final audit was to verify that the remaining EQ file deficiencies, i.e., those deficiencies the staff identified during its June 25, 1984 audit, had been corrected. The staff's findings resulting from its final audit are given below. (Note that the files are now identified by the licensee as EQ-T1-XXX, instead of the previous identification of EQ-TM-XXX). Each of the files listed below referenced documentation contained in a generic EQ file, EQ-T1-100. This generic file contained documentation such as the temperature/pressure profile for equipment located in the Intermediate Building. Therefore, the staff's audit findings were based on both the EQ documentation contained in the individual equipment files and documentation contained in the generic EQ file.

1. GPU File EQ T1 104

Limitorque Motorized Valve Actuators

Documentation in the file identified the post-accident operating time for these actuators to be the duration of time for which the specimens were tested in the simulated accident environment. Since the test duration adequately enveloped the required operating time, the deficiency with regard to the demonstrated post-accident operating time had been resolved. The file also

addressed qualification of the four additional actuators, COV-14A&B and COV-111A&B, that the licensee was informed should be included in its EQ program by staff letter of June 25, 1984. Also in the file was an evaluation addressing the disposition of IE Information Notice 83-72. The staff reviewed the evaluation and found it adequate to address the information in the Notice.

As part of its effort regarding disposition of IE Information Notice 83-72, the licensee performed a field walkdown to examine the actuators installed in TMI-1. During that walkdown it was found that actuators EFV-1A&B and COV-111A&B did not contain terminal blocks, but utilized splices for electrical connections. The licensee decided to replace these existing splices with Raychem splices, and prepared a separate EQ file for them. The Raychem EQ file is discussed later in this evaluation. Also during the walkdown it was found that COV-111A&B contained Peerless motors whose qualification was not documented. Therefore, the licensee is replacing these Peerless motors with motors manufactured by Reliance. The Reliance motors have Class B insulation. These replacement motors are documented in this file to be qualified.

The staff found during this audit that substantial changes had been made by the licensee to the contents of this file since the June 25, 1984 audit. One change that had been made involved removal from the file of a listing, cited previously in this evaluation, of valve actuators, motor manufacturers, insulation class and current type. However, except for identification of the motor manufacturer the file still contained this same information, only it was based on the results of the field walkdown the licensee performed subsequent

to the previous audit. Identification of motor manufacturer was also determined during that walkdown. The results of the field walkdown were then used by the licensee, together with correspondence from Limitorque contained in the file, to establish applicability of the various test reports in the file for TMI-1 actuators. Thus, this deficiency, cited by UCS in its May 9, 1984 supplemental petition, remained resolved.

Based on the above findings that all remaining deficiencies had been resolved, the staff found that the documentation in this file, together with documentation in the Raychem splice file discussed later, provided adequate evidence that valve actuators EFV-2A&B, MSV-2A&B and COV-14A&B are environmentally qualified, actuators EFV-1A&B with replacement Raychem splices are environmentally qualified, and actuators COV-111A&B with replacement Raychem splices and Reliance motors with Class B insulation are environmentally qualified. The staff will verify, prior to restart, that the equipment modifications discussed above have been performed.

2. GPU File EQ T1 107

Westinghouse Pump Motors

Documentation in the file identified the post-accident operating time as the time for which the test motor was tested in the simulated accident environment. Since the test duration adequately enveloped the required operating time, the deficiency with regard to the demonstrated post-accident operating time had been resolved.

Based on the above finding that the remaining deficiency had been resolved, the staff found that the documentation in this file, together with documentation in the Kerite splice file discussed later, provided adequate evidence that this equipment with the replacement Kerite splices is environmentally qualified. The staff has verified that the Kerite splices are installed.

3. GPU File EQ T1 108

Anaconda Cable

Documentation in the file identified the post-accident operating time as the time for which the test cables were tested in the simulated accident environment. Since the test duration adequately enveloped the required operating time, the deficiency with regard to the demonstrated post-accident operating time had been resolved. The file also contained a June 29, 1984 letter from the Anaconda Wire and Cable Company that, together with a May 5, 1984 letter from the same company, established similarity between the cable tested and the cable installed in TMI-1.

Based on the above findings that the remaining deficiencies had been resolved, the staff found that the documentation in this file provided adequate evidence that this equipment is environmentally qualified.

4. GPU File EQ T1 111

Kerite Cable

Documentation in the file identified the post-accident operating time as greater than six months, which adequately enveloped the required operating time. The file contained a calculation, dated July 27, 1984, that shows the cable will operate for a period of time greater than six months after initiation of the high energy line break. Therefore, the deficiency with regard to the demonstrated post-accident operating time had been resolved.

Based on the above finding that the remaining deficiency had been resolved, the staff found that the documentation in this file provided adequate evidence that the cable is environmentally qualified.

5. GPU File EQ T1 102

States Terminal Blocks

Documentation in the file identified the post-accident operating time as greater than six months, which adequately enveloped the required operating time. The file contained a calculation, dated July 23, 1984, that shows the equipment will operate for a period of time greater than six months after start of the accident environment. Therefore, the deficiency with regard to the demonstrated post-accident operating time had been resolved.

Based on the above finding that the remaining deficiency had been resolved, the staff found that the documentation in this file provided adequate evidence that the equipment is environmentally qualified.

6. GPU File EQ T1 110

Foxboro Flow Transmitters

The file contained documentation addressing the two test anomalies that the staff found during its June 25, 1984 audit had not been adequately evaluated. One of the anomalies, an interruption of the test, is addressed by a calculation, dated June 27, 1984, that shows these transmitters were adequately tested even taking no credit for the testing performed following the interruption. For the other anomaly, the licensee reviewed the WYLE (testing organization) evaluation included in the test report in the file, documented its agreement with that evaluation, and concluded the transmitters are qualified for their application in TMI-1. The staff reviewed the WYLE evaluation and found it to be adequate. Also in the file was documentation identifying the post-accident operating time as the time for which the test transmitters were tested in the simulated accident environment. The test duration enveloped the required operating time. Further, the evaluation of the test interruption anomaly showed a much longer post-accident operating time even if credit is not taken for the entire test duration. Therefore, the staff found that the deficiency with regard to the demonstrated post-accident operating time had also been resolved.

Based on the above findings that the remaining deficiencies had been resolved, the staff found that the documentation in the file provided adequate evidence that the equipment is environmentally qualified.

7. GPU File EQ T1 106

Conoflow I/P Converters

The file included a letter from the manufacturer, ITT Conoflow, to GPU which the staff found acceptable to establish similarity between the tested equipment and the TMI-1 converters.

Based on the above finding that the remaining deficiency had been resolved, the staff found that the documentation in the file provided adequate evidence that the equipment is environmentally qualified. The staff has verified that these I/P converters have been installed in place of the previously installed E/P converters (Region I Inspection Report 50-289/84-21).

8. GPU File EQ T1 109

Continental Wire & Cable Co. Cable

The file contained a June 29, 1984 letter from the cable manufacturer which established similarity between the cable tested and the cable installed in TMI-1. Also in the file was documentation identifying the post-accident operating time as greater than six months, which adequately enveloped the required operating time. A calculation, dated July 2, 1984 contained in the file shows the equipment will operate for a period of time post-accident of greater than six months. Therefore, the deficiency with regard to the demonstrated post-accident operating time had been resolved.

Based on the above findings that the remaining deficiencies had been resolved, the staff found that the documentation in this file provided adequate evidence that the equipment is environmentally qualified.

9. GPU File EQ T1 101

Boston Insulated Wire Cable

Documentation in the file identified the post-accident operating time as the time for which the test cable was tested in the simulated accident environment. Since the test duration adequately enveloped the required operating time, the deficiency with regard to the demonstrated post-accident operating time had been resolved.

Based on the above finding that the remaining deficiency had been resolved, the staff found that the documentation in this file provided adequate evidence that the equipment is environmentally qualified.

10. GPU File EQ T1 126

Kerite Splices

The test report identified failures of some cable/splice samples that were tested. An evaluation, dated July 27, 1984, addressing these failures was contained in the file. The staff reviewed that

evaluation, and together with an August 3, 1984 letter in the file from the Kerite Company stating it had reviewed GPU's evaluation and concurred with it, found it acceptable. Documentation was also in the file that properly identified and justified the post-accident operating time.

Based on the above findings that the remaining deficiencies had been resolved, the staff found that the documentation in this file provided adequate evidence that the equipment is environmentally qualified.

11. GPU File EQ T1 134

Raychem Splices

These splices are being used in Limatorque motorized valve actuators EFV-1A&B and COV-111A&B as replacements for splices found in them during the recently completed field walkdown. The staff will verify that these splices are installed prior to restart. The staff found that the documentation in this file provided adequate evidence that the splice is environmentally qualified.

In its May 9, 1984 supplemental petition, the UCS cites the three deficiencies the staff found applicable to all the files it reviewed during its March 20 and 21, 1984 audit. Subsequent to that first audit, the staff has performed the additional audits discussed above in order to independently verify that documentation exists and is technically sufficient to demonstrate environmental qualification of each and every electrical component in the EFW system and in every other system required for proper operation of the EFW system. The three deficiencies cited by UCS are now resolved, in

that 1) there is positive evidence in the files that GPU has reviewed the EQ documentation and concluded that the equipment is qualified, 2) the material in the files is signed and dated, and shows that the statements/information contained on them has been checked and approved, and 3) the files specify the duration of time for which the equipment has been qualified and the post-accident period of time for which it is required to function.

Based on the results of our audits, the staff finds that all electrical equipment requiring qualification, both EFW system equipment and equipment associated with the proper functioning of the EFW system, has been demonstrated to be environmentally qualified in accordance with the requirements of 10 CFR 50.49.

Equipment Not Requiring Qualification

As cited previously, GPU provided justification for not requiring that certain items of electrical equipment be demonstrated to be environmentally qualified. Prior to increasing the scope of equipment within this evaluation beyond EFW system equipment, information to justify not requiring qualification of certain equipment had been submitted for seven items of equipment involving NAMCO and Fisher limit switches, ASCO solenoid valves and Barton D/P switches. The staff reviewed that information and requested additional information in its letter of May 3, 1984. By letter dated May 10, 1984, the licensee provided that additional information and information to justify not requiring qualification of 16 additional items of equipment. These 16 items were added following the staff's meeting with GPU on May 7 and 8, 1984 to discuss the scope of equipment that should be considered for the purposes of this evaluation.

The staff had identified criteria that could be used to justify not having to demonstrate equipment environmental qualification in its SER for TMI-1 dated March 24, 1981. Essentially the same criteria is currently accepted by the staff. Equipment need not be environmentally qualified if one or more of the following criteria are satisfied:

- a. Equipment is not required to perform a safety function during or following exposure to the harsh environment created by a design basis accident (DBA), and failure of the equipment will not adversely impact safety functions or mislead the operator.
- b. Equipment is required to perform a safety function during or following a DBA, but is not subjected to a harsh environment as a result of the DBA.
- c. Equipment performs its function before its exposure to a harsh environment, and the adequacy of the time margin provided is justified; subsequent failure of the equipment as a result of the harsh environment will not degrade other safety functions or mislead the operator.
- d. The safety function can be accomplished by some other designated equipment that is qualified and satisfies the single-failure criterion; failure of the principal equipment as a result of the harsh environment will not degrade other safety functions or mislead the operator.

The staff reviewed the information provided by the licensee in its letter of May 10, 1984. The staff found that the information provided for four motorized valve actuators, COV-14A&B and COV-111A&B, did not justify not requiring qualification of this equipment. The licensee was informed of this finding by letter dated June 25, 1984. Qualification of these motorized valve actuators was previously discussed in this evaluation. For the other equipment identified by the licensee, the majority satisfy either criterion a. or d. above. The remaining equipment either has no electrical components, is not electrically connected, i.e., is not operational, or in the case of EFV-4&5 are locked closed with their associated breakers locked open. Since only equipment located in the Intermediate Building, and therefore subject to the harsh environmental conditions resulting from a HELB in that building, has been identified, criterion b. has not been relied upon by the licensee. No equipment was identified as not requiring qualification on the basis of satisfying criterion c.

Based on the above, the staff finds that there is adequate justification for not requiring qualification of the items of equipment the licensee has identified as such in its letter of May 10, 1984, except for the four valve actuators cited above. These actuators have now been included in the licensee's EQ program, as discussed previously.

CONCLUSIONS

In the petition, the UCS states that the TMI-1 EFW system is not environmentally qualified. The staff's December 10, 1982 SER and November 5, 1982 FRC TER for

TMI-1, cited by UCS in support of this contention, do indicate environmental qualification deficiencies for EFW system electrical equipment. The deficiencies were identified as a result of the documentation that was reviewed and evaluated at that time. The petition does not identify any EFW system electrical equipment environmental qualification problems that the staff was not already aware of. The UCS' supplemental petition cites the results of an EQ file audit performed by the staff and, therefore, does not identify any EQ problems other than those identified by the staff.

The above evaluation documents the results of the staff's review of the current status of both EFW system electrical equipment and equipment associated with the function of the EFW system. Based on the results of its evaluation, the staff concludes the following:

1. All EFW system electrical equipment and equipment associated with the function of the EFW system located in the Intermediate Building has been properly identified.
2. All such equipment required to be environmentally qualified has been demonstrated to be so in accordance with the NRC's regulations.
3. There is acceptable justification for not requiring that qualification be demonstrated for the remaining equipment.

Dated: September 13, 1984

This Safety Evaluation was prepared by R. LaGrange, Equipment Qualification Branch.