June 11, 1984

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE DIRECTOR OF NUCLEAR REACTOR REGULATION

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

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

I. INTRODUCTION

The Union of Concerned Scientists (UCS) filed with the Commission on January 20, 1984, a ". . . Petition for Show Cause Concerning TMI-1 Emergency Feedwater System." The Commission referred the UCS Petition to the Office of Nuclear Reactor Regulation for treatment as a request for action pursuant to 10 C.F.R. § 2.206. On February 24, 1984, Licensee filed with the Director of NRR its ". . . Response to Union of Concerned Scientists' Petition for Show Cause Concerning TMI-1 Emergency Feedwater System."1/

1/ Licensee's response included a "GPU Nuclear Technical Response to Union of Concerned Scientists' Petition for Show Cause

(Continued Next Page)

D503

On April 27, 1984, the Director of NRR issued "Interim Director's Decision Under 10 CFR 2.206," DD-84-12, which tentatively denied the UCS request as to four of the issues raised in the UCS Petition. The decision does not address the environmental qualification of the EFW system or the aggregate effect of the five issues raised by UCS on the reliability of the EFW system.

On May 9, 1984, UCS filed with the Commission a "Supplement to Union of Concerned Scientists' Petition for Show Cause Concerning TMI-1 Emergency Feedwater System." The UCS Supplemental Petition addresses the environmental qualification issue, requests that the Commission itself take jurisdiction in the first instance with regard to the Supplement, and seeks the following 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

---

(Continued)

Concerning TMI-1 Emergency Feedwater System," which was filed under oath pursuant to 10 C.F.R. § 50.54(f). The response has been amended on March 26, April 26, and May 16 and 31, 1984, to reflect new factual developments.

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.

The Commission has referred the UCS Supplemental Petition to the Staff for consideration in connection with the UCS Petition. Licensee hereby responds in opposition to the UCS Supplemental Petition.2/ The attached Affidavit of Richard F. Wilson meets the Staff's request that the response be submitted under oath or affirmation pursuant to 10 C.F.R. § 50.54(f).

2/ In a letter of May 29, 1984, from NRC (Eisenhut) to GPU Nuclear (Hukill), the Staff requested that Licensee respond to the matters in the Supplemental Petition connected with items 1 and 2 of the relief requested. Further, in a letter of May 30, 1984, from NRC (Denton) to UCS (Weiss), the Staff indicates that the Supplemental Petition has been referred to the Office of Inspector and Auditor for any action that office may deem appropriate. Consequently, Licensee has not responded explicitly here to relief item 3 of the Supplemental Petition. Licensee does point out below, however, that UCS seriously misconstrues the subject Staff letter of April 25, 1984, and that the Supplemental Petition does not recognize the Staff's activities which follow-up on the audit of March 20-21, 1984.

II. GENERAL UCS ALLEGATIONS

The UCS Supplemental Petition is prompted by a letter of April 25, 1984 from the NRC Staff (Stolz) to GPU Nuclear (Hukill), which transmits comments arising from an audit performed by the Staff and a consultant on March 20 and 21, 1984, of TMI-1 electrical equipment qualification files. The letter states that the primary purpose of the audit had been to review the environmental qualification documentation relied upon to demonstrate qualification of electrical equipment within the scope of 10 C.F.R. § 50.49 for the emergency feedwater (EFW) system.3/ The Staff requested that Licensee provide a detailed submittal addressing its disposition of all commer's pertaining to the EFW system.

Without waiting for Licensee's response to the audit -- and indeed only three business days after UCS received a copy of this Staff letter -- UCS filed the instant Supplemental Petition with the Commission. UCS asks for investigations of Licensee and the Staff to determine whether they have provided false or misleading information. UCS begins this campaign to ferret out the truth with its own misleading distortion of the Staff's letter of April 25, 1984. UCS states that the letter ". . . discloses, as UCS alleged, that vital components of the TMI-1 EFW system are not

---

3/ Seven files containing EFW equipment qualification documentation were reviewed. One additional file for equipment not associated with the EFW system was reviewed.

environmentally qualified as required by 10 CFR 50.49 and General Design Criterion 4 of Appendix A to 10 CFR Part 50." Supplemental Petition at 1. This is neither what the letter states nor what can reasonably be concluded from the letter. The letter merely reports on what the Staff viewed to be documentation deficiencies in the files. One must question the competence or truthfulness of a petitioner which somehow converts such comments into a conclusion, attributed to others, that vital components are not qualified.

The Commission itself has stated that such documentation deficiencies "do not necessarily mean that the equipment is unqualified" but can be a cause for concern which may require further case-by-case evaluation. Petition for Emergency and Remedial Action, CLI-80-21, 11 N.R.C. 707, 714 (1980); see also "Partial Review, Equipment Evaluation Report by the Office of Nuclear Reactor Regulation," transmitted by letter dated February 25, 1981 from T. M. Novak to H. D. Hukill, at 6. In the case of the equipment for which the recent Staff audit identified documentation concerns, Licensee has evaluated the Staff comments, taken appropriate corrective actions and responded in writing to the audit letter. See Exhibit A (GPU Nuclear letter 5211-84-2122 to NRC, Environmental Qualification Audit, May 31, 1984, which is incorporated herein by reference and attached hereto). For the one instance where qualification could not be established for required equipment (terminations on the EFW motors), Licensee has committed to install qualified terminations. Id. at 2-2.

In assessing Licensee's compliance, it must be recognized that licensees of operating reactors have been provided with only vague guidance as to the scope of documentation and degree of detail required to be maintained in the environmental qualification files for each piece of equipment covered by the environmental qualification rule.

IE Bulletin 79-01B (issued on January 14, 1980) required, inter alia, that, for each item of electrical equipment required to function under postulated accident conditions, licensees "provide written evidence of its environmental qualification ... Provide this in the format of Attachment 3." IE Bulletin 79-01B at 2. Attachment 3 to the Bulletin is a sample System Component Evaluation Work Sheet ("SCEW sheet"), which sets forth the environmental parameters to which the item must be qualified and provides an example of the type of qualification documentation references required. Licensee adopted the specific SCEW sheet format called for by the Bulletin and prepared such a sheet for the required items of electrical equipment. These SCEW sheets, and revisions thereto, have been submitted to the Staff on regular intervals. See GPU Nuclear letters L1L-238, dated August 28, 1981; 5211-82-101, dated May 3, 1982; 5211-83-076, dated May 16, 1983. Subsequent issuances on environmental qualification have not revised or rescinded the SCEW sheet requirements of IE Bulletin 79-01B. See, e.g., 10 C.F.R. § 50.49(d), (j).

However, many of the Staff's comments in the audit letter -- and particularly the generic comments -- are geared towards requiring additional evidence of qualification beyond that called for by the SCEW sheet. See, e.g., Exhibit A at 1-1, 1-2, 2-5 (Item G.2). Further, the extent to which supporting qualification documentation (i.e., test reports, calculations) was required to be maintained in the separate EQ files was not previously specified and the requirement that such documentation be "auditable" was certainly subject to individual interpretation. See DOR Guidelines (Attachment 4 to IE Bulletin 79-01B) at 15 ("Complete and auditable records must be available for qualification for any of the methods described in Section 5.0 above to be considered valid. These records should describe the qualification method in sufficient detail to verify that all of the guidelines have been satisfied."); see also 10 C.F.R. § 50.49(j). Indeed, it was not until the Staff's recent audit that Licensee had a complete understanding of the exact nature and detail of the documentation which the Staff judges to be required to be maintained in the EQ files.4/ Having now been provided with this information, Licensee has taken prompt and appropriate actions to correct the deficiencies noted by the Staff.

4/ Earlier audits by the Staff's consultant, Franklin Research Center, did not serve to communicate to Licensee anything more than FRC's final judgments. Until the Staff's audit, there has been no opportunity for Licensee to learn, with specificity, what the Staff views to be acceptable documentation.

These corrective actions, along with responses to specific Staff comments, are documented in Exhibit A and will not be repeated here.5/ UCS, however, calls into question the truthfulness of two Licensee statements made to the NRC. These allegations are the only identified basis for the UCS request that an investigation be conducted to determine whether Licensee has made material false statements to the NRC in connection with the environmental qualification program.

The first statement cited is that "Licensee has responded to the outstanding concerns raised in that [Staff and Franklin Research Center] review." See Supplemental Petition at 8; Licensee's Response to Union of Concerned Scientists' Petition for Show Cause Concerning TMI-1 Emergency Feedwater System at 17 (February 24, 1984). According to UCS, the Staff's audit letter of April 25, 1984 shows that Licensee has not "done so" because the same deficiencies identified previously still exist. Supplemental Petition at 8. Even if one assumes for the moment that UCS is right about the similarity in deficiencies, that does not call into question Licensee's statement that it had responded to the concerns. Whether the response was later judged to be adequate is a different question and one which hinges upon opinion and

---

5/ In addition, however, Licensee disputes the UCS conclusion "that in none of the eight files audited was the documentation in fact even close to adequate." Supplemental Petition at 2. Given the fact that there are nearly 20 potential deficiency categories applicable to each component, the number of deficiencies found belies the UCS claim.

judgment. That Licensee had responded, however, is an unassailable fact. See Refs. 4 and 24, GPU Nuclear Technical Response to Union of Concerned Scientists' Petition for Show Cause Concerning TMI-1 Emergency Feedwater System.

The second Licensee statement cited by UCS refers to the same facts. Licensee stated that it had "documented the resolution of outstanding qualification items in letters to the Staff of February 10 and 22, 1984." See Supplemental Petition at 8; GPU Nuclear Technical Response, supra, at 4. That statement accurately reflected Licensee's opinion at the time. The fact that the Staff later disagreed with our resolution in some cases does not mean that Licensee made a material false statement. As described above, what constitutes adequate documentation for the environmental qualification program is a matter of judgment and interpretation.

III. SPECIFIC UCS ALLEGATIONS

The UCS Supplemental Petition reiterates several of the findings on specific items of equipment contained in the audit letter. Licensee believes that its response to the Staff audit letter (Exhibit A) is also a sufficient response to the issues raised by UCS. However, in view of UCS' penchant for reaching unwarranted conclusions from the historical record, Licensee addresses below those UCS assertions which go beyond the Staff's letter of April 25, 1984.

A. Limitorque Motorized Valve Actuators

At pages 3 through 5 of the Supplemental Petition, UCS attempts to link the Staff comments regarding the lack of documentation in the EQ file on these specific motor operators' motor manufacturer, insulation class and current type, to the general comment in the 1982 TER on deficiencies in documentation showing similarity to tested equipment. It is clear, however, that the audit letter does not raise general similarity concerns and, in fact, Licensee had previously established the similarity of these motor operators to the test specimen and documented this fact to the Staff. See Ref. 4 to GPU Nuclear Technical Response, supra. Thus, UCS' reiteration of the 1982 TER comments on similarity at page 4 of the Supplemental Petition are totally inapplicable now. Further, the information requested by the 1982 TER as to motor manufacturer, insulation class and current type was documented in a separate file in Licensee's EQ section but, at the time of the March 1984 audit, had not been entered on the SCEW sheets. The SCEW sheets have now been revised to include this information. See Exhibit A at 2-1.

UCS next claims that the 1982 TER questions regarding the capability of the operators to withstand the temperatures associated with the main steam line break (MSLB) accident profile are the same as the second comment made by the Staff at page 2 of the audit letter. A comparison of the two comments, however, clearly shows that they address different subjects. During the March,

1984 audit, the Staff identified to Licensee an accident scenario (a break in the steam supply line to the EFW Pump Turbine line) which it believed would result in a more severe environment than the MSLB profile previously evaluated. On the other hand, the TER specifically addressed the MSLB profile. With respect to the MSLB profile question, Licensee performed a thermal lag analysis to show that the operator could withstand the peak temperature and documented the results of this analysis in its February 10, 1984 submittal to the Staff. See Ref. 4 to GPU Nuclear Technical Response, supra. Licensee has also evaluated the temperature profile resulting from the steam supply line to the EFW turbine driven pump postulated accident and determined that the operators are qualified for this environment. See Exhibit A at 2-1.

In sum, the Supplemental Petition provides no basis upon which to question the qualification of the Limitorque motorized valve operators associated with the TMI-1 EFW system.

B. Westinghouse Pump Motors (EFP-2A/B)

The Supplemental Petition, at 5-6, attempts to imply that Licensee has been, at best, unaggressive in its efforts to qualify the Westinghouse motors for Emergency Feedwater Pump 2 A/B. To the contrary, Licensee's attempts to obtain adequate documentation regarding the qualification of these motors is simply indicative of the problems inherent in qualifying equipment which was purchased and installed prior to the implementation of the

environmental qualification requirements. Thus, while Licensee believes that outstanding questions regarding the qualification of these motors have been adequately addressed in its response to the Staff's audit letter (Exhibit A at 2-2, 2-3), Licensee here provides a brief summary of the actions taken to qualify these motors.

In its February 25, 1981 preliminary evaluation of Licensee's environmental qualification submittals, the Staff, in a brief tabular fashion, noted deficiencies which required additional information and/or corrective action for the EFP-2 A/B motors with respect to issues of qualification time, temperature, pressure, humidity and aging. The cover letter accompanying this preliminary evaluation requested that Licensee review the identified deficiencies and their ramifications and provide a brief "overall finding regarding safe operation of your facility in the event of restart." February 25, 1981 letter to H. D. Hukill from T. M. Novak, at 1. Licensee responded to this letter, as noted by UCS, on March 12, 1981 with the requested summary statement. While Licensee's response did not address each particular item of equipment,6/ Licensee did undertake an engineering evaluation of the noted deficiencies prior to its March 12, 1981 response.

6/ Nor was such an item-by-item evaluation requested or anticipated. See February 25, 1981 letter at 2: "The purpose of this statement is to provide the NRC with needed assurance regarding the safety of the facility in the event authorization to restart precedes the time at which you can provide an item-by-item reevaluation in a detailed documented manner."

With respect to the EFP-2A/B motors, Licensee's determination that TMI-1 could operate safely was based upon the fact that analyses were then underway in an attempt to complete the qualification of the motors and were anticipated to be completed prior to restart and, further, that there existed qualified equipment capable of mitigating the failure of these pump motors.

Following the issuance of the 1982 TER which questioned the similarity of the installed motors and insulation systems to those tested, Licensee reviewed test reports and concluded that there was similarity of the installed motors to those tested. See Ref. 4 to GPU Nuclear Technical Response, supra. Licensee then obtained information orally from the manufacturer which confirmed similarity, and later requested written confirmation of the similarity of the insulation system and information concerning the leadwire. As discussed in Licensee's response to the audit letter, the information received in response from Westinghouse was different from the previous oral communication and led to the performance of additional analyses by Licensee to demonstrate the qualification of the pump motors. Licensee is also replacing, prior to restart, the current terminations for the motors (for which qualification could not be demonstrated) with qualified terminations. See Exhibit A at 2-2.

C. QA Review

At pages 7 and 8 of the Supplemental Petition, UCS refers to

statements made by an employee of Licensee at a March 8, 1984 meeting with the Staff regarding a review of the EQ files performed by Licensee's quality assurance organization. UCS then argues that, in light of the deficiencies identified in the Staff's audit letter, the referenced QA review can not be termed "independent" and provides a basis upon which to question Licensee's competence and integrity. Supplemental Petition at 8.

First, UCS is mistaken in its assertion that claims were made that the QA review "fully supported GPU's claims of qualification." Supplemental Petition at 7. As is evident from the transcript excerpt quoted by UCS, no such broad statements were made; rather, as explained by Mr. Maus, the QA assessment was undertaken in order to provide independent verification that the required information was contained in the files. Id. at 8.

The QA assessment referred to by Mr. Maus was indeed an "independent" review of the EQ files, performed by a totally separate line organization from the EQ technical group (as outlined in the GPU Nuclear Operational Quality Assurance Plan) and, in point of fact, uncovered documentation deficiencies similar to those identified in the Staff's audit letter. Further, Mr. Maus's statements at the March 8, 1984 meeting could not have been meant to convey the substance of the final QA findings since the preliminary discussions of the QA assessment occurred during the weeks of March 5 and 12, 1984, and the final written QA assessment was not issued until May 16, 1984.

In sum, the fact that a QA assessment was performed of the EQ files provides no basis for questioning Licensee's competence or integrity.

IV. RELIEF REQUESTED BY UCS

Licensee submits that the UCS Supplemental Petition represents a nearly hysterical overreaction to and distortion of the comments generated from the Staff's audit of March 20 and 21, 1984. For example, UCS asserts that "there is no indication that the staff intends to properly follow-up the results of this audit . . .". Supplemental Petition at 2. In fact, the Staff's letter of April 25, 1984 requested from Licensee a detailed submittal addressing the disposition of all comments. UCS complains, however, that the Staff requested Licensee to respond only to the specific items audited, and that "the staff apparently has no plans to go further." Id. at 9. In fact, there were three general comments, in addition to those on specific equipment files, and Licensee's response (Exhibit A) addressed the general comments and, beyond that, program-wide corrective actions undertaken. Further, the Staff conducted supplemental audits on May 7-8 and 24, 1984, and plans a further audit in June. Consequently, the UCS fear of Staff inaction is unfounded. In fact, in Licensee's view these Staff activities fulfill the first item of relief requested by UCS -- i.e., that the Staff independently verify that documentation exists (for the EFW and

required supporting systems) and that the documentation is technically sufficient to demonstrate environmental qualification. See Supplemental Petition at 10.

No basis exists for the second item of relief sought by UCS -- i.e., that the Office of Investigations investigate whether Licensee has made material false statements to NRC in connection with the environmental qualification program. As discussed above, the Licensee statements cited by UCS are demonstrably not false. To view it otherwise would be to create a material false statement every time a licensee or an applicant documents a response to a stated Staff concern (and calls it a response which in the utility's view resolves the concern) and the Staff subsequently asks for more. This is not akin to saying sirens are installed when they are not. Disagreements reflecting technical judgment and opinion, in the face of understandably general regulatory requirements, are an every day facet of regulation. Further, the cited Licensee statements could not have misled the Staff since additional audits were contemplated to assess TMI-1 compliance with 10 C.F.R. § 50.49.

In conclusion, the UCS Supplemental Petition should be denied as unnecessary (Relief Item 1) and without basis (Relief Item 2).

Respectfully submitted,

SHAW, PITTMAN, POTTS & TROWBRIDGE

Thomas A. Baxter

Thomas A. Baxter, P.C.

1800 M Street, N.W.
Washington, D.C. 20036

(202) 822-1090

Counsel for Licensee

Dated: June 11, 1984

Exhibit A

GPU Nuclear
100 Interpace Parkway
Parsippany, New Jersey 07054
201 263-6500
TELEX 136-482
Writer's Direct Dial Number:

May 31, 1984
RFW-0128
5211-84-2122

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

Sir:

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

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

1. Files have been restructured to ensure all relevant documentation is readily identifiable for each component. This restructuring provides improved control, greater assurance of documentation completeness and improved auditability of records.

2. System Component Evaluation Worksheets (SCEW) have been updated (and reviewed/approved). These sheets will now be subject to the same control as plant drawings.

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

1. Items 1 and 2 above.

2. Entering all SCEW sheets (including the EFW System) into our computerized configuration control system to assure all portions of the GPUN organization have ready access to the latest version of the data.

3. An outside consultant, expert in the field of environmental qualification, has been engaged to review the overall program and provide recommendations as appropriate.

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

1. Enclosure 1 entitled "Generic Environmental Qualification File Concerns" discusses the resolution of the three general comments provided in your 4/25/84 letter.

2. Enclosure 2 entitled "Specific EFW Environmental Qualification File Concerns" discusses resolution of specific comments on system components.

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

Sincerely,

R. F. Wilson
Vice President
Technical Functions

RFW:JW
Enclosure

cc: J. Van Vliet
R. Conte

GENERIC ENVIRONMENTAL QUALIFICATION FILE CONCERNS

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

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

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

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

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

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

Plant Specific Environmental Qualification File Concerns

A. Limitorque Motorized Valve Actuators

EF-V1A&B, Model SMB-000, TER Item No. 15
EF-V2A&B, Model SMB-0, TER Item No. 11

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

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

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

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

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

Response: GPUN has reviewed IE Notice 83-72 and has concluded that the relevant items are Item 22 (Static-O-Ring) Pressure Switches and Item 24 (Under-rated terminal blocks on Limitorque operators). The Static-O-Ring pressure switches which are used for Main Steam Line Break Detection have been replaced by qualified devices. SCEW sheets and qualification data for these are included in the EQ file. It has been determined that the under-rated terminal blocks referred to in Item 24 had been installed in the Midland plant by a service engineer. We do not have these blocks in TMI-1. Copies of the IE Notice and response to it are contained in the EQ files.

B. Westinghouse Pumps

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

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

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

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

This conclusion is based on the following:

1. The motor insulation which is identical (Thermalastic Epoxy) to that used for the aforementioned test has been shown to be able to withstand the high temperature conditions from the LOCA test results of WCAP-7829. This is further substantiated by analysis contained in Westinghouse Report "Motor Insulation Life Analysis Emergency Feedwater Pump Motors EF-P-2A, EF-P-2B Three Mile Island Nuclear Station", dated 1/81, which is in our files.

2. The motor insulation has been shown to be able to withstand the moisture conditions due to the steam environment because the insulation system is impervious to moisture. This is demonstrated by immersion tests which are documented in WCAP-8754 in the file.

3. The integrity of the bearings is demonstrated by a GPUN analysis contained in the file.

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

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

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

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

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

C. Anaconda (Continental Wire) Cable

TER Item 107 (Common Item)

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

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

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

Response: An aging calculation (GPUN Calculation 1101X-5350-77) is included in the EQ file. This calculation establishes the cable qualification life as being satisfactory for plant life and has been referenced on the revised SCEW sheet.

D. Kerite Cable

TER Item 106 (Common Item)

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

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

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

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

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

TER Item 116 (Common Item)

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

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

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

F. States Terminal Block

TER Item 110 [Model NT] (Common Item)

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

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

G. Foxboro Transmitters

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

Item 1 The EQ documentation, WYLE Test Report 45592-4, states that the end user must address specific accuracy requirements for each application and evaluate total loop error. GPU must document such an evaluation using the demonstrated accuracies from the test report.

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

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

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

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

Response: The interfaces for the transmitters at TMI-1 includes a junction box supplied by Foxboro. The installation is in accordance with the manufacturer's recommendations and is similar to the test configuration. Foxboro's certification with respect to the qualification of the transmitters to IEEE standards 323-1974, and 344-1975 is contained in the EQ file. GPUN reviewed the Foxboro test documentation against the plant equipment and its installation to ensure similarity to the tested configuration. The results of this review is also documented in the EQ file.

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

Response: The aforementioned WYLE Test Report, Figure 1, identified the seismic test profile for the qualification of these transmitters. This test profile envelops the governing TMI-1 seismic response spectra.

Item 5 On page IX-22 of the test report it is stated that a formal report will be issued to answer anomaly NOA F37. Similarly, on page X-25 it is stated that justification for a test interruption, anomaly NOA F42, will be provided in the final test report. Until the formal report addressing NOA F37 and the final test report addressing NOA F42 are reviewed by GPU and placed in the file, GPU should document its evaluation of the anomalies and their effect on the qualification of the transmitters.

Response: We have reviewed the anomalies identified in WYLE Report 45592-4. Our evaluation is documented in memorandum dated 8/3/83 contained in the EQ files and referenced on the SCEW sheet. As a result of this evaluation, we will be replacing opened seals after calibration or maintenance work on the transmitters is completed.

H. Foxboro Transmitters (Not associated with EFW System)

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

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

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

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

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

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

Item 3 On page iii [WYLE Test Report 45592-4] it is stated that additional testing is being performed by the manufacturer to extend the accident radiation qualification and to confirm the aging analysis for the silicone capsule O-rings of transmitters represented by test specimen F-1 (Model NE11). GPU should document whether the testing completed thus far adequately addresses aging for these transmitters since additional testing appears to be necessary. If it is determined that the results of the additional testing are needed to confirm the aging analysis, then GPU should review the test results and place them in the file when they become available.

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

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

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

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

J. Conoflow I/P Transducer

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

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

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

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

These calculations were not contained in the file.

Response: GPUN Calculation No. C-1101-424-5350-010 contains this analysis. A copy of the calculation is now included in the EQ file.

K. Boston Insulated Wire Cable

TER No. (None) (Common Item)

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

L. Anaconda Cable

TER (None) (Common Item)

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

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

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

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

Response: These reports do not apply to this cable and have been removed from the associated EQ file. Anaconda Report 80282, dated July, 1980, and Franklin Report F-C483-62 are the bases for qualification of this equipment. These reports are included in the EQ file.

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

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

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

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

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

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

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

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

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

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

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE DIRECTOR OF NUCLEAR REACTOR REGULATION

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

AFFIDAVIT OF RICHARD F. WILSON

Morris County)
: ss
State of New Jersey)

RICHARD F. WILSON, being duly sworn according to law, deposes and says as follows:

1. I am Vice President - Technical Functions of GPU Nuclear Corporation and am authorized to execute this affidavit.

2. The facts set forth in "Licensee's Response to Supplement to Union of Concerned Scientists' Petition for Show Cause Concerning TMI-1 Emergency Feedwater System" and in Exhibit A thereto (GPU Nuclear letter 5211-84-2122 from R. F. Wilson to J. F. Stolz dated May 31, 1984) are true and correct to the best of my knowledge and belief.

Richard F. Wilson

Sworn and subscribed before me
this 11th day of June, 1984.

Notary Public

ANNETTE M. LONGO
Notary Public of New Jersey
My Commission Expires Oct. 29, 1987

June 11, 1984

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE DIRECTOR OF NUCLEAR REACTOR REGULATION

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

CERTIFICATE OF SERVICE

I hereby certify that copies of Licensee's Response to Supplement to Union of Concerned Scientists' Petition for Show Cause Concerning TMI-1 Emergency Feedwater System and Affidavit of Richard F. Wilson were served this 11th day of June, 1984 by deposit in the U.S. Mail, first class, postage prepaid, to all those on the attached Service List, except those marked with an asterisk which were served by hand delivery.

Thomas A. Baxter

Thomas A. Baxter, P.C.

Dated: June 11, 1984

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of	)	
	)	
METROPOLITAN EDISON COMPANY	)	Docket No. 50-289
	)	
(Three Mile Island Nuclear Station, Unit No. 1)	)	

SERVICE LIST

Lillian N. Cuoco, Esquire
Office of Executive Legal Director
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

*Mr. James A. Van Vliet
Office of Nuclear Reactor Regulation
Washington, D.C. 20555

Mr. Harold R. Denton
Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

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

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

Commissioner Thomas M. Roberts
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Commissioner James K. Asslestine
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Commissioner Frederick M. Bernthal
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Docketing and Service Section
Office of the Secretary
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Gary J. Edles, Esquire
Chairman, Atomic Safety and Licensing Appeal Board
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dr. John H. Buck
Atomic Safety and Licensing Appeal Board
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dr. Reginald L. Gotchy
Atomic Safety and Licensing Appeal Board
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Ivan W. Smith, Esquire
Chairman, Atomic Safety and Licensing Appeal Board
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Sheldon J. Wolfe, Alternate Chairman
Atomic Safety and Licensing Board
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Mr. Gustave A. Linenberger, Jr.
Atomic Safety and Licensing Board
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Richard J. Rawson, Esquire
Office of Executive Legal Director
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Maxine Woelfling, Esquire
Assistant Counsel
Department of Environmental
Resources
514 Executive House
Post Office Box 2357
Harrisburg, PA 17120

Ms. Louise Bradford
TMI ALERT
1011 Green Street
Harrisburg, PA 17102

Ellyn R. Weiss, Esquire
Harmon, Weiss & Jordan
2001 S Street, N.W., Suite 430
Washington, D.C. 20009

John A. Levin, Esquire
Assistant Counsel
Pennsylvania Public Utility Commission
Post Office Box 3265
Harrisburg, PA 17120

Marjorie M. Aamodt
R. D. 5
Coatesville, PA 19320

Steven C. Sholly
Union of Concerned Scientists
Suite 1101
1346 Connecticut Avenue, N.W.

ANGRY/TMI PIRC
1037 Maclay Street
Harrisburg, PA 17103

Chauncey Kepford
Judith Johnsrud
ECNP
433 Orlando Avenue
State College, PA 16801