



Northern States Power Company

414 Nicollet Mall
Minneapolis, Minnesota 55401
Telephone (612) 330-5500

January 16, 1984

Director
Office of Nuclear Reactor Regulation
US Nuclear Regulatory Commission
Washington, D.C. 20555

Prairie Island Nuclear Generating Plant
Docket No. 50-282 License No. DPR-42
Docket No. 50-306 License No. DPR-60

Resolution of Safety Evaluation Report for Environmental
Qualification of Safety-Related Electrical Equipment

December 1, 1983 NRC/NSP Meeting Minutes

Gentlemen:

On December 1, 1983 a meeting was held between members of the NRC staff and Northern States Power Company (NSP) to resolve all equipment qualification open items for the Prairie Island Nuclear Generating Plant Units 1 and 2 (PINGP). Included in our meeting were discussions concerning the following items: the equipment qualification program at Prairie Island; the general methodology used to resolve qualification deficiencies identified in the SER and attached Technical Evaluation Report (TER), received by NSP on April 25, 1983; the specific resolution of identified deficiencies for each equipment item on the PINGP equipment list; the schedule for completion and Justification for Continued Operation (JCO) for presently unqualified equipment items; and NSP's compliance with 10 CFR 50.49, "Environmental Qualification of Electric Equipment Important to Safety for Nuclear Power Plants," which became effective February 22, 1983.

At the conclusion of our meeting, NSP was requested to prepare meeting minutes thereby documenting our discussions. This letter provides the general discussion minutes and is supplemented with three enclosures: Enclosure I provides the general methodology used to establish environmental qualification and to resolve the TER deficiencies; Enclosure II provides the specific resolution for each equipment item reviewed in the TER, and incorporates comments received from the Staff during our meeting;

8401240431 840116
PDR ADDOCK 05000282
P PDR

AD48
1/1

and Enclosure III provides our schedule for completion/justification for continued operation for all equipment within the scope of 10 CFR 50.49 not qualified as of the date of this letter.

Three categories of electrical equipment were identified in 10 CFR 50.49 as requiring environmental qualification. Equipment described in paragraph (b)(1) of 10 CFR 50.49 has been identified through a review of the accident analyses provided in the PINGP FSAR, a review of the PINGP emergency procedures, a review of safety system flow diagrams and Q-List, and a review of the installed equipment locations with respect to postulated harsh environmental zones. This equipment has been identified in all previous submittals to the IE Bulletin 79-018. Our response to 10 CFR 50.49 dated May 19, 1983, is our current master equipment list and includes all equipment within the scope of paragraph (b)(1) of 10 CFR 50.49.

Our May 19, 1983 response to 10 CFR 50.49 also included equipment identified in paragraph (b)(2). This equipment is non-safety-related electrical equipment whose failure could prevent accomplishment of safety functions of equipment identified in paragraph (b)(1) of 10 CFR 50.49. This equipment was principally identified through system review criteria and identification of display instrumentation referenced in the LOCA and HELB emergency procedures. Display instrumentation review was requested by the SER dated May 22, 1981. Our investigation of (b)(2) equipment items is continuing in additional areas. The methodology that we are using is summarized below:

- The wiring diagrams of safety related electrical equipment as defined in paragraph (b)(1) of 10 CFR 50.49 are being reviewed to identify any auxiliary devices, electrically connected directly into the control or power circuitry, whose failure due to postulated environmental conditions could prevent the required operation of the safety-related equipment.
- The review discussed above will address the potential failure of safety-related electrical equipment after its qualified operating time but before the end of the postulated accident. This evaluation will also include equipment removed from the master list as described in Enclosure II of this submittal.

We are not aware of any unqualified non-safety-related equipment whose failure would prohibit accomplishment of the safety functions of (b)(1) equipment. If as a result of the activities described above, it is determined that additional equipment should be included in this category, supplements to this response will be provided and the equipment identified.

Post-accident monitoring equipment has been identified in our May 19, 1983 response to 10 CFR 50.49 in accordance with paragraph (b)(3). In addition, our response to NUREG-0737, Supplement 1 - Generic Letter 82-23 was transmitted to the NRC on September 15, 1983. This letter identified the qualification requirements and implementation schedule for Regulatory Guide 1.97 equipment. This equipment will be qualified and added to the master equipment list in accordance with the schedule provided in the September 15, 1983 letter.

The PINGP master equipment list contains the necessary equipment to mitigate the consequences of all Design Basis Accidents (DBAs) identified in the FSAR, including flooding in the auxiliary building.

NSP believes that equipment qualification is a living requirement that requires implementation into the activities of plant operation. The master equipment list will likely change over the course of time due to system modifications; replacement equipment; or additional (b)(1), (b)(2), and (b)(3) equipment identified through procedure changes, LER Reviews, etc. To accommodate this living program, we have developed an Equipment Qualification Manual and Central File designed to provide a synopsis of the entire equipment qualification program at the PINGP. The Manual summarizes the qualification status and identifies any maintenance activities that are required to preserve the qualified status of the equipment. The manual is divided into five sections as described below.

- Master Equipment List: This list identifies the equipment by Plant ID, system, location, and manufacturer/model. It also defines the accident functional requirements for each equipment item.
- Environmental Specifications: This section identifies the normal and accident environmental conditions by plant location. The specification can be used for both existing equipment and as a specification for procuring new equipment.
- System Component Evaluation Worksheets (SCEWs): These SCEWs outline the equipment qualification status for each equipment item in the format provided in the various NRC submittals. The SCEWs also provide reference to the applicable qualification reports and analyses that are contained in the central file.
- Equipment Qualification Summary Reports: These summary reports provide an overview of the installed equipment and the qualification methods used to establish qualification. Each summary report contains sections on equipment description, qualification criteria, qualified basis, equipment functionality, summary of qualification analyses, equipment qualification maintenance requirements, and references.

Director, Office of Nuclear Reactor Regulation

January 16, 1984

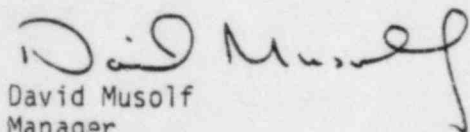
Page 4

Instructions for Evaluating Environmental Qualification: These instructions provide procedures that can be used to evaluate environmental qualification. The instruction identifies methods to be used to perform thermal aging and radiation evaluations, and provides guidance on potential problem areas in environmental qualification.

In addition to the sections of the Equipment Qualification Manual described above, procedures are provided to update the Manual and prepare summary reports. It is our intent to make the Equipment Qualification Manual a controlled document that will carry on equipment qualification for the life of the plant. The Equipment Qualification Central File supplements the Manual by providing all referenced qualification test reports, qualification analyses, vendor correspondence, and any other applicable qualification information.

The resolution of open items as identified in Enclosure II, combined with the schedule for completion provided in Enclosure III, will result in the environmental qualification of all electrical equipment within the scope of 10 CFR 50.49 by March 31, 1985. The methodology used for qualification and open item resolution is as described in Enclosure I. It should be noted that the methodology, open item resolutions, and schedule for completion/justification for continued operation described in the three enclosures to this letter were discussed at the December 1, 1983 meeting and considered acceptable.

Please contact us if you require any additional information.



David Musolf
Manager
Nuclear Support Services

cc: Regional Administrator-III, NRC
NRR Project Manager, NRC
Resident Inspector, NRC
G. Charnoff

Attachments

ENCLOSURE I

Methodology for TER Deficiency Resolution

Sixteen categories of deficiencies were defined by the Franklin Research Center (FRC) for identifying equipment qualification open items, or deficiencies. Twelve of the sixteen deficiency categories were identified in the TER as being applicable to the equipment installed at Prairie Island Units 1 and 2. For any particular equipment item, with the exception of Category I.A items (fully qualified), between one and seven deficiencies were applicable. Each of the twelve categories of deficiencies applicable to Prairie Island are described below; with a discussion provided on the methodology used to resolve the deficiency. The methodology described here is a general discussion. Equipment specific resolutions are described in Enclosure II.

1. Documented Evidence of Qualification Adequate

This deficiency was cited in cases where an incorrect qualification reference was cited on the System Component Evaluation Worksheet (SCEW), e.g., a test plan instead of a test report; in cases where an equipment replacement was identified as being required; and in cases where the supplied qualification documentation did not support the stated qualification.

This deficiency was resolved by revising the SCEW's, as necessary, to correct qualification references; by performing the equipment replacement as originally identified on the SCEW's; and by identifying the pertinent qualification documentation to support the stated qualification. All pertinent qualification documentation for both equipment qualified as installed and equipment qualified as a result of replacement is contained in a central file, on-site at Prairie Island.

2. Adequate Similarity Between Equipment and Test Specimen Established

Similarity between the installed equipment and the tested equipment is established prior to completing the qualification evaluation. In virtually all cases, the equipment vendor is contacted to obtain test reports and component materials lists applicable to the installed equipment. An evaluation was also made to review the electrical interfaces used on the test specimen to identify interface requirements for the installed equipment. In cases where the test specimen was not identical to the installed equipment, an evaluation was made to ascertain the impact of the equipment differences on environmental qualification.

On the basis of this evaluation, test report applicability was either established or rejected.

Documentation of the similarity evaluation, along with relevant vendor correspondence on equipment similarity, is provided in equipment qualification calculation files, which are included in the Central File.

In some cases, only the calculation files were requested by FRC and not the various references, e.g., correspondence with the vendor. Thus, a deficiency may have been cited simply because all the referenced information was not requested by FRC. Resolution of this TER deficiency was accomplished by either calling attention to the specific reference that establishes equipment similarity, or by performing additional vendor contact and similarity evaluation.

3. Aging Degradation Evaluted Adequately

Equipment aging is evaluated using the Arrhenius method. Cases for which equipment aging is dependent on mechanical or radiation aging, as opposed to thermal aging, are evaluated on a case basis, as applicable. The aging evaluation was used to correlate the aging performed on the test specimen to the installed environment at Prairie Island. As necessary, heat rise of the constituent components due to motor operation or solenoid energization was considered in the aging evaluation.

Determination of the appropriate activation energy was based on both the function of the component, and material specific information. As available, vendor specific data was used. For example, if a specific nylon vendor was identified as supplying the material for a component within an equipment item, data on that particular nylon was obtained. The data used would consider the functional requirements of the components and the limiting failure mechanism for that application, e.g., tensile strength, elongation, flexural strength, etc. In cases where vendor specific data was not available, or when the material vendor was not known, data available on the general material category was used. Various sources are available for this information including EPRI Report NP-1558, materials handbooks, plastics encyclopedias, and Appendix C of the DOR Guidelines. Again, the functional requirements and limiting failure mechanism of the component were considered in the selection of the activation energy. In cases where the components within an equipment item were unknown, a material activation energy of 0.5eV was conservatively used in the aging evaluation.

The most limiting component within the equipment item was used to correlate the simulated aging on the test specimen to the Prairie Island environment.

A materials evaluation based on testing of the components within an equipment item was used in cases where simulated aging tests were not performed on the entire equipment item. The materials evaluation used the DOR Guidelines as a general basis for the evaluation.

TER deficiencies were resolved, or are being resolved, by performing additional evaluations following the outline described above. These evaluations are documented in calculation files and are included in the Prairie Island Equipment Qualification Central File.

4. Qualified Life or Replacement Schedule Established (If Required)

A qualified life and replacement schedule was established based on the aging evaluation described above. In some cases, a qualified life of greater than 40 years was established and no replacement is required in the plant life. These equipment items will have maintenance performed in accordance with the Prairie Island preventive maintenance program. Some equipment items have a qualified life in excess of 40 years providing certain components are replaced periodically. These type of maintenance requirements are being factored into the plant maintenance program. Finally, some components have a defined qualified life, less than the 40 year life of the plant, for which replacement of the entire equipment item is more feasible than replacement of the equipment sub-components. The replacement of these components is also being factored into the plant maintenance program.

TER deficiencies were resolved, or are being resolved, by performing additional evaluations following the outline described above for aging evaluations and the determination of qualified life/replacement schedules. These evaluations are documented in calculation files and are included in the Prairie Island Equipment Qualification Central File.

5. Program Established to Identify Aging Degradation

The Prairie Island preventive maintenance program currently includes a provision for periodic review of inspection and maintenance records. One of the objectives of this program is to identify failure trends that would be indicative of common-mode failures, e.g., aging. The results of the maintenance and inspection records review are then factored back into the preventive maintenance program with the frequency of inspection increased, or decreased, as appropriate.

TER deficiencies are resolved via the preventive maintenance "feedback loop" described above.

6. Criteria Regarding Temperature/Pressure Exposure

In general, thermal-hydraulic requirements are satisfied by testing, with the test conditions enveloping the postulated accident conditions. In some cases, the peak pressure or the test duration did not envelop the required conditions for the entire required operating time. The specific equipment items for which this occurred were evaluated on a case basis. Resolution of the TER deficiencies was accomplished via these evaluations.

Evaluation of the peak test pressure not enveloping the required pressure was required for only one equipment item. This was accomplished by reviewing the magnitude of the difference (in this case less than 1 psi), and by reviewing the potential failure modes of the equipment item. The deficiency regarding profile duration, also cited in only one instance, was resolved by citing a motor manufacturer evaluation for long-term motor operation. Steam exposure deficiencies have been resolved by clarifying the location of the specific items (many of which are in a steam exclusion zone) and, as necessary, evaluating the potential for failure due to steam exposure. As described above, all evaluations are documented in calculation files and are maintained in the Prairie Island Equipment Qualification Central File.

7. Criteria Regarding Spray Satisfied

Chemical spray qualification is typically based on the test solution being more severe than the containment spray solution at Prairie Island. In cases where the test solution was not more severe, a specific analysis was performed evaluating the exposed materials and their susceptibility to degradation in the post-spray environment. The specific deficiencies identified in the TER were resolved by this equipment-specific evaluation. The evaluations are documented in calculation files and are maintained in the Prairie Island Equipment Qualification Central File.

8. Criteria Regarding Submergence Satisfied

Submergence qualification is established based on type testing. The specific deficiencies cited in the TER refer to the submergence qualification of electrical cables and splices. The concern identified was that post-LOCA submergence tests do not adequately simulate the post-accident environment in the containment sump. Discussions with the staff during the TER meeting resulted in the mutual conclusion that the combination of tests performed on electrical cables and splices following the guidelines of IEEE 383-1971 provide reasonable assurance of environmental qualification, thereby satisfying the requirements of 10 CFR 50.49. Thus, the deficiencies identified in the TER were retracted.

9. Criteria Regarding Radiation Satisfied

Qualification of equipment for gamma radiation is generally based on type testing of the equipment item. When radiation tests were not performed, or were not performed to an enveloping dose, qualification was established by analysis. The analysis evaluated the susceptibility of the subcomponents within the equipment item to degrade based on their functional application. Materials test data was used in this analysis.

The specific deficiencies raised in the TER were resolved by performing an evaluation similar to that described above. The results of this evaluation are documented in Calculation Files and are maintained in the Prairie Island Equipment Qualification Central File.

10. Criteria Regarding Test Failures or Severe Anomalies (if any) Satisfied

This deficiency was identified for only Rosemount 1153 Series A transmitters. The test failures noted in the TER have been addressed and transmitted to NRC (NSP letter dated May 5, 1983). Subsequently, the NRC SER for this equipment item (dated June 3, 1983) reclassified its qualification status and acknowledged that the test failures noted were not applicable to the equipment installed at Prairie Island.

11. Criteria Regarding Functional Testing Satisfied

Functional testing is generally satisfied by means of reviewing the results of qualification tests against the functional requirements of the installed equipment. In most cases, an equipment item is functionally tested before, during, and after the accident exposure. When this does not occur, an evaluation is made to determine if the functional testing criteria can still be considered satisfied based on the functional testing that was performed.

Criteria regarding functional testing was cited as a deficiency for Sostman and Rosemount RTD's. The TER noted that the functional test only provided calibration points at 32°F and 250°F, and not at the upper calibrated range of the instrument (650°F). Functional testing is considered acceptable in this case based on operating history of the equipment at Prairie Island. The operating requirements of the RTD's do not vary significantly during post-accident conditions from the normal operating temperature. Based on the operating history of the RTD's since initial plant start-up it is clear that functionality has been established for the required temperature range. Core temperature is also monitored via the core-exit thermocouple system, which meets the requirements of NUREG 0737, Paragraph II.F.2.

12. Criteria Regarding Instrument Accuracy Satisfied

In cases where instrument accuracy is an essential element in qualification, a comparison of the acceptable accuracy and the accuracy demonstrated during testing is performed. Depending upon the function of the equipment item, i.e., pre-accident evaluation, safeguards actuation, and/or post-accident monitoring, the required instrument accuracy may range from one-half to twenty percent. In addition, inaccuracies noted in testing may be due to environments that would not be postulated for events that require the installed equipment's function. Thus, evaluation of equipment accuracies is both a qualitative and quantitative process.

Deficiencies noted in the TER were for Foxboro E11GM(MCA) and E13DH(MCA) transmitters. These transmitters are used for steam generator pressure and feedwater flow, respectively. Steam generator pressure is required for both safeguards actuation and post-accident monitoring. Although errors demonstrated during testing exceeded specified accuracies for safeguards actuation, the demonstrated accuracy was in the conservative direction and will result in safeguards trip at a lower set point. Demonstrated accuracies were less than the accuracy required by post-accident monitoring procedures. Feedwater flow is required for reactor protection only (pre-accident evaluation) and is not required for either safeguards actuation or post-accident monitoring. This equipment item is not required to operate in an environment that would cause severe equipment inaccuracies, e.g., the LOCA test environment.

ENCLOSURE II

Equipment Qualification Open Item Resolutions

The table on the following pages provides the specific resolution for each equipment qualification open item identified in the TER. The resolutions provided are current to the date of this letter and incorporate comment received from the Staff during the December 1, 1983 meeting. Additional details of the resolutions are provided in the NSP/Prairie Island Response to NRC SER and attached TER, dated August 10, 1983, or in the Equipment Qualification Central File.

Component Type: Valve Controllers

[] Denotes Unit 2 Item No. and ID

| <u>Item #</u> | <u>Description</u> | <u>NRC Category</u> | <u>Deficiencies</u> | <u>Resolution</u> | <u>Current Status</u> |
|---|---|-------------------------|---|---|---|
| | Limitorque Motorized Valve Actuators Models SMB-0, SMB-00, SMB-000, SMB-1, SMB-3, | | | | |
| 1,2,3,4, 5,6,7,8, 9,10,11, 12,13,14, 15,74, [1,2,3,4, 5,6,7,8, 9,10,11, 12,13,14, 15,74] | ID MV-32064,32065,32067, 32069,32166,32206,32207, 32163,32162,32077,32078, 32075,32076,32084,32085, 32184,32185,32186,32096, 32097,32103,32105,32073, 32074,[32167,32168,32170, 32194,32208,32209,32190, 32191,32178,32179,32180, 32181,32187,32188,32081, 32082,32083,32108,32109, 32114,32116,32177,32176, 32172] | IIA | Similarity, Aging Degradation, Qualified Life | Qualification submittals have been based on Westinghouse WCAP reports and specific vendor test reports. In order to address specific defi- ciencies, a project was initiated to re-evaluate environmental quali- fication of Limitorque valve opera- tors. For the motor actuators identified, justification for envi- ronmental qualification has been established based on applicable vendor-supplied test reports. Doc- umentation of qualification is in progress. | Qualified (Category IA) |
| | ID MV-32199,32023,32024, 32040,32043,32071,32072, 32044,32051,[32210,32028, 32029,32046,32049,32174, 32175,32058,32059] | IIA | Similarity, Aging Degradation, Qualified Life | As indicated above, a project was initiated to re-evaluate environ- mental qualification of the identi- fied motor actuators. These motor actuators are qualifiable based on their isolation function on SI signal. The actuators are not required to function after the isola- tion operation. Qualification will be demonstrated based on thermo lag/ thermo endurance analysis of the actuators as discussed during our December 1, meeting with the Staff. | Qualifiable (Category IA when documentation is complete) |

Component Type: Valve Controllers (Cont.)

[] Denotes Unit 2 Item No. and ID

| <u>Item #</u> | <u>Description</u> | <u>NRC Category</u> | <u>Deficiencies</u> | <u>Resolution</u> | <u>Current Status</u> |
|---|---|-------------------------|---|---|---|
| 1,2,3,4, 5,6,7,8, 9,10,11, 12,13,14, 15,74, [1,2,3,4, 5,6,7,8, 9,10,11, 12,13,14, 15,74] | ID MV-32016,32017,32195, 32196,[32019,32020,32197, 32198] | IIA | Similarity, Aging Degradation, Qualified Life | As indicated above, a project was initiated to re-evaluate environmental qualification of the identified motor actuators. Motor actuator modifications will be required to establish qualification. This will be completed by March 31, 1985. | Not Qualified See Enclosure III, Note 1 |
| | ID MV-32070,32068,32165, 32231,32066,32164,32230, 32242,32243,32271,32273, 32274,32276,32132,32138, 32141,[32290,32292,32293, 32295,32147,32150,32153, 32156,32171,32173,32172, 32193,32233,32169,32192, 32232] | IIA | Similarity, Aging Degradation, Qualified Life | These motor actuators have been removed from the Master Equipment List. Reasons for the removal from the list are: valves are locked open; valves are required for cold shutdown only and not within the scope of 10 CFR 50.49; or system modifications have been made and they are no longer required. An evaluation is being performed to ensure that this equipment is not a b.2 equipment item. | Qualification Not Required |

Component Type: Solenoid Valves

[] Denotes Unit 2 Item No. and ID

| Item # | Description | NRC Category | Deficiencies | Resolution | Current Status |
|---|--|-----------------|-------------------------------|---|-------------------------------|
| 16 [16] | ID SV-37035,37037,37039, 37036,37038,37040, [37091,37093,37095, 37092,37094,37096] Target Rock Head Vent Solenoid Valves | IV | Documentation not provided | Qualified based on vendor-supplied type test. Documentation is avail- able in the Prairie Island Equipment Qualification Central File. | Qualified (Category IA) |
| 17,18,20, 21,22,23, [17,18, 20,21,22, 23] | ID SV-33440,33441,33990, 33991,33281,33201,33202, 33255,33256,33371,33372, 33373,33374,33375,33376, 33377,33378,33761,33762, 33738,33282,[33515,33516, 33992,33993,33283,33260, 33261,33265,33266,33392, 33763,33764,33740,33741, 33284]ASCO NP Series Solenoid Valves | IA | None | Qualified | Qualified (Category IA) |
| 19 [19] | ID 33199,33200,33204, 33254,[33258,33259, 33263,33264] ASCO Solenoid Valves | | Documentation | Removed from Master Equipment List because they perform no active acci- dent mitigation function. An eval- uation is being made to ensure that this equipment is not a b.2 equipment item. | Qualification Not Required |

Component Type: Switches (Indication)

[] Denotes Unit 2 Item No. and ID

| Item # | Description | NRC Category | Deficiencies | Resolution | Current Status |
|-----------------------------------|--|-----------------|-----------------|--|-------------------------------|
| 24 [24] | ID 31624,31625,[31630, 31631] Honeywell Micro Switch Valve Limit Switch | IIA | Steam Exposure | Item is not exposed to a steam environment. The item is environmentally qualified for the environment it is exposed to. | Qualified (Category IA) |
| 25 [25] | ID 34072,34074,34076, 34078,[34080,34082,34084, 34086] NAMCO EA-180 Valve Limit Switch | IIA | Documentation , | Item is fully qualified by applicable vendor test reports and qualified life has been evaluated. Conax Electric Conductor Seal Assemblies have been installed to seal the switch enclosure. Documentation is available in the Prairie Island Equipment Qualification Central File. | Qualified (Category IA) |
| 29,30,31, 32,[29,30, 31,32] | ID 31231,31232,32098, 31099,31084,31089,31325, 31326,31327,32019,31092, 31637,31638,31741,[31233, 31234,31116,31117,31102, 31107,31347,31348,31349, 31643,31129,31639,31640, 31743] NAMCO EA-180 Valve Limit Switch | IIC | Qualified Life | Item is fully qualified by applicable vendor test reports and qualified life has been evaluated. Conax Electric Conductor Seal Assemblies have been installed to seal the switch enclosure. Documentation is available in the Prairie Island Equipment Qualification Central File. | Qualified (Category IA) |
| 32 [32] | ID 31313,31570,31311, 31634,[31317,31575,31315, 31636] NAMCO EA-180 Valve Limit Switch | IIC | Qualified Life | These limit switches have been removed from the master equipment list because of modifications to the containment purge system. See NRC SER dated 9/9/82, "Completion of Containment Purge Generic Issue B24 and NUREG-0737 Item II.E.4.2, Prairie Island Units Nos. 1 and 2." | Qualification Not Required |

Component Type: Switches (Indication) (Cont.)

[] Denotes Unit 2 Item No. and ID

| Item # | Description | NRC Category | Deficiencies | Resolution | Current Status |
|---------|---|-----------------|---|---|----------------------------|
| 26 [26] | ID 33651,33653,33655, [33657,33659,33661] Valcor Solenoid Valve (Replacement Sample Valves) | IB | Modification Required | Modification has been completed. Item is fully qualified and documen- tation is available in the Prairie Island Equipment Qualification Central File. | Qualified (Category IA) |
| 27 [27] | ID 31235,31236,31237, [31238,31239,31240] NAMCO EA-170 Valve Limit Switch | IA | None | Qualified | Qualified (Category IA) |
| 28 [28] | ID 31621,31622, [31627,31628] NAMCO EA-170 Valve Limit Switch | IIA | Aging, Qualified Life, Pressure Profile Steam Exposure | Analyses have been performed to address qualified life, replacement schedule and pressure profile. The item is not exposed to a steam environment. This item is fully qualified and documentation is avail- able in the Prairie Island Equipment Qualification Central File. | Qualified (Category IA) |
| 67 [67] | ID 18252,18253, [18268,18269] Barton Flow Switch | IIC | Aging, Qualified Life or Replace- ment Schedule | Additional analyses have been per- formed to address the identified deficiencies. The item is fully qualified and documentation is available in the Prairie Island Equipment Qualification Central File. | Qualified (Category IA) |

Component Type: Motors

[] Denotes Unit 2 Item No. and ID

| Item # | Description | NRC Category | Deficiencies | Resolution | Current Status |
|------------------|--|-----------------|--|---|---|
| 33 [33] | ID 15-9,16-01, [25-9,26-01] Electric Machinery Containment Spray Pump Motors | IIA | Qualified Life, Aging, Radiation | Additional analyses based on vendor information have been performed to resolve the identified deficiencies. This item is fully qualified and documentation is available in the Prairie Island Equipment Qualification Central File. | Qualified (Category IA) |
| 34 [34] | ID 116-18,126-18,116-9, 126-32,[216-18,226-18, 216-19,226-32] Joy/Reliance Dome Recirc Fan | IIA | Similarity, Aging, Qualified Life, Radiation | Additional analyses based on vendor information have been performed to resolve the identified deficiencies. This item is fully qualified and documentation is available in the Prairie Island Equipment Qualification Central File. | Qualified (Category IA) |
| 35 [35] | ID 117-2,127-2,117-3, 127-3,[217-2,227-2, 217-3,227-3] Westinghouse Electric Containment Fan Coil Unit Motors | IIA | Similarity, Aging, Qualified Life, Temperature/ Pressure Exposure | Additional analyses based on vendor information have been performed to resolve the identified deficiencies. This item is fully qualified and documentation is available in the Prairie Island Equipment Qualification Central File. | Qualified (Category IA) |
| 36,37 [36,37] | ID 15-1,16-5,15-4,16-4 [26-3,25-5,25-4,26-4] Westinghouse RHR & SI Pump Motor | IIA | Similarity | A project has been initiated to re-evaluate environmental qualification. Vendor has been contacted to identify documentation. This will be completed by February 15, 1984. Any necessary modification or replacement will be completed by March 31, 1985. | Not Qualified See Enclosure III, Note 2 |

Component Type: Transmitters

[] Denotes Unit 2 Item No. and ID

| Item # | Description | NRC Category | Deficiencies | Resolution | Current Status |
|------------------------|---|-----------------|--------------------------|---|--|
| 38 [38] | ID 23073,23074, [23075,23076] Barton Model 332 SI Flow | IB | Modification | Item will be replaced with a qualified Rosemount 1153 Series B qualified transmitter prior to March 31, 1985. | Not Qualified See Enclosure III, Note 3 |
| 39,48,49 [39,48,49] | ID 23021,23022,23023, 23024,21203,21204,21205, 21200,21201,21202, [23025,23026,23027, 23028,21209,21210,21211, 21206,21207,21208] Foxboro E13DH (MCA), FW Flow Foxboro E11GM (MCA), Stm Gen Pressure | IIA | Required accuracy | Accuracies demonstrated during testing have been reviewed and determined to be acceptable for the installed applications. SCEWs for these equipment items will be updated to reflect this. See discussion in Enclosure I, Item 12 for additional details. | Qualified (Category IA) |
| 44 [40] | ID 1PT-709,1PT-710 [23017,23018,23019, 23020] Rosemount 1153 Series A Unit 1 Wide Range RCS Pressure Unit 2 Steam Flow | IIB | Not Qualified | All deficiencies have been addressed and accepted; see NRC letter from Robert Clark to D. M. Musolf (NSP) dated June 3, 1983. Aging qualification has been addressed by additional analysis. Documentation is available in the Prairie Island Equipment Qualification Central File. | Qualified (Category IA) |
| 40 [44] | ID 23013,23014,23015, 23016,[2PT-709,2PT-710] Unit 1 Steam Flow Unit 2 Wide Range RCS Pressure | IB | Modification Required | Transmitters have been replaced with Rosemount 1153 Series D transmitters which are fully qualified. | Qualified (Category IA) |

Component Type: Transmitters (Cont.)

[] Denotes Unit 2 Item No. and ID

| Item # | Description | NRC Category | Deficiencies | Resolution | Current Status |
|---------|---|-----------------|--------------------------|---|----------------------------|
| 41 [41] | ID 1LT-725, 1LT-726, 1LT-727A, 1LT-727B, 1LT-728A, 1LT-728B [2LT-725, 2LT-726, 2LT-727A, 2LT-727B, 2LT-728A, 2LT-728B] Magnetrol Transmitters Containment Sump Level | 1B | Modification Required | Transmitters have been replaced with DeLaval level transmitters (Model XM-54854-323) which are fully qualified. | Qualified (Category IA) |
| 43,45 | ID 1LT-487, 1LT-488, 21164, 21165, 21166, 21167, [2LT-487, 2LT-488, 21168, 21169, 21170, 21171] Wide Range Stm Gen Level Accumulator Pressure | 1B | Modification Required | Transmitters have been replaced with Foxboro NE Series Transmitters which are fully qualified. | Qualified (Category IA) |
| 42 [42] | ID 24041, 24042, 24043, [24046, 24047, 24048] Barton Model 386/351 Pressurizer Level | 1B | Modification Required | Transmitters have been replaced with Barton Model 764/351 transmitters which are fully qualified. These transmitters are not the subject of the recent Barton 10 CFR Part 21 report. Reference letter from J.P. Doyon, Barton to G. Sundberg NSP dated November 15, 1983 | Qualified (Category IA) |
| 46 [46] | ID 21146, 21147, 21148, 21150, [21154, 21155, 21156, 21157] Foxboro E11GM (MCA-RW) Pressurizer Pressure | 1B | Modification Required | Transmitters are now fully qualified. | Qualified (Category IA) |

Component Type: Transmitters (Cont.)

[] Denotes Unit 2 Item No. and ID

| <u>Item #</u> | <u>Description</u> | <u>NRC Category</u> | <u>Deficiencies</u> | <u>Resolution</u> | <u>Current Status</u> |
|---------------|--|-------------------------|---------------------|--|-------------------------------|
| 47 [47] | 1PT-729 [2PT-729] Rosemount 1153 Series A | IIB | Not Qualified | Item removed from master equipment list. This equipment is part of the reactor head vent leak detection system and performs no active accident mitigation function. This equipment will be considered as part of our b.2 evaluation. | Qualification Not Required |

Component Type: Detectors, Sensors, Transducers, Primary Elements, & Connectors

[] Denotes Unit 2 Item No. and ID

| Item # | Description | NRC Category | Deficiencies | Resolution | Current Status |
|---------|--|-----------------|---|--|---|
| [54] | ID [15314] Wide Range RCS Temp Rosemount RTD | IIA | Documentation, Aging, Qualified Life, Required Profile, Spray Criteria, Func- tional Testing Criteria, Instru- ment Accuracy | References provided previously were re-evaluated to address qualification deficiencies including qualified life and replacement schedule. | Qualified (Category IA) |
| 55 [55] | ID 15331,15332,15333, [15315,15322,15323] Wide Range RCS Temp Sostman RTD | IA | Documentation, Aging, Qualified Life, Required Profile, Spray Criteria, Func- tional Testing Criteria, Instru- ment Accuracy | References provided previously were re-evaluated to address qualification deficiencies including qualified life and replacement schedule. | Qualified (Category IA) |
| 52 [52] | ID SC-35085,SC-35028, [SC-35084,SC-35029] Fisher Signal Converter | IIA | Qualification not established | Component has been removed from Master List (cold shutdown equipment). | Qualification Not Required |
| 50,51 | ID 1EQ-443,1EQ-444, 1EQ-445,1EE-443,1EE-444, 1EE-445,[2EQ-443,2EQ-444, 2EQ-445,2EE-443,2EE-444, 2EE-445] Endevco Accelerometer, Unholtz-Dickey Amplifier Pressure Relief Valve Leak Detection System | IB | Equipment modification required | Qualification testing of this item is nearly completed. Some modification of installed equipment may be required as a result of this test. This will be completed by March 31, 1985. | Not Qualified See Enclosure III, Note 4 |

Component Type: Detectors, Sensors, Transducers, Primary Elements, & Connectors (Cont.)

[] Denotes Unit 2 Item No. and ID

| <u>Item #</u> | <u>Description</u> | <u>NRC Category</u> | <u>Deficiencies</u> | <u>Resolution</u> | <u>Current Status</u> |
|---------------|---|-------------------------|---------------------------------------|---|-------------------------------|
| 53 [53] | ID 15456,15457,15458, 15459,[15610,15611, 15612,15613] Incore Thermocouple System | IB | Equipment modification required | A new system, utilizing qualified incore thermocouple cable exiting containment through qualified containment penetrations, has been installed. The new equipment is included in the Master Equipment List. | Qualification Not Required |

Component Type: Electrical Cable & Splices

[] Denotes Unit 2 Item No. and ID

| <u>Item #</u> | <u>Description</u> | <u>NRC Category</u> | <u>Deficiencies</u> | <u>Resolution</u> | <u>Current Status</u> |
|---------------|----------------------|-------------------------|---|---|----------------------------|
| 56 [56] | BIW Control Cable | IIA | Submergence | Test references provided previously were re-evaluated to address submergence. This evaluation is summarized in the SER response. It was concluded that the environmental parameters are enveloped by reference documents. | Qualified (Category IA) |
| 57 [57] | Kerite Control Cable | IIA | Similarity, Aging Degradation, Qualified Life, Criteria regarding Spray | Identified additional vendor qualification documentation to address deficiencies. Documentation is available in the Prairie Island Equipment Qualification Central File. | Qualified (Category IA) |
| 58 [58] | Okonite Cable | IIA | Submergence | Test references provided previously were re-evaluated to address submergence. This evaluation is summarized in the SER response. It was concluded that the environmental parameters are enveloped by reference documents. | Qualified (Category IA) |
| 59 [59] | Okonite Cable Splice | IIA | Similarity, Aging Degradation, Qualified Life, Submergence | Deficiencies were addressed through additional vendor correspondence and test data. It was concluded that the environmental parameters are enveloped by reference documents. Documentation is available in the Prairie Island Equipment Qualification Central File. | Qualified (Category IA) |

Component Type: Electrical Cable & Splices (Cont.)

[] Denotes Unit 2 Item No. and ID

| <u>Item #</u> | <u>Description</u> | <u>NRC Category</u> | <u>Deficiencies</u> | <u>Resolution</u> | <u>Current Status</u> |
|---------------|------------------------------|-------------------------|---------------------|--|----------------------------|
| 71 [71] | Kerite Cable Splice | IIA | Similarity | Deficiencies addressed by additional vendor correspondence. Documentation is available in the Prairie Island Equipment Qualification Central File. | Qualified (Category IA) |
| 72 [72] | Okonite Splicing Tape T95 | IIA | Submergence | Deficiency was addressed through additional vendor correspondence and test data. It was concluded that the environmental parameters are enveloped by reference documents. Documentation is available in the Prairie Island Equipment Qualification Central File. | Qualified (Category IA) |
| 73 [73] | Okonite Splicing Tape T35 | IIA | Submergence | Deficiency was addressed through additional vendor correspondence and test data. It was concluded that the environmental parameters are enveloped by reference documents. Documentation is available in the Prairie Island Equipment Qualification Central File. | Qualified (Category IA) |

Component Type: Terminal Blocks & Protective Coatings

[] Denotes Unit 2 Item No. and ID

| <u>item #</u> | <u>Description</u> | <u>NRC Category</u> | <u>Deficiencies</u> | <u>Resolution</u> | <u>Current Status</u> |
|--------------------|---|-------------------------|---|---|----------------------------|
| 60 [60] 61 [61] | Allen Bradley Terminal Strips and GE Epoxy | IB | Equipment modifi- cation required to establish qualification | Environmental qualification testing has recently been completed. Our let- ter dated November 3, 1983, provided: test summary, justification for contin- ued plant operation, and schedule for qualification. All necessary modifi- cations have been completed. | Qualified (Category IA) |

Component Type: Electrical Penetrations & Seals

[] Denotes Unit 2 Item No. and ID

| <u>Item #</u> | <u>Description</u> | <u>NRC Category</u> | <u>Deficiencies</u> | <u>Resolution</u> | <u>Current Status</u> |
|------------------------|---------------------------------------|-------------------------|---------------------|-------------------|----------------------------|
| 68,69,70 [68,69,70] | DG O'Brien Electrical Penetrations | IA | None | Qualified | Qualified (Category IA) |

Component Type: Lubricants

[] Denotes Unit 2 Item No. and ID

| <u>Item #</u> | <u>Description</u> | <u>NRC Category</u> | <u>Deficiencies</u> | <u>Resolution</u> | <u>Current Status</u> |
|---------------|--------------------|-------------------------|---------------------|-------------------|---------------------------|
| 62,63 | Chevron Lubricant | IA | None | Qualified | Qualified |
| [62,63] | Mobil Lubricant | | | | (Category IA) |

Component Type: Fuses & Fuseholders

[] Denotes Unit 2 Item No. and ID

| <u>Item #</u> | <u>Description</u> | <u>NRC Category</u> | <u>Deficiencies</u> | <u>Resolution</u> | <u>Current Status</u> |
|---------------|---------------------|-------------------------|-----------------------------------|--|----------------------------|
| 64 [64] | Bussmann Fuseholder | IIA | Criteria regarding steam exposure | References provided previously were re-evaluated and installation enclosures were discussed. It was concluded that environmental parameters are enveloped by reference documents. Documentation is available in the Prairie Island Equipment Qualification Central File. | Qualified (Category IA) |

Component Type: Load Centers

[] Denotes Unit 2 Item No. and ID

| <u>Item #</u> | <u>Description</u> | <u>NRC Category</u> | <u>Deficiencies</u> | <u>Resolution</u> | <u>Current Status</u> |
|---------------|--|-------------------------|---------------------------------------|--|---|
| 66 [66] | DC Distribution Panel Creiger Distribution Panel | IB | Equipment modification required | Safety-related loads to panels located inside containment have been relocated. Distribution panels in the auxiliary building have been added to the equip- ment master list and qualification has been completed. | Qualified (Category IA) |
| 65 [65] | GE Motor Control Centers | IB | Equipment modification required | Required loads will be relocated to new motor control centers located in a mild environment. This will be completed prior to March 31, 1985. | Not Qualified See Enclosure III, Note 5 |

ENCLOSURE III

Schedule for Completion of Open Items,
Justification for Continued Operation

All equipment qualification open items within the scope of 10 CFR 50.49 are discussed below. For each item, the expected schedule for completion is provided. In addition, a Justification for Continued Operation (JCO) is provided. In all cases, we conclude that there is sufficient assurance that the consequences of any Design Basis Accident can be mitigated, and the safety of the general public will be preserved until the open items are resolved.

Please note that several of the open items discussed during our December 1, 1983 meeting have been resolved in the December outage. These items are now fully qualified and do not appear in this enclosure.

1. Limitorque Motor Valve Actuators

Plant IDs MV-32016, 32017, 32195, 32196
 [32019, 32020, 32197, 32198]

A project was initiated to re-evaluate the environmental qualification of these motor valve actuators based on the concerns raised in the TER. As a result of this evaluation, we have concluded that modifications or replacements to these installed actuators will be required. These modifications or replacements will be performed prior to March 31, 1985.

The identified valves perform two functions as described below.

MV-32016, 32017, [32019, 32020] - Main Steam isolation valve on the steam supply line to the turbine driven auxiliary feedwater pumps. These valves are installed in the auxiliary building.

MV-32195, 32196, [32197, 32198] - Pressurizer Power operated relief isolation motor valve. These valves are located inside containment.

A detailed linear elastic/elastic-plastic fracture mechanics evaluation was performed on the steam supply line to more thoroughly investigate the operating requirements of valves MV-32016, 32017, [32019, 32020]. The results indicate that previously postulated double-ended guillotine breaks that could result in a harsh environment are overly conservative. Thus, the motor valves would not be required to operate in an environment that

would possibly render them inoperable. A more extensive discussion of this evaluation is provided with item 6 of this enclosure.

The pressurizer power operated relief isolation motor valve is a backup valve to a fully qualified air operated relief valve.

In addition to the assurance of safety provided above, considerable type testing has been performed by Limitorque. Environmental qualification has not been established for these valve actuators because they are equipped with Class B insulation for which the applicable Limitorque qualification report is B0003. This testing does not envelop the Prairie Island conditions for temperature and chemical spray (for inside containment actuators). The peak temperature attained in B0003 is 250°F.

For inside containment actuators, the peak specified temperature is 290°F. However, a review of the derivation of the 290°F value will reveal its conservatisms. In the SER dated May 12, 1981, the NRC required Prairie Island to use the saturation temperature corresponding to the postulated accident pressure profile. This resulted in an increase of the 268°F peak accident temperature specified in the Prairie Island FSAR to 289°F. In this respect, the type testing applicable to these actuators falls only 18°F short of the postulated temperature values specified in the FSAR. The post-accident temperature values derived in the FSAR naturally contain inherent conservatisms.

Limitorque valve actuators installed in the auxiliary building may be exposed to a peak temperature of 300°F. The analysis on which this is based contains many conservatisms in the development of the thermal-hydraulic model which could likely be reduced through a more detailed analysis. No chemical spray is used in the auxiliary building.

IEEE Standard 117-1974, "IEEE Standard Test Procedure for Evaluation of System of Insulating Materials for Random Wound AC Electric Machinery," provides a temperature and exposure time guide for various classes of motor insulation. For Class B insulation, which is the minimum grade of insulation that the motors in this category contain, the guide states the motor to be operable for 32 days at 150°C (302°F). The longest required operating time for any of these actuators is 1 day. IEEE 117-1974 is an industry standard that most motor manufacturers follow as a guide in preparing motor application guides and is based on considerable motor performance history data. This does provide reasonable assurance of operability in post-accident conditions and forms a sound engineering basis for a JCO.

In addition, Peerless Porter Class B insulated motors have been tested in WCAP-7410L to temperatures of 311°F with no significant reduction in motor insulation resistance.

Valve actuators installed inside containment will also be exposed to chemical spray conditions. Although these specific actuators and motors have not been tested to chemical sprays, we have confidence that they could survive exposure for the short duration of their required operating time. Their general construction and materials are reasonably similar to those tested to chemical spray conditions for which successful operation has been demonstrated. As noted earlier, the unqualified valve actuators located inside containment are back-up valves to qualified block valves.

On the basis of the systems requirements and motor specific discussion provided above, we believe a sound engineering basis exists for the continued operation of the plant until motor actuator modifications or replacements can be made. As stated earlier, this will be completed prior to March 31, 1985.

2. Westinghouse Motors

Plant IDs 15-1, 15-4, 16-4, 16-5, [25-4, 25-5, 26-3, 26-4]

A project has been initiated to document the similarity of the installed motors to existing Westinghouse test data. This project was initiated as a result of the concerns raised in the TER. The qualification evaluation is currently scheduled for completion by February 15, 1984 and is expected to result in complete environmental qualification.

These motors operate the Safety Injection (SI) and Residual Heat Removal (RHR) pumps. They are located outside containment in an environment for which the only harsh parameter is radiation (1.8×10^6 Rads for SI and 3.3×10^7 Rads for RHR). Post-accident thermal-hydraulic environments do not differ from the normal environments. Similar motors have been tested extensively by Westinghouse to enveloping environments with no noted anomalies. The radiation sensitive components within the motors have not changed significantly over time such that there is reasonable assurance of applicability of this test data. Motor lubricants have been separately qualified for enveloping radiation doses.

On the basis of the discussion provided above, we believe there is a sound engineering basis for the continued operation of the plant until this current qualification evaluation is fully documented. As stated earlier, this is currently scheduled for completion by February 15, 1984.

3. Barton Flow Transmitters

Plant IDs 23073, 23074, [23075, 23076]

These transmitters are exposed to radiation (1.8×10^6 Rads gamma) during the recirculation phase. Thermal-hydraulic environments do not differ post-accident from the normal environment. Because qualification documentation is not available to establish radiation qualification, these transmitters will be replaced with fully qualified Rosemount 1153 Series B transmitters. The new Rosemount transmitters will be installed prior to March 31, 1985.

These transmitters monitor Safety Injection (SI) pump discharge flow. The critical element is that recirculation flow is occurring; thus, loss of these transmitters would hamper the monitoring of SI flow post-accident, but would not hamper the actual flow. However, the radiation that may render the transmitters inoperable will occur after recirculation has been established and verified operational. In addition, Foxboro E-10 Series SI pump discharge pressure transmitters are installed. Operation of these transmitters would ensure the ability of the operator to periodically monitor recirculation flow. Although the Foxboro transmitters are not on the master equipment list, limited radiation testing has been performed to doses exceeding 1×10^7 Rads gamma with acceptable results. Reasonable assurance of operation of the diverse Foxboro transmitters is therefore provided.

On the basis of the discussion provided above, we believe there is a sound engineering basis for the continued operation of the plant until the Barton SI flow transmitters are replaced with qualified Rosemount transmitters. As stated earlier, this replacement will occur prior to March 31, 1985

4. Endevco Accelerometer
Unholtz-Dickey Charge Amp

Plant IDs 1EQ-443, 1EQ-444, 1EQ-445, 1EE-443, 1EE-444, 1EE-445,
[2EQ-443, 2EQ-444, 2EQ-445, 2EE-443, 2EE-444, 2EE-445]

These equipment items are part of the pressure relief valve detection systems that have been installed in response to NUREG 0737 paragraph II.D.3, Direct Indication of RCS Relief-and-Safety-Valve Position. An owners group is currently conducting a qualification test program on this equipment. The testing is nearing completion and it appears that some equipment modifications may be necessary. Any necessary modifications will be completed prior to March 31, 1985.

In addition to this newly installed system, other diverse instrumentation is available to the control room operator that provides indication that the relief or safety valves have lifted. These other indications include PORV position, relief line temperature, pressurizer relief tank pressure and level, and pressurizer pressure and level. PORV position and pressurizer pressure and level instruments are fully qualified.

On the basis of the multiple diverse and qualified equipment that could be used to monitor relief valve position, we believe there is a sound engineering basis for the continued operation of the plant until the qualification testing and any modifications that may be necessary, are completed. As stated earlier, this will be completed prior to March 31, 1985.

5. Gould-Century unit cooler motors

Plant IDS 113-53, 113-54, 113-55, 123-54, 123-55, 123-56,
 [213-52, 213-53, 213-54, 223-53, 223-54, 223-55]

These unit cooler motors are exposed to radiation (1.8×10^6 Rads gamma) during the recirculation phase. In general, motors of this type and insulation class are qualified for radiation to the levels postulated here. However, documentation of the materials of construction is not available. Therefore, these motors will be replaced with fully qualified motors. Replacement motors have been ordered from Reliance Electric and will be delivered by July, 1984. This will allow for installation prior to March 31, 1985.

These motors provide cooling to rooms in which the containment spray (CS), residual heat removal (RHR), and safety injection (SI) pump motors are located. There are no postulated High Energy Line Breaks (HELBs) in the vicinity of these motors that would result in a high temperature or steam environment. In the event of unit cooler motor failure as a result of radiation exposure during the recirculation phase, the affected rooms would experience a gradual increase in temperature. It's highly unlikely that the increase in room temperature would lead to the subsequent failures of the CS, RHR, or SI pump motors.

Electric motors served by unit cooler motors are typically built to industry standards, e.g., IEEE, NEMA, etc. These industry standards contain various design specifications for electric motors including operating characteristics in high temperature environments. For example, IEEE Standard 117-1974, "IEEE Standard Test Procedure for Evaluation of Systems of Insulating Materials for Random Wound AC Electric Machinery," provides a temperature/exposure time guide for various classes of insulating materials. For

Class B insulation, this standard states that the motor should remain operable for 32 days at 150°C (302°F). While it is true that this is a generic standard and is not sufficient to establish qualification, it is sufficient to establish a sound engineering basis for a JCO.

In addition, a detailed thermal aging evaluation has been performed for the CS pump motors that indicates sufficient margin exists in the qualification to account for a possible gradual increase in ambient temperature during post-recirculation phase operation. A similar evaluation is currently being performed for the SI and RHR motors.

On the basis of the discussion provided above, we believe that there is a sound engineering basis for continued operation of the plant until the existing unit cooler motors are replaced with fully qualified motors. As stated earlier, this replacement will occur prior to March 31, 1985.

6. General Electric Motor Control Centers (MCCs)

Plant IDs 1LA1, 1LA2, 1MA1, 1MA2 [2LA1, 2LA2]

These motor control centers are potentially exposed to harsh environments as a result of breaks in the main steam line or in the steam supply line to the turbine driven auxiliary feedwater (AFW) pumps. New MCCs have been purchased for the safety-related loads in the MCCs identified above. The new MCCs will be located in a mild environment. Installation of the new MCCs and relocation of necessary loads will be performed prior to March 31, 1985.

The safety-related loads in these MCCs are for the safeguards chillers and the main steam supply valve to the turbine driven AFW pumps.

In the event of a steam line break rendering the safeguards chillers inoperable, the effects will be gradual heat-up of the affected areas. The heat-up of the rooms will be due primarily to the lack of the plant's chilled water cooling system rather than a result of a High Energy Line Break. The safety impact of nominal heat rise in these rooms is minor. In addition, the heat-up will be gradual and over a sufficient period of time that alternative cooling methods can be employed, e.g., portable fans.

The main steam supply valve to the turbine driven AFW pumps would be required during a postulated break in the steam supply line to isolate the break. This valve would not be required to function for a main steam line break. Because the MCC for this motor valve would be exposed to a break in the steam supply line, operation of the motor valve and isolation of the line is not assured. To evaluate this potential scenario in more detail, a fracture mechanics evaluation of the steam supply line was performed.

Linear elastic/elastic-plastic fracture mechanics analyses were used to demonstrate that small stable cracks will develop and be detected and repaired before a catastrophic break occurs that would render the MCC inoperable. The defense in depth approach consisted of the following evaluations:

- a. The maximum allowable in-service flaw according to ASME, Section XI was postulated and the crack growth was shown to be acceptable throughout the life of the plant.
- b. The leakage through a crack twice the wall thickness ($2t$) in both longitudinal and circumferential directions was shown to be detectable under normal operating conditions (Level A).
- c. A crack four times the wall thickness ($4t$) in both longitudinal and circumferential directions was shown to be stable locally and globally under faulted conditions (Level D).
- d. The safety margin of a $4t$ crack in item "c" was determined.
- e. The flow through the crack in item "c" was shown to have no impact on the safety-related equipment in the room.
- f. Subcritical crack development was shown to prove that cracks are likely to break through the pipe wall and leak before they propagate around the pipe and cause a break.

The analyses demonstrated that small postulated cracks in the steam supply line to the turbine driven AFW pumps are acceptable. The following specific conclusions can be drawn:

- a. The double ended guillotine breaks that were previously postulated are overly conservative.
- b. Small cracks in the piping would be stable, i.e., they would not grow, even under twice the Level D loads.
- c. Leakage from the cracks would be visually detectable, but would be of minimal quantity and at sufficient distance as to not impact the safety function of the MCC.

On the basis of the functional requirements of the safety-related loads within the affected MCCs, combined with the defense in depth fracture mechanics evaluation of the steam supply line to the turbine driven AFW pumps, we believe there is a sound engineering basis for the continued operation of the plant until the affected loads are relocated. As stated earlier, this will be completed by March 31, 1985.