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March 14, 1983

Docket No. 50-364

Director, Nuclear Reactor Regulation  
U. S. Nuclear Regulatory Commission  
Washington, D. C. 20555

Attention: Mr. S. A. Varga

Joseph M. Farley Nuclear Plant - Unit 2  
Environmental Qualification

Gentlemen:

In response to the NRC's Safety Evaluation Report (SER) dated February 4, 1983 for the Farley Nuclear Plant - Unit 2 response to NUREG-0588, Alabama Power Company has reviewed the SER and associated Technical Evaluation Report (TER) and provides the attached Report on Environmental Qualification of Class 1E electrical equipment. This submittal provides information that should resolve the NRC concerns related to environmental qualification for the Farley Nuclear Plant. It is the judgement of Alabama Power Company that all equipment required to achieve a safe shutdown condition at the Farley Nuclear Plant is environmentally qualified and, as outlined in Section A of the attached report, Justification for Continued Operation (JCO) for equipment items in NRC categories I.B., II.A. and II.B. is not necessary.

The only known outstanding action item, as outlined in the attached report, is the installation of a water-tight fitting on the Victoreen Radiation Detectors. These detectors were installed as an enhancement to the radiation monitoring system to satisfy the requirements of NUREG-0737 and would be used to detect a radiation release due to a potential breach of the reactor coolant pressure boundary. As stated in Alabama Power Company letter of September 30, 1982, the water tight fitting will be installed during the first outage of sufficient duration which is currently scheduled to begin in the fall of 1983. Since, as stated in the September 30, 1982 letter, the radiation detectors are not essential to achieve a safe shutdown condition under any design basis event, it is the position of Alabama Power Company that a JCO is not required for the Victoreen Radiation Detectors.

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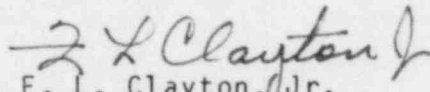
Mr. S. A. Varga  
U. S. Nuclear Regulatory Commission

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A potential action item could result for Target Rock solenoids used on the Reactor Head Vent System. The qualification reports are currently under development by Westinghouse with a scheduled completion of May 1983. Alabama Power Company will review the reports when issued and take appropriate action. Per NRC directive, the Reactor Head Vent System is not in an operating status (i.e., available for operation) on operating reactors and can not be placed into operating status without approval of the NRC.

If there are any questions, please advise.

Yours very truly,

  
F. L. Clayton, Jr.

FLCJr/DHJ:lsh-D13

Attachment

cc: Mr. R. A. Thomas  
Mr. G. F. Trowbridge  
Mr. J. P. O'Reilly  
Mr. E. A. Reeves  
Mr. W. H. Bradford

Joseph M. Farley Nuclear Plant - Unit 2

Docket No. 50-364

Environmental Qualification

Joseph M. Farley Nuclear Plant

Unit 2

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## Section A

### Introduction

In response to NRC NUREG-0588 Safety Evaluation report dated February 4, 1983, Alabama Power Company provides this report regarding the review of environmental qualification of Class 1E electrical equipment for Farley Nuclear Plant Unit 2. The components covered by this submittal include safety-related electrical equipment and other TMI Action Plan equipment exposed to a harsh environment. The scope of this review will ensure that equipment necessary to protect the public health and safety is capable of performing its safety function if subjected to a harsh environment.

The results of the environmental qualification review of safety-related electrical equipment in a harsh environment are documented herein. It is the judgement of Alabama Power Company that all equipment required to achieve a safe shutdown condition at Farley Nuclear Plant is environmentally qualified and Justification for Continued Operation (JCO) for equipment items in NRC categories I.B., II.A. and II.B. is not necessary.

The only outstanding action item is the installation of a watertight fitting on the Victoreen Radiation Detectors. These detectors were installed as an enhancement to the radiation monitoring system to satisfy the requirements of NUREG-0737 and would be used to detect a radiation release due to a potential breach of the reactor coolant pressure boundary. The watertight fitting is scheduled to be installed during the next outage of sufficient duration, currently scheduled to begin in the fall of 1983.

## Section B

### Discrepancy Clarification

This section provides the information required to resolve the concerns identified in the NRC's Safety Evaluation Report and Franklin Research Center's Technical Evaluation Report. Equipment concerns identified in NRC categories I.B, II.A, II.B, II.C, or IV have been satisfactorily resolved. Clarifications are provided for each identified concern.

EQUIPMENT ITEM NO. 1

MOTORIZED VALVE ACTUATOR LOCATED IN THE MAIN STEAM ROOM, ELEV.  
137'5"

LIMITORQUE MODEL SMB 1, 4T

FUNCTION (PLANT ID): CONTAINMENT ISOLATION  
(MOV3232A, B, C; Q2N21V001A-B, B-B, C-B)

SERVICE: MAIN FEEDWATER

FUNCTION (PLANT ID): CONTAINMENT ISOLATION  
(MOV3350A, B, C (Q2N23V001A, B, C))

SERVICE: AUXILIARY FEEDWATER

DISCREPANCY: ADEQUATE SIMILARITY BETWEEN EQUIPMENT AND TEST  
SPECIMEN ESTABLISHED  
AGING DEGRADATION EVALUATED ADEQUATELY  
QUALIFIED LIFE OR REPLACEMENT SCHEDULE  
ESTABLISHED

CLARIFICATIONS:

A. ADEQUATE SIMILARITY BETWEEN EQUIPMENT AND TEST SPECIMEN  
ESTABLISHED

Limitorque letter dated October 13, 1980, has identified that their Qualification Test Report 600456, "Nuclear Qualification," dated December 9, 1975, is applicable to the FNP motorized valve actuators listed in Equipment Item No. 1.

Limitorque test report "Nuclear Qualification" has stated, "The qualifications were conducted to encompass the entire family of Limitorque Actuators - SMB, SB, SBD, and SMB/HBC in all available unit sizes (SMB000 to SMB-5). This was accomplished by conducting the qualification testing on mid-size unit (SMB-0) subjecting the actuator to simulated seating loads equivalent to the actuators published unit rating during the procedure."

B. AGING DEGRADATION EVALUATED ADEQUATELY

Limitorque test report "Nuclear Qualification" has discussed thermal aging under Section 3.2, which establishes the following:

1. Thermal aging of motor stator with class RH insulation for 100 hours at 180°C, which envelops FNP service conditions, establishes the life in excess of 40 years at 40°C. This is based on Arrhenius Methodology and based on Thermal Regression Curves per IEEE 101-74 and 117-74.

EQUIPMENT ITEM NO. 1

2. The torque and limit switches have age-susceptible parts made of molded phenolic compound. Based on 10°C rule, which is an acceptable aging methodology, Limitorque has concluded the switches have a qualified life in excess of 40 years at 40°C, which envelops FNP service conditions.

C. QUALIFIED LIFE OR REPLACEMENT SCHEDULE ESTABLISHED (IF REQUIRED)

The motorized valve actuators are fully qualified for a life of 40 years.

ADDITIONAL CLARIFICATIONS TO NOTES ON PAGE 5f OF TER

1. Refer "A" above.
2. All motors in the motorized valve actuators have class RH insulation.
3. Valve actuators do not have motor-brakes.
4. Not applicable since actuators do not have motor-brake assembly.
5. Motors have been manufactured by Reliance Electric Company.
6. Not applicable since actuators do not have motor-brake assembly.
7. Motors on valve actuators operate on alternating current (60 Hz).
8. Not applicable since actuators do not have motor-brake assembly.
9. Motorized valve actuators are qualified for 40 years. Refer to clarification "B."

ADDITIONAL CLARIFICATIONS TO PAGE 5g OF TER

- A. Actuator serial numbers and Limitorque order number have been identified on Limitorque letter dated October 13, 1980. SCEW sheets are prepared on generic basis and do not show these numbers.
- B. See clarification "A."
- C. No comment is required.
- D. See clarification "B."

EQUIPMENT ITEM NO. 3

MOTORIZED VALVE ACTUATOR LOCATED IN THE CONTAINMENT, ELEV. 126'0"

LIMITORQUE MODEL SMB; SIZES 00,000

FUNCTION (PLANT ID): CONTAINMENT ISOLATION (MOV3660, MOV3318B  
(Q2E14V002, V004))

SERVICE: CONTAINMENT COOLING

FUNCTION (PLANT ID): CONTAINMENT ISOLATION (MOV8112(Q2E21V249A))

SERVICE: CVCS/SAFETY INJECTION

FUNCTION (PLANT ID): CONTAINMENT ISOLATION (MOV3872A, B  
(Q2E22V001A, B))

SERVICE: COMBUSTIBLE GAS CONTROL

FUNCTION (PLANT ID): CONTAINMENT ISOLATION (MOV3536 (Q2E23V021))

SERVICE: COMBUSTIBLE GAS CONTROL

FUNCTION (PLANT ID): CONTAINMENT ISOLATION (MOV3530 (Q2E23V003))

SERVICE: COMBUSTIBLE GAS CONTROL

FUNCTION (PLANT ID): CONTAINMENT ISOLATION (MOV3528A, B, C, D  
(Q2E23V022A, B, C, D))

SERVICE: COMBUSTIBLE GAS CONTROL

FUNCTION (PLANT ID): CONTAINMENT ISOLATION (MOV3835A, B  
(Q2E23V025A, B))

SERVICE: COMBUSTIBLE GAS CONTROL

FUNCTION (PLANT ID): CONTAINMENT ISOLATION (MOV3441A, B, C, D  
(Q2P16V207A, B, C, D))

SERVICE: SERVICE WATER

FUNCTION (PLANT ID): CONTAINMENT ISOLATION (MOV3131 (Q2P16V081))

SERVICE. COOLING WATER

FUNCTION (PLANT ID): CONTAINMENT ISOLATION (MOV3046 (Q2P17V097))

DISCREPANCY: ADEQUATE SIMILARITY BETWEEN EQUIPMENT AND TEST  
SPECIMEN ESTABLISHED  
AGING DEGRADATION EVALUATED ADEQUATELY  
QUALIFIED LIFE OR REPLACEMENT SCHEDULE ESTABLISHED



EQUIPMENT ITEM NO. 3

CLARIFICATIONS:

A. ADEQUATE SIMILARITY BETWEEN EQUIPMENT AND TEST SPECIMEN ESTABLISHED

Limitorque letter dated October 13, 1980, has identified that their Qualification Test Report 600456, "Nuclear Qualification," dated December 9, 1975, is applicable to the FNP motorized valve actuators listed in Equipment Item No. 3.

Limitorque test report "Nuclear Qualification" has stated, "The qualifications were conducted to encompass the entire family of Limitorque Actuators - SMB, SB, SBD, and SMB/HBC in all available unit sizes (SMB000 to SMB-5). This was accomplished by conducting the qualification testing on mid-size unit (SMB-0) subjecting the actuator to simulated seating loads equivalent to the actuators published unit rating during the procedure."

B. AGING DEGRADATION EVALUATED ADEQUATELY

Limitorque test report "Nuclear Qualification" has discussed thermal aging under Section 3.2, which established the following:

1. Thermal aging of motor stator with class RH insulation for 100 hours at 180°C, which envelops FNP service conditions, establishes the life in excess of 40 years at 50°C. This is based on Arrhenius Methodology and based on Thermal Regression Curves per IEEE 101-74 and 117-74.
2. The torque and limit switches have age-susceptible parts made of molded phenolic compound. Based on 10°C rule, which is an acceptable aging methodology, Limitorque has concluded the switches have a qualified life in excess of 40 years at 50°C which envelops FNP service conditions.

C. QUALIFIED LIFE OR REPLACEMENT SCHEDULE ESTABLISHED

The motorized valve actuators are fully qualified for a life of 40 years.

ADDITIONAL CLARIFICATIONS TO NOTES ON PAGE 5f OF TER

1. Refer "A" above.
2. All motors in the motorized valve actuators have class RH insulation.

EQUIPMENT ITEM NO. 3

3. Valve actuators do not have motor-brakes.
4. Not applicable since actuators do not have motor-brake assembly.
5. Motors have been manufactured by Reliance Electric Company.
6. Not applicable since actuators do not have motor-brake assembly.
7. Motors on valve actuators operate on alternating current (60 Hz).
8. Not applicable since actuators do not have motor-brake assembly.
9. Motorized valve actuators are qualified for 40 years. Refer to Clarification "B."

ADDITIONAL CLARIFICATIONS TO PAGE 5g OF TER

- A. Actuator serial numbers and Limitorque order number have been identified on Limitorque letter dated October 13, 1980. SCEW sheets are prepared on generic basis and do not show these numbers.
- B. See Clarification "A."
- C. No comment is required.
- D. See Clarification "B."

EQUIPMENT ITEM NO. 4

SOLENOID VALVE LOCATED IN THE CONTAINMENT, ELEV. 109'0", 110'0" AND 111'0"

ASCO MODEL NP/206 SERIES

FUNCTION (PLANT ID): ACTUATE AIR OPERATED VALVE FOR ISOLATION  
(Q2E21SV8149AB, BB, CB)

SERVICE: REGEN HX SHELL DISCHARGE

FUNCTION (PLANT ID): ACTUATE AIR OPERATED VALVE FOR ISOLATION  
(N2G21SV1003B)

SERVICE: REACTOR COOLANT DRAIN TANK HX DISCHARGE

FUNCTION (PLANT ID): ACTUATE AIR OPERATED VALVE FOR ISOLATION  
(Q2G21SV3376)

SERVICE: CONTAINMENT SUMP PUMP DISCHARGE

DISCREPANCY: QUALIFIED LIFE OR REPLACEMENT SCHEDULE ESTABLISHED  
CRITERIA FOR SUBMERGENCE SATISFIED

CLARIFICATIONS:

A. QUALIFIED LIFE OR REPLACEMENT SCHEDULE ESTABLISHED

NRC Position:

Section 7 of the DOR Guidelines and Section 4.2, Category II of NUREG-0588, do not require a qualified life to be established for all safety-related electrical equipment located in harsh environments.

An acceptable method for addressing in-service degradation is through a preventive maintenance/surveillance program with equipment and component refurbishment and/or replacement based on known susceptibility to aging degradation, the results of inspections, or manufacturers recommendations. These elements of the program lead to an understanding on a device-specific basis of the nature and extent of the increased stress levels encountered during Design Basis Accidents and resultant degradation (if any) which may occur. Arrhenius or other appropriate accelerated aging methodologies may be used to establish replacement and refurbishment schedules if the component's design and materials application are sufficiently simple and the necessary data are available to allow a meaningful application.



#### EQUIPMENT ITEM NO. 4

In plants subject to the qualification requirements of either the DOR Guidelines or NUREG-0588 Category II, for equipment that has been identified as being susceptible to significant degradation due to thermal and radiation aging, the schedule for inspection of and/or replacement of the susceptible components in that equipment must be incorporated into the preventive maintenance and surveillance programs.

##### APC Response:

The qualified life of the NP/206 series ASCO solenoid valves located inside the containment has been determined based on type testing, material analysis using Arrhenius Methodology, and/or operating experience to be 8 years. An Environmental Qualification Administrative Program is being implemented which includes for the ASCO NP/206 series solenoid valves a preventive maintenance/surveillance program with equipment and component refurbishment and/or replacement based on known susceptibility to aging degradation, the results of inspections, and manufacturers recommendations.

#### B. CRITERIA REGARDING SUBMERGENCE SATISFIED

##### NRC Position:

(DOR GUIDELINES SECTION 4.1, SUB-ITEM 3; AND SECTION 4.3.2, SUB-ITEM 3)

Equipment submergence (inside or outside containment) should be addressed where the possibility exists that submergence of equipment may result from HELBs or other postulated occurrences. Supplement 2 to IE Bulletin 79-01B (20) provides the following additional criterion: If the equipment satisfies the guidance and other requirements of the DOR guidelines or NUREG-0588 for the LOCA and HELB accidents, and the licensee demonstrates that its failure will not adversely affect any safety-related function or mislead the operator after submergence, the equipment can be considered exempt from the submergence portion of the qualification requirements.

##### APC Response:

With the qualified life clarification provided in part A above, the ASCO NP/206 series solenoid valves located inside the containment satisfy the guidance and other requirements of the DOR guidelines or NUREG-0588 for the LOCA and HELB accidents.

**EQUIPMENT ITEM NO. 4**

Appendix 4, Section II.C, of "Joseph M. Farley Nuclear Plant - Unit 2 Response to the NRC NUREG-0588," demonstrated that solenoid valves (Q2E21SV8149AB, BB and CB), (N2G21SV1003B), and (Q2G21SV3376) would perform their intended function prior to becoming submerged. In addition, Alabama Power Company has determined that any short circuits that could occur would not mislead the operator. Therefore, these solenoid valves should be considered exempt from the submergence portion of the qualification requirements.

**ADDITIONAL CLARIFICATIONS TO NOTES ON PAGE 5f OF TER**

1. No comment is required.
2. See clarification "A."
3. As discussed in Appendix 4, Section II.C, the solenoid valves addressed above will perform their safety functions prior to being submerged. Their safety functions are to go to the vent position following de-energization of the solenoid which permits air to be vented from the operator of the air operated isolation valve. Venting the air permits the isolation valve to go to its fail safe position (closed). These solenoid valves will not be required to change positions after being submerged. Appendix 4, Section II.C, provided a failure mode analysis for the solenoid coil under the submerged condition. There are no other solenoid valve internal components which due to submergence or in-leakage could effect the isolated (closed) position of the isolation valve.

EQUIPMENT ITEM NO. 5

SOLENOID VALVE LOCATED IN THE MAIN STEAM ROOM, ELEV. 135'0"

ASCO MODEL NP SERIES

FUNCTION (PLANT ID): ACTUATE AIR-OPERATED VALVE FOR ISOLATION  
(Q2N25SV3772A, B, C)

SERVICE: CHEMICAL INJECTION TO STEAM GENERATORS

FUNCTION (PLANT ID): ACTUATE AIR OPERATED VALVE FOR ISOLATION  
(Q2N23SV3228AA, BA, CA; 3227AA, BA, CA)

SERVICE: AFWP DISCHARGE

FUNCTION (PLANT ID): ACTUATE AIR OPERATED VALVE FOR ISOLATION  
(Q2N12SV3235A, B)

SERVICE: STEAM TO T.D. AFW PUMP

FUNCTION (PLANT ID): ACTUATE AIR OPERATED VALVE FOR ISOLATION  
(Q2N12SV3234A, B)

SERVICE: STEAM TO T.D. AFW PUMP

FUNCTION (PLANT ID): ACTUATE AIR OPERATED VALVE FOR ISOLATION  
(Q2N11SV3369AC, BC, CC; 3370AC, BC, CC)

SERVICE: MAIN STEAM LINE ISOLATION; STEAM LINE STOP/CHECK VALVE

FUNCTION (PLANT ID): ACTUATE AIR OPERATED VALVE FOR ISOLATION  
(Q2N11SV3368AA, BA, CA; 3976A, B, C)

SERVICE: MAIN STEAM LINE ISOLATION BYPASS

DISCREPANCY: QUALIFIED LIFE OR REPLACEMENT SCHEDULE ESTABLISHED

CLARIFICATIONS:

QUALIFIED LIFE OR REPLACEMENT SCHEDULE ESTABLISHED

NRC Position:

Section 7 of the DOR Guidelines and Section 4.2, Category II of NUREG-0588, do not require a qualified life to be established for all safety-related electrical equipment located in harsh environments.

An acceptable method for addressing in-service degradation is through a preventive maintenance/surveillance program with equipment and component refurbishment and/or replacement based on known susceptibility to aging degradation, the results of inspections, or manufacturers

EQUIPMENT ITEM NO. 5

recommendations. These elements of the program lead to an understanding on a device-specific basis of the nature and extent of the increased stress levels encountered during Design Basis Accidents and resultant degradation (if any) which may occur. Arrhenius or other appropriate accelerated aging methodologies may be used to establish replacement and refurbishment schedules if the component's design and materials application are sufficiently simple and the necessary data are available to allow a meaningful application.

In plants subject to the qualification requirements of either the DOR Guidelines or NUREG-0588 Category II, for equipment that has been identified as being susceptible to significant degradation due to thermal and radiation aging, the schedule for inspection of and/or replacement of the susceptible components in that equipment must be incorporated into the preventive maintenance and surveillance programs.

APC Response:

The qualified life of the ASCO NP/206 series solenoid valves located in harsh environments outside the containment has been determined based on type testing, material analysis using Arrhenius Methodology and/or operating experience to be 18 years. An Environmental Qualification Administrative Program has been implemented which includes for the ASCO NP/206 series solenoid valves a preventive maintenance/surveillance program with equipment and component refurbishment and/or replacement based on known susceptibility to aging degradation, the results of inspections, and manufacturers recommendations.

ADDITIONAL CLARIFICATIONS TO NOTES ON PAGE 5f OF TER

1. No comment is required.
2. See clarifications.

EQUIPMENT ITEM NO. 6

SOLENOID VALVE LOCATED IN THE CONTAINMENT

TARGET ROCK MODEL 79AB001

FUNCTION (PLANT ID): REACTOR VESSEL HEAD VENTILATION  
(Q2B-3SV2213A, B; 2214A, B)

DISCREPANCY: EQUIPMENT QUALIFICATION PENDING MODIFICATION

CLARIFICATIONS:

The best available equipment was installed to comply with the NUREG-0737 installation schedule, even though environmental qualification testing was not completed. The installation of equipment, lacking environmentally qualified documentation, was provided for in NUREG-0737 if later qualification was demonstrated. Westinghouse is scheduled to complete the qualification reports in May 1983.

This equipment was installed in APC Response to NUREG-0737 and requires NRC approval before the system can be placed into operation.



EQUIPMENT ITEM NO. 7

SOLENOID VALVE LOCATED IN THE CONTAINMENT, ELEV. 89'4"

AUTOMATIC VALVE MODEL C5439

FUNCTION (PLANT ID): ACTUATE AIR OPERATED VALVE FOR ISOLATION  
(Q2E12SV3999A, B)

SERVICE: REACTOR CAVITY COOLING SYSTEM

DISCREPANCY: EQUIPMENT QUALIFICATION PENDING MODIFICATION

CLARIFICATIONS:

A. EQUIPMENT QUALIFICATION PENDING MODIFICATION

The modification to replace automatic valve model C5439 solenoid valves with qualified ASCO Model NP8316A74E was installed during the first refueling outage for Farley Unit 2. These units are certified to be similar to units qualified by ASCO on Qualification Test Report AQR 67368, which envelops FNP service conditions.

B. QUALIFIED LIFE OF ASCO NP SERIES SOLENOIDS

NRC Position:

Section 7 of the DOR Guidelines and Section 4.2, Category II of NUREG-0588, do not require a qualified life to be established for all safety-related electrical equipment located in harsh environments.

An acceptable method for addressing in-service degradation is through a preventive maintenance/surveillance program with equipment and component refurbishment and/or replacement based on known susceptibility to aging degradation, the results of inspections, or manufacturers recommendations. These elements of the program lead to an understanding on a device-specific basis of the nature and extent of the increased stress levels encountered during Design Basis Accidents and resultant degradation (if any) which may occur. Arrhenius or other appropriate accelerated aging methodologies may be used to establish replacement and refurbishment schedules if the component's design and materials application are sufficiently simple and the necessary data are available to allow a meaningful application.

In plants subject to the qualification requirements of either the DOR Guidelines or NUREG-0588 Category II, for equipment that has been identified as being susceptible to significant degradation due to thermal and radiation aging,

EQUIPMENT ITEM NO. 7

the schedule for inspection of and/or replacement of the susceptible components in that equipment must be incorporated into the preventive maintenance and surveillance programs.

APC Response:

The qualified life of the NP series ASCO solenoid valves located inside the containment has been determined based on type testing, material analysis using Arrhenius Methodology, and/or operating experience to be 8 years. An Environmental Qualification Administrative Program is being implemented which includes for the ASCO NP series solenoid valves a preventive maintenance/surveillance program with equipment and component refurbishment and/or replacement based on known susceptibility to aging degradation, the results of inspection, and manufacturers recommendations.

EQUIPMENT ITEM NO. 8

SOLENOID VALVE LOCATED IN THE CONTAINMENT, ELEV. 129'0"

ASCO MODEL NP SERIES

FUNCTION (PLANT ID): ACTUATE AIR OPERATED VALVE FOR ISOLATION  
(Q2B31SV8047)

SERVICE: WASTE PROCESSING SYSTEM TO FRT

FUNCTION (PLANT ID): ACTUATE AIR OPERATED VALVE FOR ISOLATION  
(Q2G21SV7126)

SERVICE: REACTOR COOLANT DRAIN TANK OUT

FUNCTION (PLANT ID): ACTUATE AIR OPERATED VALVE FOR ISOLATION  
(Q2E21SV8871)

SERVICE: ACCUMULATOR TEST

FUNCTION (PLANT ID): ACTUATE AIR OPERATED VALVE FOR ISOLATION  
(Q2P13SV2867B, 2866B)

SERVICE: CONTAINMENT MINI-PURGE

FUNCTION (PLANT ID): ACTUATE AIR OPERATED VALVE FOR ISOLATION  
(Q2P17SV3443)

SERVICE: EXCESS LETDOWN ISOLATION

FUNCTION (PLANT ID): ACTUATE AIR OPERATED VALVE FOR ISOLATION  
(Q2P17SV3184)

SERVICE: CCW ISOLATION

FUNCTION (PLANT ID): ACTUATE AIR OPERATED VALVE FOR ISOLATION  
(Q2P15SV3103, 3766, 3179A, B, C)

SERVICE: SAMPLE SYSTEM ISOLATION

FUNCTION (PLANT ID): ACTUATE AIR OPERATED VALVE FOR ISOLATION  
(Q2P15SV3180A, B, C; 3181A, B, C; 3104,  
3765)

SERVICE: SAMPLE SYSTEM ISOLATION

DISCREPANCY: QUALIFIED LIFE OR REPLACEMENT SCHEDULE ESTABLISHED



EQUIPMENT ITEM NO. 8

CLARIFICATIONS:

QUALIFIED LIFE OR REPLACEMENT SCHEDULE ESTABLISHED

NRC Position:

Section 7 of the DOR Guidelines and Section 4.2, Category II of NUREG-0588, do not require a qualified life to be established for all safety-related electrical equipment located in harsh environments.

An acceptable method for addressing in-service degradation is through a preventive maintenance/surveillance program with equipment and component refurbishment and/or replacement based on known susceptibility to aging degradation, the results of inspections, or manufacturers recommendations. These elements of the program lead to an understanding on a device-specific basis of the nature and extent of the increased stress levels encountered during Design Basis Accidents and resultant degradation (if any) which may occur. Arrhenius or other appropriate accelerated aging methodologies may be used to establish replacement and refurbishment schedules if the component's design and materials application are sufficiently simple and the necessary data are available to allow a meaningful application.

In plants subject to the qualification requirements of either the DOR Guidelines or NUREG-0588 Category II, for equipment that has been identified as being susceptible to significant degradation due to thermal and radiation aging, the schedule for inspection of and/or replacement of the susceptible components in that equipment must be incorporated into the preventive maintenance and surveillance programs.

APC Response:

The qualified life of the NP/206 series ASCO solenoid valves located inside the containment has been determined based on type testing material analysis using Arrhenius Methodology, and/or operating experience to be 8 years. An Environmental Qualification Administrative Program is being implemented which includes for the ASCO NP/206 series solenoid valves a preventive maintenance/surveillance program with equipment and component refurbishment and/or replacement based on known susceptibility to aging degradation, the results of inspections, and manufacturers recommendations.

EQUIPMENT ITEM NO. 8

ADDITIONAL CLARIFICATIONS TO NOTES ON PAGE 5f OF TER

1. No comment is required.
2. See clarifications.

EQUIPMENT ITEM NO. 9

SOLENOID VALVE LOCATED IN THE CONTAINMENT

ASCO MODEL HTX8320A22V

FUNCTION (PLANT ID): PILOT FOR AIR OPERATED VALVE  
(N2B21SV0444BA, BB; 445AA, AB)

SERVICE: PORV

DISCREPANCY: EQUIPMENT QUALIFICATION PENDING MODIFICATION

CLARIFICATIONS:

A. EQUIPMENT QUALIFICATION PENDING MODIFICATION

The modification to replace the ASCO Model HTX8320A22V with a qualified ASCO Model NP 8316 54E solenoid valve was completed during the first refueling outage for Farley Unit 2. These units are certified to be similar to units qualified by ASCO on Qualification Test Report AQR 67368, which envelops FNP service conditions.

B. QUALIFIED LIFE OF ASCO NP SERIES SOLENOIDS

NRC Position:

Section 7 of the DOR Guidelines and Section 4.2, Category II of NUREG-0588, do not require a qualified life to be established for all safety-related electrical equipment located in harsh environments.

An acceptable method for addressing in-service degradation is through a preventive maintenance/surveillance program with equipment and component refurbishment and/or replacement based on known susceptibility to aging degradation, the results of inspections, or manufacturers recommendations. These elements of the program lead to an understanding on a device-specific basis of the nature and extent of the increased stress levels encountered during Design Basis Accidents and resultant degradation (if any) which may occur. Arrhenius or other appropriate accelerated aging methodologies may be used to establish replacement and refurbishment schedules if the component's design and materials application are sufficiently simple and the necessary data are available to allow a meaningful application.

In plants subject to the qualification requirements of either the DOR Guidelines or NUREG-0588 Category II, for equipment that has been identified as being susceptible to significant degradation due to thermal and radiation aging, the schedule for inspection of and/or replacement of the

EQUIPMENT ITEM NO. 9

susceptible components in that equipment must be incorporated into the preventive maintenance and surveillance programs.

APC Response:

The qualified life of the NP series ASCO solenoid valves located inside the containment has been determined based on type testing, material analysis using Arrhenius Methodology, and/or operating experience to be 8 years. An Environmental Qualification Administrative Program is being implemented which includes for the ASCO NP series solenoid valves a preventive maintenance/surveillance program with equipment and component refurbishment and/or replacement based on known susceptibility to aging degradation, the results of inspection, and manufacturers recommendations.

EQUIPMENT ITEM NO. 10

SOLENOID VALVE LOCATED IN THE MAIN STEAM VALVE ROOM ELEV. 121'0"

ASCO MODEL: HV206-381-4U

FUNCTION (PLANT ID): ACTUATE AIR OPERATED VALVE FOR ISOLATION  
(N2C22SV0479A, B; 489A, B; 499A, B)

SERVICE: STEAM GENERATOR FEEDWATER

FUNCTION (PLANT ID): ACTUATE AIR OPERATED VALVE FOR ISOLATION  
(N2C22SV0478A, B; 488A, B; 498A, B)

SERVICE: STEAM GENERATOR FEEDWATER

DISCREPANCY: QUALIFIED LIFE OR REPLACEMENT SCHEDULE ESTABLISHED

CLARIFICATIONS:

QUALIFIED LIFE OR REPLACEMENT SCHEDULE ESTABLISHED

NRC Position:

Section 7 of the DOR Guidelines and Section 4.2, Category II of NUREG-0588, do not require a qualified life to be established for all safety-related electrical equipment located in harsh environments.

An acceptable method for addressing in-service degradation is through a preventive maintenance/surveillance program with equipment and component refurbishment and/or replacement based on known susceptibility to aging degradation, the results of inspections, or manufacturers recommendations. These elements of the program lead to an understanding on a device-specific basis of the nature and extent of the increased stress levels encountered during Design Basis Accidents and resultant degradation (if any) which may occur. Arrhenius or other appropriate accelerated aging methodologies may be used to establish replacement and refurbishment schedules if the component's design and materials application are sufficiently simple and the necessary data are available to allow a meaningful application.

In plants subject to the qualification requirements of either the DOR Guidelines or NUREG-0588 Category II, for equipment that has been identified as being susceptible to significant degradation due to thermal and radiation aging, the schedule for inspection of and/or replacement of the susceptible components in that equipment must be incorporated into the preventive maintenance and surveillance programs.



EQUIPMENT ITEM NO. 10

APC Response:

The qualified life of the ASCO NP/206 series solenoid valves located in harsh environments outside the containment has been determined based on type testing, material analysis using Arrhenius Methodology, and/or operating experience to be 18 years. An Environmental Qualification Administrative Program is being implemented which includes for the ASCO NP/206 series solenoid valves a preventive maintenance/surveillance program with equipment and component refurbishment and/or replacement based on known susceptibility to aging degradation, the results of inspections, and manufacturers recommendations.

ADDITIONAL CLARIFICATIONS TO NOTES ON PAGE 5f OF TER

1. No comment is required.
2. See clarifications.

EQUIPMENT ITEM NO. 12

ELECTRIC MOTOR LOCATED IN THE CONTAINMENT, ELEV. 155'0"

JOY MANUFACTURING COMPANY - MODEL TYPE P

FUNCTION (PLANT ID): HYDROGEN CONCENTRATION REDUCTION  
(COO1A, B; Q2E22M001A, B)

SERVICE: POST-LOCA H<sub>2</sub> CONTROL

FUNCTION (PLANT ID): HYDROGEN CONCENTRATION REDUCTION  
(COO1A, B, C, D; Q2E19M001A, B, C, D)

SERVICE: POST-LOCA H<sub>2</sub> CONTROL

FUNCTION (PLANT ID): CONTAINMENT COOLING  
(H001A, B, C, D; Q2E12M001A, B, C, D)

SERVICE: CONTAINMENT HEAT REMOVAL

DISCREPANCY: ADEQUATE SIMILARITY BETWEEN EQUIPMENT AND TEST  
SPECIMEN ESTABLISHED

CLARIFICATIONS:

By their letter dated June 30, 1977, American Air Filter forwarded Joy Manufacturing Company's Report X-604 dated April 6, 1977, as applicable to the motor fan units supplied for Unit 1 - Containment Coolers (H001A, B, C, D; Q1E12M001A, B, C, D).

The Unit 2 containment cooler air fan units are identical to the ones for Unit 1 and have been supplied by the same manufacturers, Joy/Reliance. Hence, these units are fully qualified by Joy Manufacturing Company's Report X-604, dated April 6, 1977, for use inside the FNP containment.

A review of the motor data for motors (Q2E22M001A, B; Q2E19M001A, B, C, D) used in the POST-LOCA hydrogen control system, indicates that these motors are generically the same as the motor tested in Joy's Test Report X-604, dated April 6, 1977, and hence are fully qualified for use inside the FNP containment.

The following parameters are the same as the tested motor:

Manufacturer: Reliance Electric Company  
Motor Type : Induction  
Insulation : RN  
Enclosure : Totally enclosed

EQUIPMENT ITEM NO. 13

RTD LOCATED IN THE CONTAINMENT, ELEV. 122'9"

ROSEMOUNT MODEL 176KS

FUNCTION (PLANT ID): REACTOR TRIP (N2B21TE410, 413, 420,  
423, 430, 433)

DISCREPANCY: AGING DEGRADATION EVALUATED ADEQUATELY  
QUALIFIED LIFE OR REPLACEMENT SCHEDULE ESTABLISHED  
CRITERIA REGARDING SPRAY SATISFIED  
CRITERIA REGARDING FUNCTIONAL TESTING SATISFIED  
CRITERIA REGARDING INSTRUMENT ACCURACY SATISFIED

CLARIFICATIONS:

A. AGING DEGRADATION EVALUATED ADEQUATELY

NRC Position:

Section 7 of the DOR Guidelines and Section 4.2, Category II of NUREG-0588, do not require a qualified life to be established for all safety-related electrical equipment located in harsh environments.

An acceptable method for addressing in-service degradation is through a preventive maintenance/surveillance program with equipment and component refurbishment and/or replacement based on known susceptibility to aging degradation, the results of inspections, or manufacturers recommendations. These elements of the program lead to an understanding on a device-specific basis of the nature and extent of the increased stress levels encountered during Design Basis Accidents and resultant degradation (if any) which may occur. Arrhenius or other appropriate accelerated aging methodologies may be used to establish replacement and refurbishment schedules if the component's design and materials application are sufficiently simple and the necessary data are available to allow a meaningful application.

In plants subject to the qualification requirements of either the DOR Guidelines or NUREG-0588 Category II, for equipment that has been identified as being susceptible to significant degradation due to thermal and radiation aging, the schedule for inspection of and/or replacement of the susceptible components in that equipment must be incorporated into the preventive maintenance and surveillance programs.



APC Response:

An Environmental Qualification Administrative Program is being implemented for the RTDs which includes a preventive maintenance/surveillance program with equipment and component refurbishment and/or replacement based on known susceptibility to aging degradation, the results of inspection, and manufacturers recommendations. These RTDs have been determined to have a 40-year qualified life based on a thermal and radiation evaluation described below.

B. QUALIFIED LIFE OR REPLACEMENT SCHEDULE ESTABLISHED

Following are the results of the Westinghouse Thermal Aging Analysis, which were transmitted to APC in their letter APW-A-6006, dated June 14, 1982.

1. Lead Wrapping - Silicone-Impregnated Fiberglass

Thermal data on silicone-varnished glass cloth yields a 40-year-life temperature of 140-180°C using 50 percent retention of dielectric strength.

2. Insulating Tubing - Polyolefin

Testing of Polyolefin cable insulation was conducted by aging samples in ovens and periodically subjecting them to 2000 volts after soaking them in water and wrapping them around mandrels. The criterion used for end of life was dielectric failure under such conditions. The extrapolated 40-year life for samples wrapped on a 2X mandrel is 100°C.

3. Epoxy - Novalac

The 40-year extrapolated life based on 70 percent retention of initial flexural and impact strength is 90°C for an anhydride-cured epoxy Novalac.

4. Packing - Mica Quartz

This material does not contain organic substances and is not evaluated for aging effects.

5. Swaged Insulation - N/A (Crimped)

6. Wire Insulation - Silicone Rubber

Testing of silicone rubber has indicated that degradation is extremely slow at temperatures from 150°C to 230°C. The 40-year-life temperature is 70°C which envelops the Farley Nuclear Plant conditions.

7. Insulator and Seal - Silica Glass

The life expectancy for this type of material is much greater than 40 years and is considered to be inert for an indefinite period at temperatures below 120°C.

8. Cement - PBX (Serital) X

This material does not contain organic substances and has not been evaluated for aging effects.

The material aging analysis reports are applicable to FNP and are maintained on file at Westinghouse Water Reactor Division.

C. CRITERIA REGARDING SPRAY SATISFIED

Spray was injected via main inlet steam piping to test chamber over the first 24 h at a range of 6.0 gal/h and a concentration of 1.14 weight percent boric acid and 0.17 percent sodium hydroxide dissolved in water.

D. CRITERIA REGARDING FUNCTIONAL TESTING SATISFIED

The RTDs are calibrated by the vendor at 32°F, 525°F, and 625°F, which demonstrates accuracy over the temperature range of interest. Although it is difficult to provide an exact accuracy statement during the transient (the sensing end was exposed), the HELB test does demonstrate that the RTDs responded to the HELB temperature without exhibiting noticeable errors. Calibration checks after the test also provide additional support.

E. CRITERIA REGARDING INSTRUMENT ACCURACY SATISFIED

The temperature deviation was expressed as a percent of the span between the selected test temperatures when, in reality, the error expressed as a percent of the real span (670°F) would be much lower. The test report concludes that the environmental test results demonstrate that the RTDs meet or exceed all minimum performance requirements.

ADDITIONAL CLARIFICATIONS TO NOTES ON PAGES 5f-5j OF TER

1. APC complies with the Westinghouse recommendation that model 176KF be utilized for narrow range operation and model 176KS be utilized for the wide range.

EQUIPMENT ITEM NO. 13

2. The only requirement was to expose the head of the RTD to the accident environment. The sensing end was also exposed for ease of testing.
3. Electrical connections, e.g., splices, connectors, were not part of the RTD qualification program. Alabama Power Company has provided fully qualified cabling, cable splices and other necessary electrical components to ensure the electrical signals are transmitted under accident conditions.
4. See clarification "D."
5. The W test program was not intended to provide Rosemount's internal acceptance criteria. The W specification does require a repeatability throughout the range of  $+0.2^{\circ}\text{F}$ . As the report states, difficulties were encountered with the calibration equipment which tended to cause excessive deviations in a few sensors. The two-out-of-three acceptance criteria are based on Westinghouse engineering judgment and experience.
6. See clarification "E."
7. The test method described in WCAP-9157 is a more conservative method than the Arrhenius methodology, accepted by NUREG-0588.
8. No comment is required.
9. No comment is required.
10. As stated in WCAP-9157, the Rosemount Model 176KS and 176KF RTDs have been qualified in the qualification program to a total integrated dose of  $1 \times 10^6 \text{ R gamma}$ . The wide range RTDs used to measure  $T_{\text{HOT}}$  and  $T_{\text{COLD}}$  are Rosemount Model 176KS and are located on the RCS hot and cold leg piping. The narrow range RTDs used to measure RCS temperature are Rosemount Model 176KF and are located on the RTD bypass manifold. A material evaluation of the Rosemount Model 176KS and 176KF RTDs has determined that there are no radiation-susceptible materials contained in the portion of the RTDs which is in contact with the reactor coolant. All radiation-susceptible materials are located in the portion of the RTDs which is external to the RCL pipe and the bypass manifold pipe.

An analysis has been performed for the wide range RTDs (176KS) based on a 40-year normal operating dose (WCAP-8587, Rev. 4) and a 2-week post-DBE integrated gamma dose, taking into consideration the relative position of the radiation-susceptible materials to the RCL pipe. Modifications have been performed to provide beta radiation shielding on the wide range  $T_{\text{HOT}}$  and  $T_{\text{COLD}}$  RTDs. With

EQUIPMENT ITEM NO. 13

the completed installation of the beta shielding based on material qualification to a total integrated dose of  $1 \times 10^8$ R gamma per WCAP-9157, and based on the normal and accident integrated dose analysis considering the relative position of the radiation-susceptible materials to the RCL pipe, the model 176KS RTDs are radiation qualified for greater than 40 years of operation.

The narrow range RTDs Rosemount Model 176KF do not perform any long-term post-accident monitoring function. They will perform their intended reactor trip function approximately 30 s after the DBE. An analysis has been performed for the narrow range RTDs (176KF) based on a 40-year normal operating gamma dose and a 1-hour post-DBE integrated gamma dose, taking into consideration the relative position of the radiation-susceptible materials to the RTD bypass manifold pipe and the RCL piping. Based on material qualification to a total integrated dose of  $1 \times 10^8$ R gamma per WCAP-9157 and based on the normal and accident integrated dose analysis considering the relative position of the radiation-susceptible materials to the RTD bypass manifold and RCL piping, the model 176KF RTDs are radiation qualified for greater than 40 years of operation.

11. Refer to comment on note 10.
12. Test pressure control actually corresponds to saturated conditions at 320°F.
13. No comment is required.
14. See clarification "C."
15. Estimated air velocities in the area of RTD head are considered sufficient to limit the temperature rise due to convection so that the total head temperature is approximately 200°F. Operating experience has not shown adverse effects due to high temperatures. The material list in clarification "B" has been corrected from that shown in WCAP-9157. No ethylene propylene is contained in these RTDs.

EQUIPMENT ITEM NO. 14

RTD LOCATED IN THE CONTAINMENT, ELEV. 124'-0"

ROSEMOUNT MODEL 176KF

FUNCTION (PLANT ID): REACTOR TRIP (N2B13TE412B, D; 422B, D;  
432, B)

DISCREPANCY: AGING DEGRADATION EVALUATED ADEQUATELY  
QUALIFIED LIFE OR REPLACEMENT SCHEDULE ESTABLISHED  
CRITERIA REGARDING SPRAY SATISFIED  
CRITERIA REGARDING FUNCTIONAL TESTING SATISFIED  
CRITERIA REGARDING INSTRUMENT ACCURACY SATISFIED

CLARIFICATIONS:

A. AGING DEGRADATION EVALUATED ADEQUATELY

NRC Position:

Section 7 of the DOR Guidelines and Section 4.2, Category II of NUREG-0588, do not require a qualified life to be established for all safety-related electrical equipment located in harsh environments.

An acceptable method for addressing in-service degradation is through a preventive maintenance/surveillance program with equipment and component refurbishment and/or replacement based on known susceptibility to aging degradation, the results of inspections, or manufacturers recommendation. These elements of the program lead to an understanding on a device-specific basis of the nature and extent of the increased stress levels encountered during Design Basis Accidents and resultant degradation (if any) which may occur. Arrhenius or other appropriate accelerated aging methodologies may be used to establish replacement and refurbishment schedules if the component's design and materials application are sufficiently simple and the necessary data are available to allow a meaningful application.

In plants subject to the qualification requirements of either the DOR Guidelines or NUREG-0588 Category II, for equipment that has been identified as being susceptible to significant degradation due to thermal and radiation aging, the schedule for inspection of and/or replacement of the susceptible components in that equipment must be incorporated into the preventive maintenance and surveillance programs.



EQUIPMENT ITEM NO. 14

APC Response:

An Environmental Qualification Administrative Program is being implemented for the RTDs which includes a preventive maintenance/surveillance program with equipment and component refurbishment and/or replacement based on known susceptibility to aging degradation, the results of inspection, and manufacturers recommendations. These RTDs have been determined to have a 40-year qualified life based on a thermal and radiation evaluation described below.

B. QUALIFIED LIFE OR REPLACEMENT SCHEDULE ESTABLISHED

Following are the results of the Westinghouse Thermal Aging Analysis, which were transmitted to APC in their letter APW-A-6006, dated June 14, 1982.

1. Lead Wrapping - Silicone-Impregnated Fiberglass

Thermal data on silicone-varnished glass cloth yields a 40-year-life temperature of 140-180°C using 50 percent retention of dielectric strength.

2. Insulating Tubing - Polyolefin

Testing of Polyolefin cable insulation was conducted by aging samples in ovens and periodically subjecting them to 2000 volts after soaking them in water and wrapping them around mandrels. The criterion used for end of life was dielectric failure under such conditions. The extrapolated 40-year life for samples wrapped on a 2X mandrel is 100°C.

3. Epoxy - Novalac

The 40-year extrapolated life based on 70 percent retention of initial flexural and impact strength is 90°C for an anhydride-cured epoxy Novalac.

4. Packing - Mica Quartz

This material does not contain organic substances and is not evaluated for aging effects.

5. Swaged Insulation - N/A (Crimped)

6. Wire Insulation - Silicone Rubber

Testing of silicone rubber has indicated that degradation is extremely slow at temperatures from 150°C to 230°C. The 40-year-life temperature is 70°C which envelops the Farley Nuclear Plant conditions.

7. Insulator and Seal - Silica Glass

The life expectancy for this type of material is much greater than 40 years and is considered to be inert for an indefinite period at temperatures below 120°C.

8. Cement - PBX (Serital) X

This material does not contain organic substances and has not been evaluated for aging effects.

The material aging analysis reports are applicable to FNP and are maintained on file at Westinghouse Water Reactor Division.

C. CRITERIA REGARDING SPRAY SATISFIED

Spray was injected via main inlet steam piping to test chamber over the first 24 h at a range of 6.0 gal/h and a concentration of 1.14 weight percent boric acid and 0.17 percent sodium hydroxide dissolved in water.

D. CRITERIA REGARDING FUNCTIONAL TESTING SATISFIED

The RTDs are calibrated by the vendor at 32°F, 525°F, and 625°F, which demonstrates accuracy over the temperature range of interest. Although it is difficult to provide an exact accuracy statement during the transient (the sensing end was exposed), the HELB test does demonstrate that the RTDs responded to the HELB temperature without exhibiting noticeable errors. Calibration checks after the test also provide additional support.

E. CRITERIA REGARDING INSTRUMENT ACCURACY SATISFIED

The temperature deviation was expressed as a percent of the span between the selected test temperatures when, in reality, the error expressed as a percent of the real span (670°F) would be much lower. The test report concludes that the environmental test results demonstrate that the RTDs meet or exceed all minimum performance requirements.

ADDITIONAL CLARIFICATIONS TO NOTES ON PAGES 5f-5j OF TER

1. APC complies with the Westinghouse recommendation that model 176KF be utilized for narrow range operation and model 176KS be utilized for the wide range.
2. The only requirement was to expose the head of the RTD to the accident environment. The sensing end was also exposed for ease of testing.

3. Electrical connections, e.g., splices, connectors, were not part of the RTD qualification program. Alabama Power Company has provided fully qualified cables, cable splices and other necessary electrical components to ensure the electrical signals are transmitted under accident conditions.
4. See clarification "D."
5. The W test program was not intended to prove Rosemount's internal acceptance criteria. The W specification does require a repeatability throughout the range of  $+0.2^{\circ}\text{F}$ . As the report states, difficulties were encountered with the calibration equipment which tended to cause excessive deviations in a few sensors. The two-out-of-three acceptance criteria are based on Westinghouse engineering judgment and experience.
6. See clarification "E."
7. No comment is required.
8. The operating time requirements for the narrow range RTD may be found in the safety analysis report. However, the total test time should provide adequate assurance since this far exceeds trip time requirements. Margins for trip function requirements are contained in the HELB envelopes which encompass a full spectrum of break sizes and are also justified by the fact that a signal generated by the sensor is "locked in" by the protection system and will not reset should the sensor fail after the designated trip time requirement.
9. No comment is required.
10. As stated in WCAP-9157, the Rosemount Model 176KS and 176KF RTDs have been qualified in the qualification program to a total integrated dose of  $1 \times 10^6 \text{ R gamma}$ . The wide range RTDs used to measure  $T_{\text{HOT}}$  and  $T_{\text{COLD}}$  are Rosemount Model 176KS and are located on the RCS hot and cold leg piping. The narrow range RTDs used to measure RCS temperature are Rosemount Model 176KF and are located on the RTD bypass manifold. A material evaluation of the Rosemount Model 176KS and 176KF RTDs has determined that there are no radiation-susceptible materials contained in the portion of the RTDs which is in contact with the reactor coolant. All radiation-susceptible materials are located in the portion of the RTDs which is external to the RCL pipe and the bypass manifold pipe.

An analysis has been performed for the wide range RTDs (176KS) based on a 40-year normal operating dose (WCAP-8587, Rev. 4) and a 2-week post-DBE integrated gamma dose, taking into consideration the relative position of the radiation-susceptible materials to the RCL pipe.



EQUIPMENT ITEM NO. 14

Modifications have been performed to provide beta radiation shielding on the wide range  $T_{HOT}$  and  $T_{COLD}$  RTDs. With the completed installation of the beta shielding based on material qualification to a total integrated dose of  $1 \times 10^8 R$  gamma per WCAP-9157, and based on the normal and accident integrated dose analysis considering the relative position of the radiation-susceptible materials to the RCL pipe, the model 176KS RTDs are radiation qualified for greater than 40 years of operation.

The narrow range RTDs Rosemount Model 176KF do not perform any long-term post-accident monitoring function. They will perform their intended reactor trip function approximately 30 s after the DBE. An analysis has been performed for the narrow range RTDs (176KF) based on a 40-year normal operating gamma dose and a 1-hour post-DBE integrated gamma dose, taking into consideration the relative position of the radiation-susceptible materials to the RTD bypass manifold pipe and the RCL piping. Based on material qualification to a total integrated dose of  $1 \times 10^8 R$  gamma per WCAP-9157 and based on the normal and accident integrated dose analysis considering the relative position of the radiation-susceptible materials to the RTD bypass manifold and RCL piping, the model 176KF RTDs are radiation qualified for greater than 40 years of operation.

11. Refer to comment on note 10.
12. Test pressure control actually corresponds to saturated conditions at 320°F.
13. No comment is required.
14. See clarification "C."
15. Estimated air velocities in the area of RTD head are considered sufficient to limit the temperature rise due to convection so that the total head temperature is approximately 200°F. Operating experience has not shown adverse effects due to high temperatures. The material list in clarification "B" has been corrected from that shown in WCAP-9157. No ethylene propylene is contained in these RTDs.

EQUIPMENT ITEM NO. 15

RADIATION DETECTOR LOCATED IN THE CONTAINMENT, ELEV. 155'0"

VICTOREEN MODEL 877-1

FUNCTION (PLANT ID): RADIATION MONITOR (Q2D21RE0027A-A, B-B)

SERVICE: HIGH RANGE CONTAINMENT RADIATION MONITOR

DISCREPANCY: ADEQUATE SIMILARITY BETWEEN EQUIPMENT AND TEST  
SPECIMEN ESTABLISHED

CLARIFICATION:

Victoreen, Inc. Qualification Test Report No. 950.301, dated June 19, 1981, fully supports the qualification of the detector Model 877-1 and the cable Model 878-1 which are located inside the containment when the detector cables/connectors are sealed from the accident moisture environment of the containment atmosphere. This was accomplished in the test configuration by enclosing the detector cables/connectors in stainless steel from the inner penetration surface of the test chamber to the detectors.

Design for sealing the detector cable/connectors installed at the plant by duplicating the sealing procedure followed in the Victoreen Test Report No. 950.301 has been completed. The sealing modification will be completed during the next refueling outage of sufficient duration currently scheduled for the fourth quarter of 1983.

The best available equipment was installed to comply with the NUREG-0737 installation schedule, even though environmental qualification testing was not completed. The installation of equipment, lacking environmentally qualified documentation, was provided in NUREG-0737 if later qualification was demonstrated.

EQUIPMENT ITEM NO. 16

PRESSURE TRANSMITTER LOCATED IN THE CONTAINMENT, ELEV. 116'0"

BARTON MODEL 763 (LOT 2)

FUNCTION (PLANT ID): POST-ACCIDENT MONITOR (N2B21PT402, 403)

SERVICE: REACTOR COOLANT SYSTEM PRESSURE

DISCREPANCY: DOCUMENTATION NOT MADE AVAILABLE

CLARIFICATIONS:

Because WCAP-9885 is a proprietary document, it was requested that it not be made available for others to review. The pertinent data was extracted and is in the response to margin:

- (a) Temperature - The 380°F qualification test condition exceeds the 300°F required temperature by 80°F; thus adequate margin has been demonstrated.
- (b) Pressure - The 75 psig qualification test condition exceeds the margin above the maximum calculated Farley containment pressure of 47.5 psig.
- (c) Radiation - The Barton transmitter equipment qualification tests were based on a conservative calculation from the Westinghouse generic program which uses TID-14844 source terms and a 4100 MW<sub>t</sub> plant as a basis. This conservative calculation established 5 x 10<sup>7</sup> rad as the qualification basis. The maximum calculated dose for Farley plant Barton transmitters would be substantially reduced from this amount by a ratio of the Farley power rating (2652 MW<sub>t</sub>) over the calculational basis; therefore, adequate margin exists.
- (d) Operating Time - The Barton transmitters qualification test program utilized a 15-day test period simulating a 4-month post-DBE environment based on conservative aging procedures referenced in Westinghouse WCAP-9885. This documented conservative basis ensures that adequate margin exists beyond the specified operating time of 30 days.

An Environmental Qualification Administrative Program is being implemented which will include for the Barton Lot 2 transmitters a preventive maintenance/surveillance program with equipment and component refurbishment and/or replacement based on known susceptibility to aging degradation, the results of inspections, and manufacturers recommendations.

EQUIPMENT ITEM NO. 17

PRESSURE TRANSMITTER LOCATED IN THE CONTAINMENT, ELEV. 116'0"

BARTON MODEL 764 (LOT 2)

FUNCTION (PLANT ID): REACTOR TRIP (Q2B31PT455, 456, 457)

SERVICE: PRESSURIZER PRESSURE SYSTEM

DISCREPANCY: DOCUMENTATION NOT MADE AVAILABLE

CLARIFICATIONS:

Because WCAP-9885 is a proprietary document, it was requested that it not be made available for others to review. The pertinent data was extracted and is in the response to margin:

- (a) Temperature - The 380°F qualification test condition exceeds the 300°F required temperature by 80°F; thus adequate margin has been demonstrated.
- (b) Pressure - The 75 psig qualification test condition exceeds the margin above the maximum calculated Farley containment pressure of 47.5 psig.
- (c) Radiation - The Barton transmitter equipment qualification tests were based on a conservative calculation from the Westinghouse generic program which uses TID-14844 source terms and a 4100 MW<sub>t</sub> plant as a basis. This conservative calculation established 5 x 10<sup>7</sup> rad as the qualification basis. The maximum calculated dose for Farley plant Barton transmitters would be substantially reduced from this amount by a ratio of the Farley power rating (2652 MW<sub>t</sub>) over the calculational basis; therefore, adequate margin exists.
- (d) Operating Time - The Barton transmitters qualification test program utilized a 15-day test period simulating a 4-month post-DBE environment based on conservative aging procedures referenced in Westinghouse WCAP-9885. This documented conservative basis ensures that adequate margin exists beyond the specified operating time of 30 days.

An Environmental Qualification Administrative Program is being implemented which will include for the Barton Lot 2 transmitters a preventive maintenance/surveillance program with equipment and component refurbishment and/or replacement based on known susceptibility to aging degradation, the results of inspections, and manufacturers recommendations.

EQUIPMENT ITEM NO. 18

LEVEL SWITCH LOCATED IN THE MAIN STEAM ROOM, ELEV. 133'5"

DELAVAL MODEL LS36497

FUNCTION (PLANT ID): MAIN FEED PUMP TRIP (Q2N21LSH2828A, B, C;  
2829A, B, C)

SERVICE: FLOOD LEVEL SENSOR

DISCREPANCY: ADEQUATE SIMILARITY BETWEEN EQUIPMENT AND TEST  
SPECIMEN ESTABLISHED  
AGING DEGRADATION EVALUATED ADEQUATELY  
CRITERIA REGARDING TEST FAILURES OR SEVERE  
ANOMALIES SATISFIED

CLARIFICATIONS:

A. ADEQUATE SIMILARITY BETWEEN EQUIPMENT AND TEST SPECIMEN  
ESTABLISHED

The environmental qualification documentation for the  
Gems-DeLaval level transmitters (FIRL Test Report F-C3834,  
March 1974) is also applicable to the Gems-DeLaval level  
switches. Applicability of the report to the level switches  
is documented on Gems-DeLaval drawing LS-36497, dated  
June 8, 1975.

B. AGING DEGRADATION EVALUATED ADEQUATELY

NRC Position:

Section 7 of the DOR Guidelines and Section 4.2, Category II  
of NUREG-0588, do not require a qualified life to be  
established for all safety-related electrical equipment  
located in harsh environments.

An acceptable method for addressing in-service degradation  
is through a preventive maintenance/surveillance program  
with equipment and component refurbishment and/or  
replacement based on known susceptibility to aging  
degradation, the results of inspections, or manufacturers  
recommendations. These elements of the program lead to an  
understanding on a device-specific basis of the nature and  
extent of the increased stress levels encountered during  
Design Basis of Accidents and resultant degradation (if any)  
which may occur. Arrhenius or other appropriate accelerated  
aging methodologies may be used to establish replacement and  
refurbishment schedules if the component's design and  
materials application are sufficiently simple and the  
necessary data are available to allow a meaningful  
application.



EQUIPMENT ITEM NO. 18

In plants subject to the qualification requirements of either the DOR Guidelines or NUREG-0588 Category II, for equipment that has been identified as being susceptible to significant degradation due to thermal and radiation aging, the schedule for inspection of and/or replacement of the susceptible components in that equipment must be incorporated into the preventive maintenance and surveillance programs.

APC Response:

An Environmental Qualification Administrative Program is being implemented which will include for the Gems-DeLaval level switches a preventive maintenance/surveillance program with equipment and component refurbishment and/or replacement based on known susceptibility to aging degradation, the results of inspections, and manufacturers recommendations.

C. CRITERIA REGARDING TEST FAILURES OR SEVERE ANOMALIES SATISFIED

Based on Gems-DeLaval letter dated February 25, 1983, from Transamerica DeLaval, Inc., to Southern Company Services, the deficiency listed in page 5f of the Franklin Research Center Review regarding the FIRL Report S-C3834 (1888) Supplement was a supplemental test run at the Franklin Institute for Gems-DeLaval which subjected the units to a temperature of 346°F at a pressure of 126 psig to the point of failure at less than 90 minutes. This test was a destructive test and was not meant as part of the unit qualification test. As documented in previous APC submittals, the maximum surface temperature of these FNP components is 214°F in the main steam valve room. The maximum pressure at FNP is 5.8 psig in the main steam valve room. As stated in the subject letter and test report F-C3834, the unit is qualified for 280°F and 55 psig. Since the qualification temperature and pressure are not exceeded, the FNP DeLaval level sensors are qualified and the supplemental report, referenced in the TER, is not applicable to FNP.

ADDITIONAL CLARIFICATIONS TO NOTES ON PAGE 5f OF TER

1. See clarification "C."
2. See clarification "B."
3. See clarification "B."

EQUIPMENT ITEM NO. 19

LEVEL SENSOR LOCATED IN THE CONTAINMENT, ELEV. 80'0"

DELAVAL MODEL XM54854323

FUNCTION (PLANT ID): LEVEL INDICATION (Q2G21LT3282A-A, B-B)

SERVICE: CONTAINMENT SUMP (3-FOOT LEAKAGE COLLECTION SUMP)

DISCREPANCY: DOCUMENTED EVIDENCE OF QUALIFICATION ADEQUATE

CLARIFICATIONS:

These level transmitters were installed as a result of a commitment for a monitor for a narrow range containment sump to satisfy NUREG-0588. The actual test was completed during the fourth quarter of 1982, and the test results were issued from Wyle Laboratories on December 8, 1982, as NEQ Test Report 45700-1. Based on the results of this test report, the Gems-DeLaval level monitor in the containment leakage collection sump is environmentally qualified for use in the FNP containment.

EQUIPMENT ITEM NO. 20

LEVEL TRANSMITTER LOCATED IN THE CONTAINMENT, ELEV. 116'0"

DELAVAL MODEL XM36495

FUNCTION (PLANT ID): POST-ACCIDENT LEVEL MONITOR  
(Q2E11LT3594A, B)

SERVICE: WIDE RANGE CONTAINMENT SUMP LEVEL MONITOR - POST-LOCA

DISCREPANCY: ADEQUATE SIMILARITY BETWEEN EQUIPMENT AND TEST  
SPECIMEN ESTABLISHED  
AGING DEGRADATION EVALUATED ADEQUATELY  
CRITERIA REGARDING TEST FAILURES OR SEVERE  
ANOMALIES SATISFIED

CLARIFICATIONS:

- A. ADEQUATE SIMILARITY BETWEEN EQUIPMENT AND TEST SPECIMEN  
ESTABLISHED

Franklin Institute Research Laboratories Report F-C3834 page 2-1 describes the test specimen under test as "P/N XM 36495," which is identical to the model number XM 36495 installed at Farley plant. The difference between the test specimen that underwent the test and the unit installed is the overall length of the probe. The test specimen was 2 feet long, and the actual probe is 10 feet long. This should not affect the results of a temperature/pressure environmental test.

- B. AGING DEGRADATION EVALUATED ADEQUATELY

NRC Position:

Section 7 of the DOR Guidelines and Section 4.2, Category II of NUREG-0588, do not require a qualified life to be established for all safety-related electrical equipment located in harsh environments.

An acceptable method for addressing in-service degradation is through a preventive maintenance/surveillance program with equipment and component refurbishment and/or replacement based on known susceptibility to aging degradation, the results of inspections, or manufacturers recommendations. These elements of the program lead to an understanding on a device-specific basis of the nature and extent of the increased stress levels encountered during Design Basis Accidents and resultant degradation (if any) which may occur. Arrhenius or other appropriate accelerated aging methodologies may be used to establish replacement and refurbishment schedules if the component's design and

EQUIPMENT ITEM NO. 20

materials application are sufficiently simple and the necessary data are available to allow a meaningful application.

In plants subject to the qualification requirements of either the DOR Guidelines or NUREG-0588 Category II, for equipment that has been identified as being susceptible to significant degradation due to thermal and radiation aging, the schedule for inspection of and/or replacement of the susceptible components in that equipment must be incorporated into the preventive maintenance and surveillance programs.

APC Response:

An Environmental Qualification Administrative Program is being implemented which will include for the Gems-DeLaval level monitors a preventive maintenance/surveillance program with equipment and component refurbishment and/or replacement based on known susceptibility to aging degradation, the results of inspections, and manufacturers recommendations.

C. CRITERIA REGARDING TEST FAILURES OR SEVERE ANOMALIES SATISFIED

Based on Gems-DeLaval letter dated February 25, 1983, from Transamerica DeLaval, Inc., to Southern Company Services, the deficiency listed in page 5F of the Franklin Research Center Review regarding the FIRL Report S-C3834 (1888) Supplement was a supplemental test run at the Franklin Institute for Gems-DeLaval which subjected the units to a temperature of 346°F at a pressure of 126 psig to the point of failure at less than 90 minutes. This test was a destructive test and was not meant as part of the unit qualification test. As documented in previous APC submittals, the maximum surface temperature of these FNP components is 270°F in the containment. The maximum pressure at FNP is 47.5 psig in the containment. As stated in the subject letter and test report F-C 3834, the unit is qualified for 280°F and 55 psig. Since the qualification temperature and pressure are not exceeded, the FNP DeLaval level sensors are qualified and the supplemental report, referenced in the TER, is not applicable to FNP.

ADDITIONAL CLARIFICATIONS TO NOTES ON PAGE 5f OF TER

1. See clarification "C."
2. See clarification "B."
3. See clarification "B."

EQUIPMENT ITEM NO. 21

LEVEL TRANSMITTER LOCATED IN THE CONTAINMENT, ELEV. 116'0"

BARTON MODEL 764 (LOT 2)

FUNCTION (PLANT ID): PRESSURIZER LEVEL (Q2B31LT459, 460, 461)

SERVICE: PRESSURIZER LEVEL SYSTEM

FUNCTION (PLANT ID): FEEDWATER CONTROL (Q2C22LT474 TO 476,  
484 TO 486, 494 TO 496)

SERVICE: STEAM GENERATOR LEVEL SYSTEM

FUNCTION (PLANT ID): LEVEL INDICATION (Q2N11LT477, 487, 497)

SERVICE: STEAM GENERATOR LEVEL SYSTEM

DISCREPANCY: DOCUMENTATION NOT MADE AVAILABLE

CLARIFICATIONS:

Because WCAP-9885 is a proprietary document, it was requested that it not be made available for others to review. The pertinent data was extracted and is in the response to margin:

- (a) Temperature - The 380°F qualification test condition exceeds the 300°F required temperature by 80°F; thus, adequate margin has been demonstrated.
- (b) Pressure - The 75 psig qualification test condition exceeds the margin above the maximum calculated Farley containment pressure of 47.5 psig.
- (c) Radiation - The Barton transmitter equipment qualification tests were based on a conservative calculation from the Westinghouse generic program which uses TID-14844 source terms and a 4100 MW<sub>t</sub> plant as a basis. This conservative calculation established 5 x 10<sup>7</sup> rad as the qualification basis. The maximum calculated dose for Farley plant Barton transmitters would be substantially reduced from this amount by a ratio of the Farley power rating (2652 MW<sub>t</sub>) over the calculational basis; therefore, adequate margin exists.



EQUIPMENT ITEM NO. 21

- (d) Operating Time - The Barton transmitters qualification test program utilized a 15-day test period simulating a 4-month post-DBE environment based on conservative aging procedures referenced in Westinghouse WCAP-9885. This documented conservative basis ensures that adequate margin exists beyond the specified operating time of 30 days.

An Environmental Qualification Administrative Program is being implemented which will include for the Barton Lot 2 transmitters a preventive maintenance/surveillance program with equipment and component refurbishment and/or replacement based on known susceptibility to aging degradation, the results of inspections, and manufacturers recommendations.

EQUIPMENT ITEM NO. 22

FLOW TRANSMITTER LOCATED IN THE CONTAINMENT, ELEV. 121'0"

BARTON MODEL 764 (LOT 2)

FUNCTION (PLANT ID): FEEDWATER CONTROL (Q2C22FT474, 475, 484, 485, 494, 495)

SERVICE: STEAM GENERATOR LEVEL SYSTEM

DISCREPANCY: DOCUMENTATION NOT MADE AVAILABLE

CLARIFICATIONS:

Because WCAP-9885 is a proprietary document, it was requested that it not be made available for others to review. The pertinent data was extracted and is in the response to margin:

- (a) Temperature - The 380°F qualification test condition exceeds the 300°F required temperature by 80°F; thus, adequate margin has been demonstrated.
- (b) Pressure - The 75 psig qualification test condition exceeds the margin above the maximum calculated Farley containment pressure of 47.5 psig.
- (c) Radiation - The Barton transmitter equipment qualification tests were based on a conservative calculation from the Westinghouse generic program which uses TID-14844 source terms and a 4100 MW<sub>t</sub> plant as a basis. This conservative calculation established 5 x 10<sup>7</sup> rad as the qualification basis. The maximum calculated dose for Farley plant Barton transmitters would be substantially reduced from this amount by a ratio of the Farley power rating (2652 MW<sub>t</sub>) over the calculational basis; therefore, adequate margin exists.
- (d) Operating Time - The Barton transmitters qualification test program utilized a 15-day test period simulating a 4-month post-DBE environment based on conservative aging procedures referenced in Westinghouse WCAP-9885. This documented conservative basis ensures that adequate margin exists beyond the specified operating time of 30 days.

An Environmental Qualification Administrative Program is being implemented which will include for the Barton Lot 2 transmitters a preventive maintenance/surveillance program with equipment and component refurbishment and/or replacement based on known susceptibility to aging degradation, the results of inspections, and manufacturers recommendations.

EQUIPMENT ITEM NO. 23

LIMIT SWITCH LOCATED IN THE MAIN STEAM VALVE ROOM, ELEV. 121'0"

NAMCO MODEL EA180

FUNCTION (PLANT ID): VALVE POSITION INDICATION (N2C22ZS0478,  
488, 498, 479, 489, 499)

SERVICE: STM GEN FDWTR AND FDWTR BYPASS

DISCREPANCY: QUALIFIED LIFE OR REPLACEMENT SCHEDULE ESTABLISHED

CLARIFICATIONS:

NRC Position:

Section 7 of the DOR Guidelines and Section 4.2, Category II of NUREG-0588, do not require a qualified life to be established for all safety-related electrical equipment located in harsh environments.

An acceptable method for addressing in-service degradation is through a preventive maintenance/surveillance program with equipment and component refurbishment and/or replacement based on known susceptibility to aging degradation, the results of inspections, or manufacturers recommendations. These elements of the program lead to an understanding on a device-specific basis of the nature and extent of the increased stress levels encountered during Design Basis Accidents and resultant degradation (if any) which may occur. Arrhenius or other appropriate accelerated aging methodologies may be used to establish replacement and refurbishment schedules if the component's design and materials application are sufficiently simple and the necessary data are available to allow a meaningful application.

In plants subject to the qualification requirements of either the DOR Guidelines or NUREG-0588 Category II, for equipment that has been identified as being susceptible to significant degradation due to thermal and radiation aging, the schedule for inspection of and/or replacement of the susceptible components in that equipment must be incorporated into the preventive maintenance and surveillance programs.

APC Response:

The qualified life of the NAMCO EA180 limit switches located in harsh environments outside of the containment has been determined based on type testing, material analysis using Arrhenius Methodology, and/or operating experience to be 18 years. An Environmental Qualification Administrative Program is being implemented which includes for the NAMCO EA180 limit

EQUIPMENT ITEM NO. 23

switches a preventive maintenance/surveillance program with equipment and component refurbishment and/or replacement based on known susceptibility to aging degradation, the results of inspections, and manufacturers recommendations.

ADDITIONAL CLARIFICATIONS TO NOTES ON PAGE 5f OF TER

1. See clarifications.

EQUIPMENT ITEM NO. 24

LIMIT SWITCH LOCATED IN THE MAIN STEAM ROOM, ELEV. 131'7"

NAMCO MODEL EA180

FUNCTION (PLANT ID): VALVE POSITION INDICATION  
(Q2N25ZS3772A, B, C)

SERVICE: ISOLATION OF CHEMICAL INJECTION TO STEAM GENERATORS

FUNCTION (PLANT ID): VALVE POSITION INDICATION  
(Q2N23ZS3228A, B, C; 3227A, B, C)

SERVICE: AFWP DISCHARGE

FUNCTION (PLANT ID): VALVE POSITION INDICATION  
(Q2N12ZS3234A, B; 3235A, B)

SERVICE: STEAM TO T.D. AFW

FUNCTION (PLANT ID): VALVE POSITION INDICATION  
(Q2N11ZS3369A, B, C; 3370A, B, C)

SERVICE: MAIN STEAMLINE ISOL;/STEAMLINE STOP/CHECK VLV.

FUNCTION (PLANT ID): VALVE POSITION INDICATION  
(Q2N11ZS3368A, B, C; 3976A, B, C)

SERVICE: MAIN STEAM ISOLATION BYPASS

DISCREPANCY: AGING DEGRADATION EVALUATED ADEQUATELY,  
CRITERIA REGARDING SUBMERGENCE SATISFIED

CLARIFICATIONS:

A. AGING DEGRADATION EVALUATED ADEQUATELY

NRC Position:

Section 7 of the DOR Guidelines and Section 4.2, Category II of NUREG-0588, do not require a qualified life to be established for all safety-related electrical equipment located in harsh environments.

An acceptable method for addressing in-service degradation is through a preventive maintenance/surveillance program with equipment and component refurbishment and/or replacement based on known susceptibility to aging degradation, the results of inspections, or manufacturers recommendations. These elements of the program lead to an understanding on a device-specific basis of the nature and extent of the increased stress levels encountered during Design Basis Accidents and resultant degradation (if any) which may occur. Arrhenius or other appropriate accelerated



EQUIPMENT ITEM NO. 24

aging methodologies may be used to establish replacement and refurbishment schedules if the component's design and materials application are sufficiently simple and the necessary data are available to allow a meaningful application.

In plants subject to the qualification requirements of either the DOR Guidelines or NUREG-0588 Category II, for equipment that has been identified as being susceptible to significant degradation due to thermal and radiation aging, the schedule for inspection of and/or replacement of the susceptible components in that equipment must be incorporated into the preventive maintenance and surveillance programs.

APC Response:

The qualified life of the NAMCO EA180 limit switches located in harsh environments outside of the containment has been determined based on type testing, material analysis using Arrhenius Methodology, and/or operating experience to be 18 years. An Environmental Qualification Administrative Program is being implemented which includes for the NAMCO EA180 limit switches a preventive maintenance/surveillance program with equipment and component refurbishment and/or replacement based on known susceptibility to aging degradation, the results of inspections, and manufacturers recommendations.

B. CRITERIA REGARDING SUBMERGENCE SATISFIED

As shown in Rev. 4 to APC's NUREG-0588 submittal on the Master Lists in Sections C.2.13, C.2.14, C.2.16, and C.2.17, limit switches (Q2N25Z-S3772A, B, C), (Q2N23ZS3228A, B, C; 3227A, B, C), (Q2N12ZS3234A, B; 3235A, B) and (Q2N11ZS3368A, B, C; 3976A, B, C) are all located at elevations above the 130'5" flood level. Only limit switches (Q2N11Z-S3369A, B, C; 3370A, B, C) are located below the flood level. Watertight seals have been installed on these limit switches, and the switches with watertight seals have been qualified by test in accordance with the submergence requirements of NUREG-0588, Section 2.2 (5), Category II. (Reference Rev. 4 to APC's NUREG-0588 submittal.)

ADDITIONAL CLARIFICATIONS TO NOTES ON PAGE 5f OF TER

1. See Clarification "A."
2. See Clarification "B."

EQUIPMENT ITEM NO. 25

LIMIT SWITCH LOCATED IN THE CONTAINMENT, ELEV. 118'-0" AND ABOVE  
NAMCO MODEL EA180

FUNCTION (PLANT ID): VALVE POSITION INDICATION (N2B31ZS8047)

SERVICE: WPS TO PRESS RELIEF TANK

FUNCTION (PLANT ID): VALVE POSITION INDICATION (Q2E21ZS8871)

SERVICE: ACCUMULATOR TEST LINE

FUNCTION (PLANT ID): VALVE POSITION INDICATION (Q2P13ZS3196,  
2867B, 3197, 2866B)

SERVICE: CONTAINMENT PURGE AND MINI-PURGE

FUNCTION (PLANT ID): VALVE POSITION INDICATION (Q2P17ZS3184,  
3443; N2C22ZS0499)

SERVICE: CCW/EXCESS LETDOWN ISOL.

FUNCTION (PLANT ID): VALVE POSITION INDICATION (Q2P15ZS3104,  
3103, 3765, 3766; 3179A, B, C)

SERVICE: SAMPLE SYSTEM ISOL.

FUNCTION (PLANT ID): VALVE POSITION INDICATION  
(Q2P15ZS3180A, B, C; 3181A, B, C)

SERVICE: SAMPLE SYSTEM ISOL.

FUNCTION (PLANT ID): VALVE POSITION INDICATION (Q2E12ZS3999A, B)

SERVICE: REACTOR CAVITY COOLING SYS.

DISCREPANCY: QUALIFIED LIFE OR REPLACEMENT SCHEDULE ESTABLISHED

CLARIFICATIONS:

Limit switch N2C22ZS0499 is located in the auxiliary building  
and is included as part of Equipment Item No. 23.

NRC Position:

Section 7 of the DOR Guidelines and Section 4.2, Category II of  
NUREG-0588, do not require a qualified life to be established  
for all safety-related electrical equipment located in harsh  
environments.

An acceptable method for addressing in-service degradation is  
through a preventive maintenance/surveillance program with

EQUIPMENT ITEM NO. 25

equipment and component refurbishment and/or replacement based on known susceptibility to aging degradation, the results of inspections, or manufacturers recommendations. These elements of the program lead to an understanding on a device-specific basis of the nature and extent of the increased stress levels encountered during Design Basis Accidents and resultant degradation (if any) which may occur. Arrhenius or other appropriate accelerated aging methodologies may be used to establish replacement and refurbishment schedules if the component's design and materials application are sufficiently simple and the necessary data are available to allow a meaningful application.

In plants subject to the qualification requirements of either the DOR Guidelines or NUREG-0588 Category II, for equipment that has been identified as being susceptible to significant degradation due to thermal and radiation aging, the schedule for inspection of and/or replacement of the susceptible components in that equipment must be incorporated into the preventive maintenance and surveillance programs.

APC Response:

All of the limit switches identified under Equipment Item No. 25 are NAMCO EA180's except for limit switch Nos. Q2P13ZS2866B and 2867B, which are qualified NAMCO EA740's.

The qualified life of the NAMCO EA180/EA740 limit switches located inside containment has been determined based on type testing, material analysis using Arrhenius Methodology, and/or operating experience to be 8 years. An Environmental Qualification Administrative Program is being implemented which includes for the NAMCO EA180/EA740 limit switches a preventive maintenance/surveillance program with equipment and component refurbishment and/or replacement based on known susceptibility to aging degradation, the results of inspections, and manufacturers recommendations.

ADDITIONAL CLARIFICATIONS TO NOTES ON PAGE 5f OF TER

1. See clarifications.

EQUIPMENT ITEM NO. 26

LIMIT SWITCH LOCATED IN THE CONTAINMENT, ELEV. 109'-0"

NAMCO MODEL EA180

FUNCTION (PLANT ID): VALVE POSITION INDICATION  
(N2E21ZS8149A, B, C; Q2E21ZS8808AB, BB, CB)

SERVICE: REGEN HX SHELL DISCH; ACCUMULATOR TANK DISCH.

FUNCTION (PLANT ID): VALVE POSITION INDICATION (Q2G21ZS3376,  
7126; N2G21ZS1003B)

SERVICE: CONT. SUMP PUMP DISCH; REACTOR COOL DRAIN TK; REACTOR  
COOLANT DRAIN TK HX DISCH.

DISCREPANCY: QUALIFIED LIFE OR REPLACEMENT SCHEDULE ESTABLISHED,  
CRITERIA REGARDING SUBMERGENCE SATISFIED

CLARIFICATIONS:

A. QUALIFIED LIFE OR REPLACEMENT SCHEDULE ESTABLISHED

NRC Position:

Section 7 of the DOR Guidelines and Section 4.2, Category II of NUREG-0588, do not require a qualified life to be established for all safety-related electrical equipment located in harsh environments.

An acceptable method for addressing in-service degradation is through a preventive maintenance/surveillance program with equipment and component refurbishment and/or replacement based on known susceptibility to aging degradation, the results of inspections, or manufacturers recommendations. These elements of the program lead to an understanding on a device-specific basis of the nature and extent of the increased stress levels encountered during Design Basis Accidents and resultant degradation (if any) which may occur. Arrhenius or other appropriate accelerated aging methodologies may be used to establish replacement and refurbishment schedules if the component's design and materials application are sufficiently simple and the necessary data are available to allow a meaningful application.

In plants subject to the qualification requirements of either the DOR Guidelines or NUREG-0588 Category II, for equipment that has been identified as being susceptible to significant degradation due to thermal and radiation aging, the schedule for inspection of and/or replacement of the



EQUIPMENT ITEM NO. 26

susceptible components in that equipment must be incorporated into the preventive maintenance and surveillance programs.

APC Response:

The qualified life of the NAMCO EA180 limit switches located inside containment has been determined based on type testing, material analysis using Arrhenius Methodology, and/or operating experience to be 8 years. An Environmental Qualification Administrative Program is being implemented which includes for the NAMCO EA180 limit switches a preventive maintenance/surveillance program with equipment and component refurbishment and/or replacement based on known susceptibility to aging degradation, the results of inspections, and manufacturers recommendations.

B. CRITERIA REGARDING SUBMERGENCE SATISFIED

NRC Position:

(DOR GUIDELINES SECTION 4.1, SUB-ITEM 3; AND SECTION 4.3.2, SUB-ITEM 3)

Equipment submergence (inside or outside containment) should be addressed where the possibility exists that submergence of equipment may result from HELBs or other postulated occurrences. Supplement 2 to IE Bulletin 79-01B (20) provides the following additional criterion: If the equipment satisfies the guidance and other requirements of the DOR Guidelines or NUREG-0588 for the LOCA and HELB accidents, and the licensee demonstrates that its failure will not adversely affect any safety-related function or mislead the operator after submergence, the equipment can be considered exempt from the submergence portion of the qualification requirements.

APC Response:

With the Qualified Life clarification provided in Part A above, the NAMCO EA180 limit switches located inside containment satisfy the guidance and other requirements of the DOR Guidelines or NUREG-0588 for the LOCA and HELB accidents.

Appendix 4, Section II.D, which was included in Rev. 4 to APC's September 12, 1980, submittal, "Joseph M. Farley Nuclear Plant - Unit 2 Response to NRC NUREG-0588," and was forwarded to the NRC on July 1, 1981, demonstrated that submergence of limit switches (N2E21ZS8149A, B, C;



EQUIPMENT ITEM NO. 26

Q2E21ZS8808AB, BB, CB) and (Q2G21ZS3376, N2G21Z1003B) will not adversely affect any safety-related function. In addition, Alabama Power Company has determined that these limit switches would perform their intended function prior to becoming submerged and any circuit shorts that could occur would not mislead the operator. Therefore, these limit switches should be considered exempt from the submergence portion of the qualification requirements.

As shown on the Master List, Section C.2.12 of Rev. 4 to APC's NUREG-0588 response, limit switch Q2G21ZS7126 is located at elev. 117'-0" in the containment, which is above the flood level. Therefore, Q2G21ZS7126 should be considered exempt from the submergence position of the qualification requirements.

ADDITIONAL CLARIFICATIONS TO NOTES ON PAGE 5f OF TER

1. See Clarification "A."
2. See Clarification "B."

EQUIPMENT ITEM NO. 27

LIMIT SWITCH LOCATED IN THE CONTAINMENT, ELEV. GREATER THAN 115'0"

NAMCO MODEL EA180

FUNCTION (PLANT ID): VALVE POSITION INDICATION (N2B31ZS0445A, 444B)

SERVICE: PRESSURIZER PORV

FUNCTION (PLANT ID): VALVE POSITION INDICATION (Q2B3ZS2034, 2035, 2036)

SERVICE: PRESSURIZER SAFETY VALVE

DISCREPANCY: QUALIFIED LIFE OR REPLACEMENT SCHEDULE ESTABLISHED

CLARIFICATIONS:

NRC Position:

Section 7 of the DOR Guidelines and Section 4.2, Category II of NUREG-0588, do not require a qualified life to be established for all safety-related electrical equipment located in harsh environments.

An acceptable method for addressing in-service degradation is through a preventive maintenance/surveillance program with equipment and component refurbishment and/or replacement based on known susceptibility to aging degradation, the results of inspections, or manufacturers recommendations. These elements of the program lead to an understanding on a device-specific basis of the nature and extent of the increased stress levels encountered during Design Basis Accidents and resultant degradation (if any) which may occur. Arrhenius or other appropriate accelerated aging methodologies may be used to establish replacement and refurbishment schedules if the component's design and materials application are sufficiently simple and the necessary data are available to allow a meaningful application.

In plants subject to the qualification requirements of either the DOR Guidelines or NUREG-0588 Category II, for equipment that has been identified as being susceptible to significant degradation due to thermal and radiation aging, the schedule for inspection of and/or replacement of the susceptible components in that equipment must be incorporated into the preventive maintenance and surveillance programs.

EQUIPMENT ITEM NO. 27

APC Response:

The qualified life of the NAMCO EA180 limit switches located inside containment has been determined based on type testing, material analysis using Arrhenius Methodology, and/or operating experience to be 8 years. An Environmental Qualification Administrative Program is being implemented which includes for the NAMCO EA180 limit switches a preventive maintenance/surveillance program with equipment and component refurbishment and/or replacement based on known susceptibility to aging degradation, the results of inspections, and manufacturers recommendations.

ADDITIONAL CLARIFICATIONS TO NOTES ON PAGE 5f OF TER

1. See clarifications.

EQUIPMENT ITEM NO. 34

ELECTRICAL CABLE, INSTRUMENT LOCATED IN THE MAIN STEAM ROOM,  
ELEV. 135'0" AND ABOVE

BOSTON INSULATED WIRE, MODEL - NONE

FUNCTION (PLANT ID): ELECTRICAL INSTRUMENTATION  
(2VAL5007C, 8C, 9C; 2VAL5013D, 14D, 15D)

SERVICE: ELECTRICAL SAFETY - AUXILIARY FEEDWATER

FUNCTION (PLANT ID): ELECTRICAL INSTRUMENTATION (2VNR5003A, B)

SERVICE: ELECTRICAL SAFETY - AUXILIARY STEAM

DISCREPANCY: DOCUMENTATION NOT MADE AVAILABLE

CLARIFICATIONS:

The FNP cables are fully qualified by Boston Insulated Wire  
and Cable Company's Test Report 73E062, dated September 7,  
1973, and their clarification letter dated August 21, 1981.

The test conditions envelop the FNP service requirements.

ELECTRICAL EQUIPMENT ITEM NO. 35

ELECTRICAL CABLE, INSTRUMENT LOCATED IN THE MAIN STEAM ROOM,  
ELEV. 116'0"

BOSTON INSULATED WIRE MODEL - NONE

FUNCTION (PLANT ID): ELECTRICAL INSTRUMENTATION  
(2VXV5013L, 14H, 14J)

SERVICE: ELECTRICAL SAFETY, MAIN STEAM - SG LEVEL

DISCREPANCY: DOCUMENTATION NOT MADE AVAILABLE

CLARIFICATIONS:

The FNP cables are fully qualified by Boston Insulated Wire and Cable Company's Test Report 73E062, dated September 7, 1973, and their clarification letter dated August 21, 1981.

The test conditions envelop the FNP service requirements.



EQUIPMENT ITEM NO. 36

ELECTRICAL CABLE, INSTRUMENT LOCATED IN THE CONTAINMENT, ELEV.  
121'0"

BOSTON INSULATED WIRE MODEL - NONE

FUNCTION (PLANT ID): ELECTRICAL INSTRUMENTATION  
(2V1V5002L, M, N; 2V2V5002L, M, N)

SERVICE: ELECTRICAL SAFETY SYSTEM - FEEDWATER CONTROL

FUNCTION (PLANT ID): ELECTRICAL INSTRUMENTATION  
(2V3V5002H, J, K, L, M, N)

SERVICE: ELECTRICAL SAFETY SYSTEM - FEEDWATER CONTROL

FUNCTION (PLANT ID): ELECTRICAL INSTRUMENTATION  
(2V4V5002A, B, C)

SERVICE: ELECTRICAL SAFETY SYSTEM - FEEDWATER CONTROL

DISCREPANCY: DOCUMENTATION NOT MADE AVAILABLE

CLARIFICATIONS:

The FNP cables are fully qualified by Boston Insulated Wire and Cable Company's Test Report 73E062, dated September 7, 1973, and their clarification letter dated August 21, 1981.

The test conditions envelop the FNP service requirements.

EQUIPMENT ITEM NO. 37

ELECTRICAL CABLE, INSTRUMENT LOCATED IN THE CONTAINMENT, ELEV.  
122'9"

BOSTON INSULATED WIRE MODEL - NONE

FUNCTION (PLANT ID): ELECTRICAL INSTRUMENTATION  
(2VYV5031D; 2V2V5002T, U)

SERVICE: ELECTRICAL SAFETY SYSTEM - PRESSURIZER

FUNCTION (PLANT ID): ELECTRICAL INSTRUMENTATION  
(2V1V5002U; 2V3V5002T, U)

SERVICE: ELECTRICAL SAFETY SYSTEM - PRESSURIZER

FUNCTION (PLANT ID): ELECTRICAL INSTRUMENTATION  
(2VYV5031B; 2VYV5033B)

SERVICE: ELECTRICAL SAFETY SYSTEM - STEAM GENERATOR

FUNCTION (PLANT ID): ELECTRICAL INSTRUMENTATION  
(2V1V5002E, F, G; 2V2V5002E, F, G)

SERVICE: ELECTRICAL SAFETY SYSTEM - STEAM GENERATOR

FUNCTION (PLANT ID): ELECTRICAL INSTRUMENTATION  
(2V1V5002B, D; 2V2V5002B, D)

SERVICE: ELECTRICAL SAFETY SYSTEM - REACTOR COOLANT

DISCREPANCY: DOCUMENTATION NOT MADE AVAILABLE

CLARIFICATIONS:

The FNP cables are fully qualified by Boston Insulated Wire and Cable Company's Test Report 73E062, dated September 7, 1973, and their clarification letter dated August 21, 1981.

The test conditions envelop the FNP service requirements.

EQUIPMENT ITEM NO. 38

ELECTRICAL CABLE, CONTROL LOCATED IN THE AUXILIARY BUILDING,  
ELEV. 121'0"

OKONITE

FUNCTION (PLANT ID): ELECTRICAL POWER AND CONTROL (VARIOUS)

SERVICE: ELECTRICAL SYSTEMS - FEEDWATER CONTROL

DISCREPANCY: ADEQUATE SIMILARITY BETWEEN EQUIPMENT AND TEST  
SPECIMEN ESTABLISHED

CLARIFICATIONS:

In a letter dated June 22, 1981, the Okonite Company has certified that all power and control cables supplied by them for Joseph M. Farley Nuclear Plant Unit 2 are qualified by their test report N-1, dated July 3, 1978.

ADDITIONAL CLARIFICATIONS TO NOTES ON PAGE 5f OF TER

1. See clarifications.

EQUIPMENT ITEM NO. 39

ELECTRICAL CABLE, CONTROL LOCATED IN THE MAIN STEAM ROOM, ELEV.  
135'0"

OKONITE

FUNCTION (PLANT ID): ELECTRICAL POWER AND CONTROL (VARIOUS)

SERVICE: ELECTRICAL SYSTEM - CHEMICAL INJECTION

FUNCTION (PLANT ID): ELECTRICAL POWER AND CONTROL (VARIOUS)

SERVICE: ELECTRICAL SYSTEM - AUX. FEEDWATER

FUNCTION (PLANT ID): ELECTRICAL POWER AND CONTROL (VARIOUS)

SERVICE: ELECTRICAL SYSTEM - MAIN FEEDWATER AND COND.

FUNCTION (PLANT ID): ELECTRICAL POWER AND CONTROL (VARIOUS)

SERVICE: ELECTRICAL SYSTEM - AUXILIARY STEAM

FUNCTION (PLANT ID): ELECTRICAL POWER AND CONTROL (VARIOUS)

SERVICE: ELECTRICAL SYSTEM - MAIN STEAM

DISCREPANCY: ADEQUATE SIMILARITY BETWEEN EQUIPMENT AND TEST  
SPECIMEN ESTABLISHED

CLARIFICATIONS:

In a letter dated June 22, 1981, the Okonite Company has certified that all power and control cables supplied by them for Joseph M. Farley Nuclear Plant Unit 2 are qualified by their test report N-1 dated July 3, 1978.

ADDITIONAL CLARIFICATIONS TO NOTES ON PAGE 5f OF TER

1. See clarifications.

EQUIPMENT ITEM NO. 40

ELECTRICAL CABLE, CONTROL LOCATED IN THE CONTAINMENT  
OKONITE

FUNCTION (PLANT ID): ELECTRICAL POWER AND CONTROL (VARIOUS)

SERVICE: CONTAINMENT SUMP LEVEL

FUNCTION (PLANT ID): ELECTRICAL POWER AND CONTROL (VARIOUS)

SERVICE: PZR SAFETY VALVE POSITION INDICATION

FUNCTION (PLANT ID): ELECTRICAL POWER AND CONTROL (VARIOUS)

SERVICE: PZR RELIEF AND SAFETY VALVES

FUNCTION (PLANT ID): ELECTRICAL POWER AND CONTROL (VARIOUS)

SERVICE: REACTOR COOLANT SYSTEM (HEAD VENT)

DISCREPANCY: ADEQUATE SIMILARITY BETWEEN EQUIPMENT AND THE TEST  
SPECIMEN ESTABLISHED

CLARIFICATIONS:

In a letter dated June 22, 1981, the Okonite Company has certified that all power and control cables supplied by them for Joseph M. Farley Nuclear Plant Unit 2 are qualified by their test report N-1, dated July 3, 1978.

ADDITIONAL CLARIFICATIONS TO NOTES ON PAGE 5f OF TER

1. See clarifications.



EQUIPMENT ITEM NO. 41

ELECTRICAL CABLE, CONTROL LOCATED IN THE CONTAINMENT, ELEV.  
118'0"

OKONITE

FUNCTION (PLANT ID): ELECTRICAL POWER AND CONTROL (VARIOUS)

SERVICE: ELECTRICAL SYSTEM - COMP. COOLING WATER

FUNCTION (PLANT ID): ELECTRICAL POWER AND CONTROL (VARIOUS)

SERVICE: ELECTRICAL SYSTEM - SERVICE WATER

FUNCTION (PLANT ID): ELECTRICAL POWER AND CONTROL (VARIOUS)

SERVICE: ELECTRICAL SYSTEM - SAMPLING

FUNCTION (PLANT ID): ELECTRICAL POWER AND CONTROL (VARIOUS)

SERVICE: ELECTRICAL SYSTEM - REACTOR COOLANT PRESSURIZER

FUNCTION (PLANT ID): ELECTRICAL POWER AND CONTROL (VARIOUS)

SERVICE: ELECTRICAL SYSTEM - LIQUID WASTE DISPOSAL

FUNCTION (PLANT ID): ELECTRICAL POWER AND CONTROL (VARIOUS)

SERVICE: ELECTRICAL SYSTEM - COMBUSTIBLE GAS CONTROL

FUNCTION (PLANT ID): ELECTRICAL POWER AND CONTROL (VARIOUS)

SERVICE: ELECTRICAL SYSTEM - REACTOR CAVITY DILUTION

FUNCTION (PLANT ID): ELECTRICAL POWER AND CONTROL (VARIOUS)

SERVICE: ELECTRICAL SYSTEM - CHEMICAL VOLUME CONTROL

FUNCTION (PLANT ID): ELECTRICAL POWER AND CONTROL (VARIOUS)

SERVICE: ELECTRICAL SYSTEM - POST-LOCA AIR MIXING

FUNCTION (PLANT ID): ELECTRICAL POWER & CONTROL (VARIOUS)

SERVICE: ELECTRICAL SYSTEM - HYDROGEN RECOMBINER

FUNCTION (PLANT ID): ELECTRICAL POWER AND CONTROL (VARIOUS)

SERVICE: ELECTRICAL SYSTEM - CONTAINMENT COOLING AND PURGE

EQUIPMENT ITEM NO. 41

FUNCTION (PLANT ID): ELECTRICAL POWER AND CONTROL (VARIOUS)

SERVICE: ELECTRICAL SYSTEM - SAFETY INJECTION

DISCREPANCY: ADEQUATE SIMILARITY BETWEEN EQUIPMENT AND THE TEST  
SPECIMEN ESTABLISHED

CLARIFICATIONS:

In a letter dated June 22, 1981, the Okonite Company has certified that all power and control cables supplied to Joseph M. Farley Nuclear Plant Unit 2 are qualified by their test report N-1, dated July 3, 1978.

ADDITIONAL CLARIFICATIONS TO NOTES ON PAGE 5f OF TER

1. See clarifications.

### Section C

#### Justification for Continued Operation

It is the judgement of Alabama Power Company that all equipment required to achieve a safe shutdown condition at Farley Nuclear Plant is qualified and justification for continued operation for equipment items in NRC categories I.B., II.A. and II.B. is not necessary.

The information provided in Section B should resolve all NRC concerns related to environmental qualification of FNP equipment except for Victoreen Radiation Detectors. The only outstanding action item related to Victoreen Radiation Detectors is the installation of a watertight fitting.

These detectors were installed as an enhancement to the radiation monitoring system to satisfy the requirements of NUREG-0737 and would be used to detect a radiation release due to a potential breach of the reactor coolant pressure boundary.

As stated in Alabama Power Company letter of September 30, 1982, the watertight fitting will be installed during the first outage of sufficient duration. The next planned outage is the second refueling outage scheduled to begin in the fall of 1983. Since the radiation detectors are not essential to achieve a safe shutdown condition under any design basis event, it is the position of Alabama Power Company that a JCO is not required for the Victoreen Radiation Detectors.