

JUL 3 1978

SAFETY EVALUATION

BY THE OFFICE OF NUCLEAR REACTOR REGULATION

50-338

SUPPORTING AMENDMENT NO. 7

(VIRGINIA ELECTRIC AND POWER COMPANY)

A. Evaluation of Licensee's Request concerning Environmental Testing of Barton Transmitters

In Supplement 9 to the North Anna Safety Evaluation Report, we concluded that certain instruments were not properly qualified. We informed the licensee that as a condition of the license, they were required to complete a properly conducted test which demonstrates that these instruments are acceptably qualified. This verification testing was to be done within 90 days from the receipt of the license. The instruments involved were:

1. Barton 386/752 (now designated Barton 764) pressurizer level transmitter,
2. Barton 393 (now designated Barton 763) reactor coolant pressure (wide range) transmitter, and
3. Foxboro E11GM (MCA/RRW) pressurizer pressure transmitter.

We believed that the testing could be completed during this three-month period at the time Supplement No. 9 to the Safety Evaluation Report was completed; however, since that time, the licensee has informed the staff by letter, dated May 5, 1978, that he has entered into an arrangement with the Westinghouse Electric Company to provide the necessary verification testing for the Barton transmitters. In addition, the licensee has stated in a letter dated June 7, 1978 that the Foxboro pressurizer pressure transmitters have been replaced with the Barton 393(763) transmitters. The Westinghouse verification testing of the Barton transmitters is now anticipated to provide the required test data by the end of July 1978. We understand that at that time sufficient information will be available to determine whether the required tests have been successfully completed and that a final report can be provided by October 1, 1978.

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Since these verification tests will not be completed in the originally allowed time frame (i.e. 90 days from April 1, 1978), we have reevaluated the information provided by the licensee to determine whether the additional time required to perform the tests would be acceptable. The purpose of the required verification test is to confirm by sequential testing that the Barton transmitters presently installed in the North Anna Station can conservatively perform their design requirements with ample margin. The staff has reevaluated the information presented in the Westinghouse letter to NRC, NS-CE-1384, dated March 23, 1977. The Barton transmitters previously tested, which were identical to those installed in the plant, demonstrated acceptable results when exposed to pressure, temperature and chemical spray environments more severe than those that would result from any design basis event. The radiation testing of the electronics performed for these Barton transmitters was completed in other separate tests on different instruments of the same type which demonstrated acceptable results at integrated radiation exposures higher than those that would result from forty-year integrated dose levels plus the radiation from any design basis event. Our basis in Supplement No. 9 to the Safety Evaluation Report for initially permitting plant operation for 90 days, within which we anticipated completion of the sequential verification test, was that separate radiation and environment tests had been performed successfully, and that the normal in-plant radiation levels are insignificantly low during that period of time, in fact almost negligible compared to those in the test. An additional 90 days of exposure to normal in-plant radiation levels is still insignificant compared to the test levels. We conclude that the additional time to complete the sequential verification test does not result in a significant risk to the health and safety of the public.

Therefore, we conclude that the operation of the North Anna Unit 1 up to the receipt of the preliminary verification test data (now anticipated at the end of July '78) is acceptable. We shall require that the licensee provide the preliminary results of these tests as soon as the tests are completed and a final report by October 1, 1978. The final acceptance of these transmitters will be addressed by the staff after completion of the qualification testing and the review of the final test program report which is to be supplied by October 1978.

Amendment #21 to NA-1 License NPF-4 Issued
November 19, 1980

Supporting SER
VIRGINIA ELECTRIC AND POWER COMPANY

DOCKET NO. 50-338

NORTH ANNA POWER STATION, UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 21
License No. NPF-4

1. The Nuclear Regulatory Commission (the Commission) has found that:

- A. The application for amendment by the Virginia Electric and Power Company (the licensee) dated July 22, 1980 complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's rules and regulations set forth in 10 CFR Chapter I;
- B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
- C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
- D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
- E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, paragraph 2.D.(3)j of Facility Operating License No. NPF-4 is hereby amended to read as follows:

- 2.D.(3)j The Virginia Electric and Power Company shall modify or replace the presently installed Barton Models No. 763 and No. 764 LC-1 Transmitters used in safety-related circuits inside containment with transmitters that have been demonstrated to provide a greater tolerance to harsh environments. The modifications or replacement of these transmitters shall be completed as soon as practicable but not later than June 30, 1982.

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Amendment # 21 to NA-1 License NPF-4 Issued
November 19, 1980

SUPPORTING SER
VIRGINIA ELECTRIC AND POWER COMPANY

DOCKET NO. 50-338

NORTH ANNA POWER STATION, UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 21
License No. NPF-4

1. The Nuclear Regulatory Commission (the Commission) has found that:

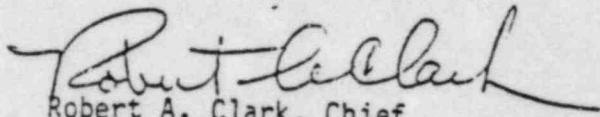
- A. The application for amendment by the Virginia Electric and Power Company (the licensee) dated July 22, 1980 complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's rules and regulations set forth in 10 CFR Chapter I;
- B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
- C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
- D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
- E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, paragraph 2.2.(3)j of Facility Operating License No. NPF-4 is hereby amended to read as follows:

- 2.D.(3)j The Virginia Electric and Power Company shall modify or replace the presently installed Barton Models No. 763 and No. 764 LC-1 Transmitters used in safety-related circuits inside containment with transmitters that have been demonstrated to provide a greater tolerance to harsh environments. The modifications or replacement of these transmitters shall be completed as soon as practicable but not later than June 30, 1982.

3. The license amendment is effective as of the date of issuance and is to be implemented by no later than June 30, 1982.

FOR THE NUCLEAR REGULATORY COMMISSION



Robert A. Clark, Chief
Operating Reactors Branch #3
Division of Licensing

Date of Issuance: November 19, 1980



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 21 TO LICENSE NO. NPF-4

VIRGINIA ELECTRIC AND POWER COMPANY

NORTH ANNA POWER STATION, UNIT NO. 1

DOCKET NO. 50-338

Introduction:

By letter dated July 22, 1980, the Virginia Electric and Power Company (the licensee) requested that the time allowed for replacing the Barton Lot 1 Transmitters at the North Anna Power Station, Unit No. 1 (NA-1) be extended to the third refueling outage.

License Condition 2.D.(3)j to NA-1 Facility Operating License NPF-4 presently states that the Barton Lot 1 Transmitters used in safety-related circuits inside containment shall be replaced or modified prior to restart after the second refueling outage.

Discussion:

Amendment No. 16 to Facility Operating License NPF-4 (December 28, 1979) revised License Condition 2.D.(3)j to require that the Barton Models No. 763 and No. 764 Lot 1 Transmitters be modified or replaced with transmitters which have been qualified to provide a greater tolerance to harsh environments. While the staff concluded that the presently installed Barton Lot 1 Transmitters were suitable for an interim period of time, the staff also concluded that the additional margin of safety provided by the replaced or modified transmitters was warranted for long term operation. The revised License Condition 2.D.(3)j required that the modification or replacement of the transmitters be completed prior to restart after the second refueling outage.

Subsequent to the issuance of Amendment No. 16 to Operating License NPF-4 (December 28, 1979), the Commission Memorandum and Order dated May 23, 1980 directed the staff to complete its review of environmental qualification of Class 1E electrical equipment including the publication of the Safety Evaluation Reports by February 1, 1981 for all operating reactors. Also, this Order directs that by no later than June 30, 1982, all electrical equipment in operating reactors subject to this review shall be qualified in accordance with the requirements stated in the Division of Operating Reactor's "Guidelines for Evaluating Environmental Qualification of Class 1E Electrical Equipment in Operating Reactors" or NUREG-0558 "Interim Staff Position on Environmental Qualification of Safety-Related Electrical Equipment".

Dupe PDR

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Evaluation:

The licensee's letter dated July 22, 1980 states that the current availability of suitable replacement transmitters precludes completing the implementation schedule for License Condition 2.D.(3)j by the end of the second refueling outage now scheduled for late February, 1981. Therefore, the licensee has requested that the implementation date for License Condition 2.D.(3)j be revised to the end of the third refueling outage. However, the date for the licensee's third refueling outage at NA-1 may exceed the Commission's implementation date of June 30, 1982, and therefore the licensee's requested implementation date is not acceptable.

However, based upon our Safety Evaluation Report supporting Amendment No. 16 to Operating License NPF-4 which provides the basis for interim use of the presently installed transmitters, we find the licensee's requested change for implementation schedule to be acceptable up to but not exceeding the Commission's implementation date of June 30, 1982.

Therefore, License Condition 2.D.(3)j to Facility Operating License NPF-4 is hereby revised to read:

"The Virginia Electric and Power Company shall modify or replace the presently installed Barton Models No. 763 and No. 764 Lot 1 Transmitters used in safety-related circuits inside containment with transmitters that have been demonstrated to provide a greater tolerance to harsh environments. The modifications or replacement of these transmitters shall be completed as soon as practicable but not later than June 30, 1982.

Environmental Consideration

We have determined that the amendment does not authorize a change in effluent types or total amounts nor an increase in power level and will not result in any significant environmental impact. Having made this determination, we have further concluded that the amendment involves an action which is insignificant from the standpoint of environmental impact and, pursuant to 10 CFR §51.5(d)(4), that an environmental impact statement or negative declaration and environmental impact appraisal need not be prepared in connection with the issuance of the amendment.

Conclusion

We have concluded, based on the considerations discussed above, that: (1) because the amendment does not involve a significant increase in the probability or consequences of accidents previously considered and does not involve a significant decrease in a safety margin, the amendment does not involve a significant hazards consideration, (2) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (3) such activities will be conducted in compliance with the Commission's regulations and the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Amendment No. 16 to NA-1, NPF-4 issued
December 28, 1979. license Cont 2.D.(3) and SER

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.D.(2) of Facility Operating License No. NPF-4 is hereby amended to read as follows:

2.D.(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 16, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. Further, the following paragraphs of Facility Operating License No. NPF-4 are hereby deleted: -

Paragraph 2.D.(3).b
Paragraph 2.D.(3).h
Paragraph 2.D.(3).i
Paragraph 2.D.(3).k
Paragraph 2.D.(3).l
Paragraph 2.D.(3).m

4. Additionally, paragraph 2.D.(3).j of Facility Operating License No. NPF-4 is hereby amended to read as follows:

2.D.(3).j The Virginia Electric and Power Company shall modify or replace the presently installed Barton Models No. 763 and No. 764 Lot 1 Transmitters used in safety-related circuits inside containment with transmitters that have been demonstrated to provide a greater tolerance to harsh environments. The modifications or replacement of these transmitters shall be completed prior to startup after the second refueling outage.

5. Also, new paragraph 2.D.(3).o is hereby added to Facility Operating License No. NPF-4 to read as follows:

2.D.(3).o The Virginia Electric and Power Company shall perform a secondary water chemistry monitoring program to inhibit steam generator tube degradation. This program shall include:

1. Identification of a sampling schedule for the critical parameters and control points for these parameters;
2. Identification of the procedures used to quantify parameters that are critical to control points;
3. Identification of process sampling points;
4. Procedure for the recording and management of data;
5. Procedures defining corrective actions for off control point chemistry conditions; and

SER Supporting amendment NO 16, NA-1

In addition, in order to preserve the current dynamic operation characteristics of the reactor (pressure drops, coolant flow rates, etc.) which could be affected if just removal of the part length rod cluster control assemblies were to be performed, the licensee will install thimble plug assemblies in the spaces previously occupied by the part length rod cluster control assemblies. If found to be necessary during future cycles, the licensee may replace these thimble plug assemblies with either burnable poison rods, neutron source rods, or full length control rods.

The thimble plug assembly consists of a flat base plate with short rods suspended from the bottom surface and a spring back assembly. The twenty short rods, called thimble plugs, project into the upper ends of the guide thimbles to reduce the bypass flow area. Fuel assemblies interface with the upper core plate and with the fuel assembly top nozzles by resting on the adapter plate. The spring pack is compressed by the upper core plate when the upper internals assembly is lowered into place. Each thimble plug is permanently attached to the base plate by a nut which is locked to the threaded end of the plug by a pin welded to the nut. All components in the thimble plug assembly, except for the springs, are constructed from type 304 stainless steel.

The thimble plugs will effectively limit bypass flow through the rod cluster control guide thimbles in the fuel assemblies from which the P.R.C.C.s have been removed, just as they currently limit bypass flow in those assemblies which do not contain control rods, source rods, or burnable poison rods.

Based on the considerations that 1) the part length rod cluster control assemblies are not needed for reactor operation, 2) that the removal of these assemblies will remove the chance for an abnormal flux distribution or reactor shutdown because of a dropped part length rod and 3) that insertion of the thimble plug assemblies will preserve the current dynamic operating characteristics of the reactor, we conclude this change is acceptable.

Therefore, we find acceptable the removal of the part length control rod requirements from the Technical Specifications.

Environmental Qualification of Barton Models 763 and 764 Lot 1 Transmitter.

In Amendment No. 7 to Facility Operating Licensee NPR-4 (issued July 3, 1978), license condition 2.D.(3)j was revised to redesignate Barton transmitters No. 393 and No. 386/752 to Barton Models No. 763 and No. 764 Lot 1 transmitters respectively. Also, license conditions 2.D.(3)j, as amended, further stated the licensee would provide for staff review the test results of qualification testing for the Barton transmitters by October 1, 1978.

On September 29, 1978, Westinghouse provided the results of the environmental qualification of Barton Models 763 and 764 Lot 1 transmitters. (Letter Report NS-TMA-1950). Our conclusions based on these tests, was that the instruments would perform their short term safety functions. However, we indicated that additional testing should be conducted to confirm their capability for longer term post accident monitoring.

On September 14, 1979, Westinghouse provided the results of these supplemental tests (Letter Report NS-RMA-2120). The original tests attempted to demonstrate the qualification of these transmitters by subjecting them to high radiation levels corresponding to post loss-of-coolant accident conditions and subsequently exposing them to the higher steam temperature conditions, typical of a main steam line break accident. This combination of high radiation and temperature conditions, while not causing the transmitters to fail, resulted in excessive instrument errors. The supplemental tests which followed were based upon radiation levels and subsequent exposure to a steam environment corresponding to loss-of-coolant-accident and main steam line break conditions separately. Additional tests were also conducted to investigate the effects of radiation and temperature separately and in combination. This was done to promote an understanding of the phenomena which caused the errors and further to provide a basis to support the conclusion that the transmitters are qualified to operate satisfactorily under the required service conditions. These tests also led to a recall of a number of differential pressure transmitters to correct their temperature compensation.

While the supplemental test results support the conclusions that the instrument will fulfill their required safety function in an accident environment, they do not provide an adequate margin of safety with respect to the magnitude of observed errors and time at which they occur. To reduce the impact of harsh environments on these transmitters, a modified circuit board has been developed. The modified units, designated as Lot 2, have been tested and preliminary results demonstrate an improvement in their response to harsh environments. These units are less susceptible to compensation errors due to their more linear response to temperature changes. Further, a margin of safety has been provided by testing these instruments to the higher values of temperature and radiation applicable to both loss-of-coolant-accident and main steam line break conditions.

We conclude that the Barton Lot 1 transmitters are acceptable in the short term to satisfy the Commission requirements. However, further improvements to obtain a margin to safety are warranted due to the safety significance of the information provided by these measurements for post accident recovery. Accordingly, license condition 2.D.(3)j to Facility Operating Licensee NPF-4 should be revised to require the presently installed Barton Lot 1 transmitters be modified or replaced with transmitters that have been demonstrated to have a greater tolerance prior to restart after the second refueling outage. The licensee has agreed to this additional requirement.

NA-2 Full Power Operating License, NPF-7
Issued August 21, 1980 - 4 - 2.C.4.6

√ (3) Initial Test Program

VEPCO shall conduct the post-fuel-loading initial test program (set forth in Section 14 of VEPCO's Final Safety Analysis Report, as amended) without making any major modifications of this program unless modifications have been identified and have received prior Commission approval. Major modifications are defined as:

- a. Elimination of any test identified in Section 14 of VEPCO's Final Safety Analysis Report, as amended, as essential;
- b. Modification of test objectives, methods or acceptance criteria for any test identified in Section 14 of VEPCO's Final Safety Analysis Report, as amended, as essential;
- c. Performance of any test at a power level different from there described; and
- d. Failure to complete any tests included in the described program (planned or scheduled for power levels up to the authorized power level).

(4) VEPCO shall take the following remedial actions, or alternative actions, acceptable to the Commission, with regard to the environmental qualification requirements for Class 1E equipment:

- (a) No later than November 1, 1980, VEPCO shall submit information to show compliance with the requirements of NUREG-0588, "Interim Staff Position on Environmental Qualification of Safety-Related Electrical Equipment," for safety-related equipment exposed to a harsh environment;
- (b) No later than June 30, 1982, VEPCO shall replace Rosemount pressure transmitters and differential pressure transmitters, and pressure transmitters and differential pressure transmitters from Barton lot I with suitably qualified devices; and
- (c) No later than June 30, 1982, the wide-range resistance temperature detectors for the reactor coolant system shall be qualified for radiation exposure for the 40-year plant life and appropriate exposure condition due to design basis accidents. Pending completion of such qualification and acceptance by the Commission, VEPCO shall replace each of these detectors at each refueling outage.

Safety Evaluation Report, Supplement No. 10 NUREG-0053
related to the operation of North Anna Power Station, Unit 2
April, 1980

3.0 DESIGN CRITERIA FOR STRUCTURES, SYSTEMS, AND COMPONENTS

3.9 Mechanical Systems and Components

3.9.4 Analysis Methods for Loss-of-Coolant Accident Loadings

In Supplement No. 7 to the Safety Evaluation Report we reported our findings with respect to the capability of the reactor vessel support system's ability to withstand the loads associated with a simultaneous safe shutdown earthquake and loss-of-coolant accident. We noted that we had reviewed and approved a set of load interaction failure curves developed by the applicant for the reactor vessel supports. We further reported that the calculated loads acting on the reactor vessel supports fell within these curves and that plastic deformation would occur only in a very small portion of the entire reactor vessel support system. We therefore concluded that the reactor vessel, its supports, and its internals would remain structurally sound under these severe loads and were acceptable.

By letter of January 31, 1979, the applicant notified us that the neutron shield tanks on Unit 2 were being modified to reduce the escape of neutrons from the reactor vessel cavity. Neutron shield tanks comprise a portion of the reactor vessel support system. A modification of the neutron shield tank therefore necessitated a reevaluation of the structural integrity of the reactor vessel supports under the loads due to a simultaneous safe shutdown earthquake and loss of coolant accident. In the letter mentioned above, the applicant submitted the results of such a reevaluation. Although the reactor vessel supports may experience slightly larger deflections than previously predicted, the newly calculated loads acting on the supports still fall within the approved load interaction failure curves. This demonstrates the structural integrity of the supports.

Therefore, we reaffirm our previous conclusion that the reactor pressure vessel support system is acceptable and that the North Anna Power Station, Unit 2 can safely operate with respect to this matter.

3.10 Seismic and Environmental Qualification of Seismic Category I Instrumentation and Electrical Equipment

3.10.3 Environmental Qualification of Westinghouse and Balance-of-Plant Seismic Category I Instrumentation and Electrical Equipment

In our Safety Evaluation supporting Amendment No. 7 to facility operating license NPP-4, North Anna Power Station, Unit 1, we required the licensee to provide preliminary results as soon as tests are completed and a final report by October 1, 1978 of the tests performed on the Barton pressure and differential pressure transmitters used for Unit 1 and 2.

On September 29, 1978, Westinghouse provided the results of the environmental qualification of Barton Models 763 and 764 Lot 1 transmitters. (Letter Report NS-TMS-1950). Our conclusions based on these tests, were that the instruments would perform their short term safety functions. However, we indicated that additional testing should be conducted to confirm their capability for longer term post accident monitoring.

On September 14, 1979, Westinghouse provided the results of these supplemental tests to confirm the capability of the transmitters to meet the acceptance criteria for longer term post-accident monitoring. In the original tests, it was attempted to demonstrate the qualification of these transmitters by subjecting them to high radiation levels corresponding to post loss-of-coolant accident conditions and subsequently exposing them to the high temperature steam conditions, typical of main steam line break accidents. This combined test was performed to circumvent the need for separate loss-of-coolant accident and main steam line break tests. This combination of high radiation and temperature while not causing the transmitters to fail, resulted in excessive instrument error.

The supplemental tests which followed were based upon radiation levels and subsequent exposure to a steam environment corresponding to loss-of-coolant accident and main steam line break conditions separately. Additional tests were also conducted to investigate the effects of radiation and temperature separately and in combination. This was done to promote an understanding of the phenomena which caused the errors and to provide a basis to support the conclusion that the transmitters are qualified to operate satisfactorily under the required service conditions. While the supplemental tests results support the conclusions that the Lot 1 instruments will function in an accident environment, we do not believe that these instruments provide a sufficient margin of safety to justify their use throughout the life of the plant. Further improvements to obtain an additional margin of safety are warranted due to the safety significance of the information provided for post accident recovery by these instruments. Accordingly, the Technical Specifications will permit the use of the Lot 1 Barton Transmitters until the second refueling outage. At that time, modified or replacement transmitters, that have been demonstrated to have a greater tolerance to harsh environments, will be required.

We questioned the adequacy of the qualification of Rosemount pressure and differential pressure transmitters to survive the extreme environmental conditions produced by high energy line breaks inside containment. Based on our review of the qualification report for these transmitters, we conclude that a sufficient basis was not provided to justify their use throughout the life of the plant. Since the test conditions to which these transmitters were subjected did not result in a failure of the transmitter to respond to changes in measured process conditions, we find that they are acceptable for use in the interim. Accordingly, the Technical Specifications will permit the use of Rosemount pressure and differential pressure transmitters until the second refueling outage. At this time, requalification of these transmitters or replacement transmitters that have been qualified will be required.

We reviewed Westinghouse Topical Report WCAP-9157 "Environmental Qualification of Safety Related Class IE Process Instrumentation" which contains the environmental

qualification results for the main coolant loop resistance temperature detectors. These temperature sensors provide data to confirm natural circulation cooling as well as data to ensure an adequate margin of subcooling to prevent steam formation in the reactor coolant system. We questioned the basis for the assessment that the normal and post accident radiation exposure would be limited to a radiation dose for which the resistance temperature detectors were qualified. The applicant provided a response to our concern which concluded that the resistance temperature detectors used for post accident monitoring are adequate if replaced after 14 years of operation. We conclude that this evaluation did not include assumptions which contained an adequate degree of conservatism. Therefore, the Technical Specifications will require the replacement of resistance temperature detectors used for post accident monitoring at each refueling outage pending requalification of the sensor to a higher radiation dose which is established based on a conservative assessment of post accident radiation levels and the normal radiation dose for their service life.

In June of 1979 Westinghouse reported a potential safety hazard under 10 CFR Part 41. This report addressed errors caused in steam generator level indication following high energy pipe breaks inside containment. High ambient temperatures due to accidents can result in a decrease in the density of water in the level instrument reference leg with a consequent increase in the indicated steam generator water level (i.e., the indicated water level exceeds actual level). We requested that the applicant evaluate the effects of such errors for all level measurement systems in containment. This evaluation led to a decision to insulate the reference legs for steam generator level measurements.

The applicant also assessed the method for establishing the low-low steam generator level trip setpoint. This setpoint is adjusted above zero-measured level by an amount which just equals the accumulation of all system errors, including temperature effects on the reference legs. We do not find this approach to evaluating errors and establishing the setpoint for safety action to be acceptable. The choice of zero-measured level, as a reference point for establishing the setpoint, does not provide an adequate margin of safety since these level transmitters do not respond to a reduction of water level below this point in the steam generators. Accordingly, the Technical Specifications will require a minimum low-low steam generator level setpoint of 18 percent (a margin of three percent in addition to identified errors of 15 percent) until such time as it can be demonstrated that this method establishes that an adequate margin of safety exists.

We have recently published staff guidance to be used in environmentally qualifying electrical equipment (see NUREG-0588, "Interim Staff Position on Environmental Qualification of Safety-Related Electrical Equipment"). Recognizing that the equipment qualification review for the North Anna Power Station, Unit 2 has been a long-term effort spanning several years, we recently required that the Virginia Electric and Power Company reassess their qualification documentation for equipment installed at North Anna Power, Station Unit 2 with the purpose of establishing that the qualification methods used and results obtained are in conformance with the staff positions contained in NUREG-0588. We believe that this additional review will