



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 105

FACILITY OPERATING LICENSE NO. NPF-4

VIRGINIA ELECTRIC AND POWER COMPANY

OLD DOMINION ELECTRIC COOPERATIVE

NORTH ANNA POWER STATION, UNIT NO. 1

DOCKET NO. 50-338

INTRODUCTION:

By letter dated January 14, 1988, the Virginia Electric and Power Company (the licensee) requested a change to the Technical Specifications (TS) for the North Anna Power Station, Unit No. 1 (NA-1). The licensee's proposed change is related to the "Relaxed Power Distribution Control Methodology" (RPDC). The methodology was described in topical report VEP-NE-1 submitted by the licensee for review on December 10, 1987. The staff has reviewed the report and concluded that it is acceptable. The proposed changes would allow the widening of the axial flux difference bands from the current +5% about a target value to +6% to -15% at 100% power and +20% to -28% at 50% power. The implementation of the proposed changes is intended to be implemented during the latter part of the NA-1 Fuel Cycle No. 7. The proposed changes are effective for forthcoming fuel cycles (Cycle 7, Cycle 8, etc.) based on the licensee's submittal of the NA-1 core surveillance report on a cycle-by-cycle basis. An identical amendment was reviewed, approved and issued on April 14, 1986 for NA-2 (Amendment No. 64) and NA-2 has a design similar to NA-1.

EVALUATION

The affected sections of the Technical Specifications are:

1. 3/4.2.1, B3/4.2.1 and 3.10.2: Replacement of Constant Axial Offset Control (CAOC) Axial Flux Difference Limits with RPDC Limits.
2. 3.2.2a: Deletion of the requirement to place the reactor in at least hot standby to reduce the overpower ΔT trip setpoint.
3. 3.2.2a.2, 3.2.5, 3/4.3.3.8, B3/4.2.6, B3/4.3.3.8, 6.9.1.7: Removal of all references to the Axial Power Distribution Monitoring System.
4. 4.2.2, B3/4.2, 4.2.3, 6.9.1.7: Replacement of F_{xy} Surveillance Requirement with F_Q Surveillance.
5. 6.9.1.7: Modification of the Core Surveillance Report.

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Each of the proposed changes is discussed below:

TS 3/4.2.1, B3/4.2.1 and 3.10.2: Replacement of CAOC Axial Flux Difference Limits with RPDC Limits

In these TS sections, all references to the axial flux difference for the CAOC operating strategy would be deleted and replaced with the axial flux difference limits required in the RPDC methodology. In the action statement, the requirement to restore the axial flux difference to the indicated value within 15 minutes would be retained. If this requirement is not met, power must be reduced to less than 50% within 30 minutes. The new TS (Section 3.2.2) assures that the F_0 will not exceed the specified limits, nor will the axial flux distribution fall outside the range ensuring adequate protection from the overtemperature and overpower ΔT . The special test exception of Section 3.10.2 would be removed, and thus, the axial flux difference limits would apply during the performance of physics tests. The TS is identical to the one proposed in VEP-NE-1 which has been approved and, therefore, is acceptable.

TS 3.2.2a: Deletion of Requirement to Place the Reactor in at Least Hot Standby to Reduce the Overpower ΔT Trip Setpoints

One of the action items in 3.2.2(a) requires reduction of the overpower ΔT trip setpoint by 1% for each 1% the $F_0(Z)$ exceeds the limit. The requirement to place the reactor in hot standby in order to reduce the overpower ΔT trip setpoint would be deleted since the reduction can be performed one channel at a time while at power without exceeding specified limits. The deletion of the hot standby requirement is part of the proposed and approved TS in VEP-NE-1, hence, it is acceptable.

TS 3.2.2a.2, 3.2.6, 3/4.3.3.8, B3/4.2.6, B3/4.3.3.8, 6.9.1.7: Removal of all References to the Axial Power Distribution Monitoring System.

Under the RPDC operating methodology, the operating limits on axial offset are established to ensure that the F_0 loss of coolant accident (LOCA) limit is not exceeded. The change of the axial flux difference envelope is now the essential variable which is subject to cycle-by-cycle analytic verification. The revised specifications would account for potential F_0 violations which could occur under nonequilibrium conditions by narrowing the change of the axial flux difference. Therefore, the axial power distribution monitoring system would not be needed to maintain safety limits and could be eliminated. The axial power distribution monitoring has been eliminated from the proposed and approved specification in VEP-NE-1, and hence, this change is acceptable.

TS 4.2.2, B3/4.2, B3/4.2.3, 6.9.1.7: Replacement of F_{xy} Surveillance Requirement with F_0 Surveillance.

The revised specifications would require a direct measurement of F_0 at least once per 31 effective full power days. The measured F_0 would then be increased by the nonequilibrium factor $N(Z)$ to account for power distribution transient during normal operation. Since the F_0 is measured directly, the requirement for F_{xy} surveillance would no longer be needed.

TS 6.9.1.7: Modification of the Core Surveillance Report.

As discussed above, the F_0 surveillance requires the use of $N(Z)$ as a cycle-specific multiplier to incorporate nonequilibrium effects. The core surveillance report provides this function on a cycle-by-cycle basis. This would replace the requirement to provide the F_{xy} limit and the power level.

SUMMARY

The staff has reviewed the information presented in the request for the NA-1 TS related to the adoption of the relaxed power distribution control methodology and intended for application in the last part of the NA-1 cycle 7. An identical amendment was issued on April 14, 1986 for NA-2. The methodology described in the report VEP-NE-1 has been reviewed and approved by the staff. The proposed Technical Specification changes are identical with those approved in report VEP-NE-1. The surveillance requirements have been adjusted to the new proposed specification. In addition, the licensee has performed cycle-specific analyses to ascertain that the F_0 values are within the allowable limits for overtemperature overpower protection. Therefore, the proposed NA-1 TS changes are acceptable and can be applied to the latter part of the NA-1 cycle 7 and for forthcoming fuel cycles based on the licensee's submittal of the NA-1 core surveillance report to the NRC on a cycle-by-cycle basis.

ENVIRONMENTAL CONSIDERATION

This amendment involves a change in the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20, and changes surveillance requirements. The staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously published a proposed finding that the amendment involves no significant hazards considerations and there has been no public comment on such finding. Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR §51.22(c)(9). Pursuant to 10 CFR §51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

CONCLUSION

We have concluded, based on the considerations discussed above, that (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (2) 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.

Date: September 7, 1988

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