UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NOS. 179 AND 160 TO

FACILITY OPERATING LICENSE NOS. NPF-4 AND NPF-7

VIRGINIA ELECTRIC AND POWER COMPANY

OLD DOMINION ELECTRIC COOPERATIVE

NORTH ANNA POWER STATION, UNITS NO. 1 AND NO. 2

DOCKET NOS. 50-338 AND 50-339

## 1.0 INTRODUCTION

By letter dated March 18, 1993, as supplemented by letter dated December 9, 1993, the Virginia Electric and Power Company (the licensee) requested changes to the Technical Specifications (TS) for the North Anna Power Station, Units No. 1 and No. 2 (NA-1&2). The changes address operation with a control rod urgent failure condition including limited operation with one control or shutdown bank inserted slightly below its insertion limit.

The December 9, 1993 letter provided clarification of operation in the urgent failure condition. This clarification did not alter the proposed action or affect the staff's determination of no significant hazards consideration as noticed in the Federal Register on April 14, 1993 (58 FR 19492).

TS require periodic testing of each control and shutdown control rod assembly bank in the core during power operation to ensure that the control rod assemblies are trippable. This testing requires partial movement of each control rod assembly not fully inserted into the core. This is typically done at or near full power, one bank at a time. Current procedures call for sequential insertion and withdrawal of 18 steps for the bank being tested. Special test exceptions allow the rods to be inserted beyond their insertion limits for this test. The length of the test is not prescribed.

On several occasions NA-1&2 have experienced control rod urgent failure alarms during the control rod assembly surveillance testing. This alarm is indicative of an internal failure in the rod control equipment that has affected the ability of the system to move control rod assemblies. These failures have a number of causes and may take some time to diagnose.

These failures in no way impact the trippability of the control rod assemblies.

With an urgent failure alarm the present TS provide 2 hours for troubleshooting and repair prior to bringing the unit to hot shutdown in 6

hours. The proposed changes would allow up to 72 hours for troubleshooting and repair if the rod assembly exceeds the insertion limit.

2.0 TS CHANGES

TS 3.1.3.5 and TS 3.1.3.6 provide a limit on both time and insertion if a bank is immovable due to failures external to the control rod assembly drive mechanism. A maximum of one control or shutdown bank (with the exception of Control Bank D) may be inserted below its insertion limit for up to 12 hours during diagnosis and repair of the Rod Control System provided that:

1) the control or shutdown bank is inserted no more than 18 steps below the insertion limit as measured by the group step counter demand position indicators.

2) the affected bank is trippable

3) each shutdown and control rod is aligned to within ± 12 steps of its respective group step counter demand position

4) the shutdown margin requirement of TS 3.1.1.1 is determined to be met at least once per 12 hours.

TS 3.1.3.1 has been changed to treat control banks which cannot be moved by the Rod Control System as operable provided the affected banks are trippable.

3.0 EVALUATION

The proposed TS 3.1.3.1 modifies the wording to clearly define a control rod assembly as OPERABLE if it is trippable. If more than one control rod assembly in a given bank is immovable due to a failure external to the control rod assembly drive mechansim but remains trippable, the current specification allows 2 hours to restore the affected control rod assemblies to operable status. The proposed change would treat control banks which cannot be moved as operable as long as they are trippable and each control rod assembly is aligned with the group step counter. While there is no time limit for correcting such a problem, the licensee has committed in a letter dated December 9, 1993, to take prompt corrective action to return the Control Rod Drive System to service and regain the normal plant control function provided by the control rods. This change is acceptable because rods which are trippable, above the insertion limits, and within the analyzed alignment requirements, are fully capable of performing the intended safety function, even if they cannot be moved by the Rod Control System.

TS 3.1.3.5 and 3.1.3.6 define the shutdown and control bank insertion limits. The present TS allow exemption from the insertion limits for physics testing and periodic exercise of individual control rod assemblies. The exemption for control rod assembly testing is necessary because insertion limits require shutdown banks and control banks A, B, and C to be fully withdrawn for full power operation. In the event that the insertion limit is exceeded, the

present TS provide 2 hours for troubleshooting and repair and, if unsuccessful, the unit must be brought to hot shutdown in 6 hours. The 2-hour time limit does not allow sufficient time for diagnosis and repair and the licensee has had to request enforcement discretion in order to complete diagnosis and repair on several occasions.

The proposed TS 3.1.3.5 and TS 3.1.3.6 define limits of both time and insertion if a bank is immovable due to failures external to the control rod assembly drive mechanism. A maximum of one control or shutdown bank (with the exception of Control Bank D) may be inserted no more than 18 steps below its insertion limit for up to 72 hours during diagnosis and repair of the rod control system provided the bank is trippable and the shutdown margin requirements are satisfied once per 12 hours. Concurrent control rod misalignment (misalignment of individual control rod assemblies from their group step counter demand position by more than ± 12 steps) is not allowed. Because of the misalignment constraints and the 18 step limit, the impact on core reactivity and power distribution is very small. In addition, the shutdown margin is specifically reconfirmed every 12 hours and explicit analytical checks on the radial power distribution are performed as part of the reload safety evaluation process. Furthermore, if the affected bank is not restored to above the insertion limit within the allowed 72 hours, the unit must be placed in hot shutdown within the next 6 hours. This change will allow sufficient time for diagnosis and repairs while maintaining the safety function of the control rods since the affected rods are still trippable. In addition, alignment must be maintained and shutdown margin will be checked.

The changes to TS 3.1.3.5 and TS 3.1.3.6 are acceptable because:

1) all control and shutdown rod assemblies are trippable
2) all immovable rod assemblies exceed insertion limits by no more than 18 steps
3) all immovable rod assemblies are aligned
4) shutdown margin is specifically reconfirmed every 12 hours
5) explicit analytical checks of radial power distribution are performed as part of the reload safety evaluation and
6) if rod assemblies are not restored to within insertion limits within 72 hours, the unit must be placed in hot shutdown within the next 6 hours.

Finally, the proposed changes are consistent with the standard TS. Therefore, based on all of the above, the staff finds the proposed changes to be acceptable.

## 4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Virginia State official was notified of the proposed issuance of the amendment. The State official had no comment.

## 5.0 ENVIRONMENTAL CONSIDERATION

These amendments change a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The NRC staff has determined that the amendments involve 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 issued a proposed finding that these amendments involve no significant hazards consideration and there has been no public comment on such finding (58 FR 13492). Accordingly, these amendments meet 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 amendments.

## 6.0 CONCLUSION

The Commission has 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, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendments will not be inimical to the common defense and security or to the health and safety of the public.

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