



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NOS. 98 AND 85 TO

FACILITY OPERATING LICENSE NO. 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

INTRODUCTION

By letter dated May 27, 1987, the Virginia Electric and Power Company (the licensee) requested a change to the North Anna Power Station, Units No. 1 and No. 2 (NA-1&2) Technical Specifications (TS). Specifically, the proposed change would modify TS 3/4.6.3, Table 3.6.1 to: (1) correct an inconsistency between the licensee's response to NUREG-0737 and the NA-2 TS with regard to the isolation signal for the containment instrument air system. At the time of the requested change, instrument air isolated on a Phase B signal in NA-1 and a Phase A signal in NA-2. This request would change the containment isolation signal in NA-2 from Phase A to Phase B in compliance with NUREG-0737; and (2) place the hydrogen recombiner containment isolation valves for NA-1&2 under administrative control in order to permit functional testing in Modes 1 through 4.

Item (1) above was addressed in Amendment No. 82 to Facility Operating License No. NPF-7 for NA-2, which was issued on October 22, 1987.

This Safety Evaluation (SE) addresses Item (2), as noted above. Our discussion and evaluation of Item (2) of the licensee's change request dated May 27, 1987 is provided below.

DISCUSSION

Technical Specification surveillance requirements as listed in TS 4.6.4.2.a for NA-1&2 require a functional test of the hydrogen recombiners every 6 months. TS 3.6.1.1, however, requires that containment integrity be maintained in Modes 1-4 and specifies that the valves listed in Table 3.6-1, which do not receive automatic closure signals, be maintained closed unless otherwise noted in Table 3.6-1. At present, the valves not receiving automatic closure signals include the hydrogen recombiner remote-manual isolation valves (NA-1 - TV-HC-104A and B, 105A and B, 106A and B, and 107A and B; NA-2 - TV-HC-204A and B, 205A and B, 206A and B, and 207A and B). The licensee proposed that Table 3.6-1 be changed by adding asterisks to these valves to provide for taking administrative control in order to permit surveillance testing at power. During these periods (approximately 4 hours every 6 months), the operation of the affected valves would be administratively controlled by a Periodic Test (PT) procedure.

General Design Criterion (GDC) 56 (Primary Containment Isolation) requires that lines which connect directly to the containment atmosphere and penetrate reactor containment should consist of one isolation valve inside containment and one isolation valve outside containment. If it is not practical to locate a valve inside containment, the design should conform to Standard Review Plan (SRP) Section 6.2.4.II.6.d. The design of the NA-1&2 hydrogen recombiner has two remote-manual isolation valves outside containment, which are designed to withstand the effects of postulated accidents. This design is consistent with SRP Section 6.2.4.II.6.d, which states that if it is not practical to locate an isolation valve inside containment, both isolation valves may be located outside containment provided the design of the valve nearest containment can withstand the effects of postulated accidents. GDC 56 also provides that the isolation valves be automatic or locked closed, unless the isolation provisions for a specific class of lines are acceptable on another defined basis. The valves involved in this amendment are remote manual valves. SRP Section 6.2.4 accepts use of remote manual valves for lines associated with essential systems. The system involved is an essential system and thus remote manual valves are acceptable for this class of lines on the basis defined in SRP 6.2.4.

In a letter from the NRC dated January 12, 1984, an NRC SE was provided which accepted NA-1&2's action taken in response to NUREG-0737, Item II.E.4.1 (Dedicated Hydrogen Penetrations). The NRC SE found the licensee's request to add the remotely operated (HC Series) valves to Table 3.6-1 acceptable and that "opening of these valves will take place only under specific administrative control as specified in post-accident procedures." During the testing period, the recombiner would be connected directly to the containment atmosphere and the recombiner and associated piping could possibly be pressurized to 45 psig if an accident were to occur. For normal operation, the recombiner is designed for an operating pressure limit of 10 psig.

A review by the licensee of the hydrogen recombiner system design was performed to evaluate conducting the test at power. The hydrogen recombiners and their associated piping systems are seismically designed and missile protected. The piping and components are designed to ASME III, Class 2 through Summer 1973 Addendum. The recombiner system piping is 150 lb. carbon steel. The recombiner pressure-retaining boundary is 304 stainless steel, is designed to withstand 50 psig and was originally tested to 75 psig.

The recombiner technical manual specifies a 10 psig rating for operating conditions (1300-1400°F) and 50 psig for non-operating conditions. Rockwell International was contacted and stated that the 10 psig operating pressure limit is imposed to limit the mass flow through the recombiner in order to provide assurance that effluent hydrogen concentration meets specifications, and that there is no overstress concern with a pressure excursion to 45 psig at operating temperatures.

Further analysis and evaluation has concluded that the recombiner could withstand a design basis accident (DBA) since sufficient design margin exists to preclude a breach of the hydrogen recombiner components and associated piping. This conclusion was based upon a review of the Rockwell Stress Report (TI-019-120-003) and application of design information through calculations to show that sufficient design margin existed for the postulated test configuration with a temperature of 1250°F and a pressure excursion to 50 psig.

The alignment of the recombiner to the containment during functional testing provides verification of design flow capability for the actual flow path used during accident conditions. Alternative testing schemes to keep the recombiner separated from containment atmosphere would require some degree of piping reconfiguration which could potentially affect the integrity of the piping system following restoration after testing. In addition, the capability exists to isolate the containment from the recombiner by taking operator action from the control room in the event containment isolation is required while surveillance testing is in progress. Prior to implementation of this TS change, which would allow functional testing at power, precautions will be added to the two affected PTs (68.1.1 and 68.1.2) to instruct the control room operator to secure the recombiner and shut any open HC valves if a containment isolation signal is generated while the test is in progress.

#### EVALUATION

The proposed change will add the remotely operated (HC Series) hydrogen recombiner isolation valves to TS Table 3.6-1 to allow administrative control for limited periods of time in order to permit surveillance testing at power. The proposed change has previously been found to be acceptable in the NRC SE dated January 12, 1984 which accepted the licensee's actions in response to NUREG-0737, Item II.E.4.1 (Dedicated Hydrogen Penetrations). In addition, the opening of these valves under administrative control (by procedure) for testing will not affect containment conditions or the operation of any other equipment which directly communicates with containment. Moreover, the design conditions used for the construction of the recombiner system ensure that containment conditions will not be degraded and integrity will be maintained for existing accident analysis. Also, upon receipt of a containment isolation signal, the affected valves can be shut remotely from the control room. Prior to implementation of the proposed TS, as discussed above, the licensee has committed to modify the NA-1&2 PTs (68.1.1 and 68.1.2) to instruct control room operators to secure the recombiner and shut any open HC valves should a containment isolation signal be generated when the hydrogen recombiner functional test is in progress. Based on all of the above, we find this change to be acceptable.

#### ENVIRONMENTAL CONSIDERATION

These amendments involve a change in the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The 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 published a proposed finding that these amendments involve no significant hazards consideration and there has been no public comment on such finding. 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 these amendments.

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 amendments will not be inimical to the common defense and security or to the health and safety of the public.

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