



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 205 TO FACILITY OPERATING LICENSE NO. DPR-32
AND AMENDMENT NO. 205 TO FACILITY OPERATING LICENSE NO. DPR-37
VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION, UNIT NCS. 1 AND 2
DOCKET NOS. 50-280 AND 50-281

1.0 INTRODUCTION

By letter dated November 10, 1994, the Virginia Electric and Power Company proposed amendments to the operating licenses of the Surry Power Station, Units 1 and 2, to revise the plant Technical Specifications (TS). The proposed changes are to clarify the surveillance requirements for reactor protection and engineered safeguards systems instrumentation and actuation logic.

2.0 BACKGROUND

The licensee performed a comprehensive review of the TS surveillance program to verify that proper testing was being performed for each line item listed in TS Table 4.1-1, "Minimum Frequencies for Check, Calibration and Test of Instrument Channels." Changes to the TS were initiated due to the identification of certain instrument and logic circuit tests for which the licensed plant design does not facilitate the complete testing of the circuit or actuating logic without using temporary modifications.

The original licensed plant design for the Reactor Protection System (RPS) and engineered safeguards system uses relays for the actuation logic and to initiate the safety function. Typically, an overlapping testing scheme is used to satisfy the testing requirements without interrupting power operation. The channel functional test requires the injection of a simulated signal into an analog channel, as close to the sensor as practicable, and actuation of the logic combinations in a logic channel to verify that the complete channel is operable, including the alarm and/or trip initiating action. The design of the RPS and engineered safeguards system does not support the complete functional testing of each actuation logic combination or the associated actuation relays at power without using temporary modifications. Components requiring installation of jumpers or temporary modifications for testing are more subject to equipment damage, and may adversely impact power operations.

The RPS is capable of being tested from the analog channel through the final actuation device (the trip breaker). However, portions of the engineered safeguards system and the auxiliary feedwater system automatic actuation logic and actuation relays cannot be fully tested. The complete testing is therefore performed when the plant is shutdown.

3.0 EVALUATION

Consistent with the approved licensing basis and industry testing standards, instrument and logic circuits are tested to the extent practicable on a monthly basis and are fully tested on a refueling basis. Each instrumentation channel or actuation logic in TS Table 4.1-1 that cannot be fully tested in accordance with the existing definition of channel functional test (without lifting leads or installing jumpers) will be identified with a note in the remarks column.

As a result of the review of the TS surveillance program, the licensee proposed the following changes to TS Table 4.1-1:

Item 19, Containment Sump Level

The licensee stated that Item 19, Containment Sump Level, would be deleted from Table 4.1-1, because the test is duplicated in TS Table 4.1-2, "Accident Monitoring Instrumentation Surveillance Requirements." The line item in Table 4.1-1 indicates that a channel calibration will be performed on a refueling basis for the Containment Sump Level instrumentation. The channel check and channel functional tests are shown as not applicable to this line item.

Containment Sump Level is covered by two line items in Table 4.1-2, narrow range instrumentation (Item 9), and wide range instrumentation (Item 10). For both items, this table indicates that a channel check will be performed on a monthly basis and a channel calibration will be performed on a refueling basis.

Since both tables indicate that a channel calibration will be performed on a refueling basis, the deletion of Item 19, Containment Sump Level, from Table 4.1-1 is an acceptable change.

Item 26, Logic Channel Testing

The licensee plans to add the following notes to the remarks column of Item 26, Logic Channel Testing, to identify which logic channels are tested monthly, and to what extent the logic is tested:

- 1) Reactor protection, safety injection and the consequence limiting safeguards system logic channels are tested monthly per this line item.
- 2) The master and slave relays are not included in the monthly logic channel test of the safety injection system.

Note 1 provides clarification of which logic channels are included in definition of Line Item 26, Logic Channel Testing. The reactor protection

logic channel testing is further explained in Final Safety Analysis Report (FSAR) Section 7.2.2.1.6. The engineered safeguards system is divided into protective safeguards (safety injection) and consequence limiting safeguards (spray system, containment isolation system, and containment vacuum system). Logic channel testing for the engineered safeguards system is further explained in FSAR Section 7.5.2.3.2. Since Note 1 clarifies, but does not change, what tests are being performed, its addition is administrative in nature and, therefore, acceptable.

Note 2 excludes the master and slave relays from the monthly logic channel test of the safety injection (SI) system. As pointed out in the TS Section 4.11, Safety Injection System Tests, complete system tests cannot be performed when the reactor is operating, because an SI signal causes containment isolation. Therefore, as described in FSAR Section 7.5.2.3.2, the master actuating relays are removed from parts of the logic channel testing in order to avoid an unintentional start of the engineered safeguards equipment. Intentional start remains available through the redundant train not undergoing testing.

On a monthly basis, logic channel testing is capable of simulating all of the actuating logic combinations required to initiate an SI signal. In addition, verification of the integrity of both the master actuating relays and the slave relays is made by connecting an ohmmeter across the coil terminals. The system tests, performed on a refueling basis, will demonstrate the proper automatic operation of the SI System by verifying that the components actually receive the SI signal in the proper sequence with the pumps blocked from starting. This test demonstrates the operation of the valves, pump circuit breakers, and automatic circuitry.

The Nuclear Regulatory Commission (NRC) staff agrees that it is not desirable to initiate operation of safety system equipment for testing during operation. According to the approved TS and FSAR, the master and slave relays have always been excluded from the monthly testing. Therefore, Note 2 does not change the actual testing being performed. It provides clarification to Table 4.1-1 to indicate to what extent the safety injection logic is tested on a monthly basis. In conclusion, the addition of Note 2 is administrative in nature and, therefore, acceptable.

Item 32, Auxiliary Feedwater, Item a, Steam Generator Water Level Low-Low:
The licensee requested to add a note in the remark section of Table 4.1-1 to indicate that the auto start of the turbine driven auxiliary feedwater pump would not be included in the monthly test, but would be tested within 30 days prior to each startup.

The turbine-driven pump receives an automatic start signal when a low-low level signal exists on two-out-of-three channels in two-out-of-three steam generators. The two-out-of-three channel low-low level logic matrix is tested monthly. The two-out-of-three steam generator logic (auto start) cannot be tested without implementing temporary modifications or actuating the pump. Hence, this logic would be tested within 30 days prior to each startup. Each pump autostart test performed during shutdown satisfies the surveillance requirements for any startup within 30 days of the completed test.

The Surry TS definition of the channel functional test indicates that operability should be verified through to the trip initiating action, which would be the starting of the turbine-driven pump. As stated in Revision 3 to Regulatory Guide (RG) 1.118, the NRC staff position indicates that it is not desirable to initiate operation of safety system equipment for testing during operation. RG 1.118 clarifies the definition for a logic system functional test, as noted in Section 6.3.5 of IEEE Std. 338-1987, "Periodic Testing of Electric Power and Protection Systems," to be a test of all logic components of a logic circuit, from as close to the sensor as practicable up to but not including the actuated device, to verify operability. The steam generator water level low-low is tested to the extent possible on a monthly basis, and completely tested during shutdowns. This change is therefore acceptable.

Item 32, Auxiliary Feedwater, Item b, Reactor Coolant Pump (RCP) Undervoltage:
The licensee requested: (1) to change the frequency of the channel functional test from monthly to Not Applicable and (2) to add a note in the remark section of Table 4.1-1 to indicate that the actuation logic and relays are tested within 30 days prior to each startup.

The turbine-driven auxiliary feedwater pump is started when an undervoltage condition exists on two-out-of-three station service busses. A reactor trip is also initiated. The reactor trip and pump autostart actuation logic and the reactor trip actuation relay contacts are tested monthly as part of Item 8, "4KV Voltage and Frequency." The actuation relay contacts for autostart of the auxiliary feedwater pump cannot be tested monthly without implementing temporary modifications or actuating the pump. Instead, they are tested within 30 days prior to each startup. Each pump autostart test satisfies the surveillance requirements for any startup within 30 days of the completed test.

The Surry TS definition of the channel functional test indicates that operability should be verified through to the trip initiating action, which would be the starting of the turbine-driven pump. As stated in Revision 3 to RG 1.118, the NRC staff position indicates that it is not desirable to initiate operation of safety system equipment for testing during operation. RG 1.118 clarifies the definition for a logic system functional test, as noted in Section 6.3.5 of IEEE Std. 338-1987, "Periodic Testing of Electric Power and Protection Systems," to be a test of all logic components of a logic circuit, from as close to the sensor as practicable up to but not including the actuated device, to verify operability. The RCP undervoltage is tested to the extent possible on a monthly basis, and completely tested during shutdowns. This change is therefore acceptable.

Item 37, Safety Injection Input from Engineered Safety Feature (ESF)
The licensee is renaming Item 37 in Table 4.1-1 to "Safety Injection Input to RPS" from "Safety Injection Input from ESF." This line item still tests the reactor trip signal generated by the Safety Injection System. Since this change does not alter the required test and is purely administrative in nature, it is acceptable.

4.0 SUMMARY

The licensee proposed changes to five line items in TS Table 4.1-1, all of which provided clarifications to the TS surveillance program. As a result of these changes, the TS now accurately reflects the actual testing being performed and are consistent with the existing plant design and/or the original licensing basis. The changes do not alter the actual test frequency or test methodology in any way. The reactor protection and engineered safeguards systems instrumentation and actuation logic are still tested to the extent possible on a monthly basis and are fully tested on a refueling cycle basis consistent with the guidelines of RG 1.118. The staff concludes that the changes are administrative in nature, and are, therefore, acceptable.

5.0 STATE CONSULTATION

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

6.0 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 and change surveillance requirements. 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 (60 FR18630). 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.

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

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