

December 10, 2002

Mr. David A. Christian  
Senior Vice President - Nuclear  
Virginia Electric and Power Company  
5000 Dominion Blvd.  
Glen Allen, Virginia 23060

SUBJECT: SURRY UNITS 1 AND 2 - SURVEILLANCE FREQUENCY FOR THE  
CONTAINMENT SPRAY AND RECIRCULATION SPRAY NOZZLES  
(TAC NOS. MB5114 AND MB5115)

Dear Mr. Christian:

The Commission has issued the enclosed Amendment No. 232 to Facility Operating License No. DPR-32 and Amendment No. 232 to Facility Operating License No. DPR-37 for the Surry Power Station, Unit Nos. 1 and 2, respectively. The amendments change the Technical Specifications (TS) in response to your application transmitted by letter dated May 14, 2002, as supplemented by letter dated July 22, 2002.

The amendments revise TS Section 4.5 and the associated Bases. The changes revise the surveillance frequency of the containment spray and recirculation spray header nozzles from a periodic surveillance of once every 10 years to a performance-based surveillance following maintenance that could cause nozzle blockage.

A copy of the Safety Evaluation is also enclosed. The Notice of Issuance will be included in the Commission's biweekly *Federal Register* notice.

Sincerely,

/RA/

Chris Gratton, Senior Project Manager, Section 1  
Project Directorate II  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Docket Nos. 50-280 and 50-281

Enclosures:

1. Amendment No. 232 to DPR-32
2. Amendment No. 232 to DPR-37
3. Safety Evaluation

cc w/encls: See next page

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OFFICE	PDII-1/PM	PDII-1/PM	PDII-2/LA	OGC	PDII-1/SC
NAME	GEEdison	CGratton	EDunnington	RHoefling	HBerkow for JNakoski
DATE	11/27/02	12/27/02	11/27/02	12 /04/02	12/10/02

**OFFICIAL RECORD COPY**

DATED: December 10, 2002

AMENDMENT NO. 232 TO FACILITY OPERATING LICENSE NO. DPR-32 - SURRY UNIT 1  
AMENDMENT NO. 232 TO FACILITY OPERATING LICENSE NO. DPR-37 - SURRY UNIT 2

PUBLIC  
PDII-1 R/F  
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Surry Power Station

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VIRGINIA ELECTRIC AND POWER COMPANY

DOCKET NO. 50-280

SURRY POWER STATION, UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 232  
License No. DPR-32

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by Virginia Electric and Power Company (the licensee) dated May 14, 2002, as supplemented by letter dated July 22, 2002, 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, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 3.B of Facility Operating License No. DPR-32 is hereby amended to read as follows:

(B) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 232 , are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance and shall be implemented within 30 days of the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

*/RA by HBerkow for/*

John A. Nakoski, Chief, Section 1  
Project Directorate II  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Attachment:  
Changes to the Technical  
Specifications

Date of Issuance: December 10, 2002

VIRGINIA ELECTRIC AND POWER COMPANY

DOCKET NO. 50-281

SURRY POWER STATION, UNIT NO. 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 232  
License No. DPR-37

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by Virginia Electric and Power Company (the licensee) dated May 14, 2002, as supplemented by letter dated July 22, 2002, 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, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 3.B of Facility Operating License No. DPR-37 is hereby amended to read as follows:

(B) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 232 , are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance and shall be implemented within 30 days of the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

*/RA by HBerkow for/*

John A. Nakoski, Chief, Section 1  
Project Directorate II  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Attachment:  
Changes to the Technical  
Specifications

Date of Issuance: December 10, 2002

ATTACHMENT TO

LICENSE AMENDMENT NO. 232 TO FACILITY OPERATING LICENSE NO. DPR-32

LICENSE AMENDMENT NO. 232 TO FACILITY OPERATING LICENSE NO. DPR-37

DOCKET NOS. 50-280 AND 50-281

Replace the following pages of the Appendix A Technical Specifications with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Remove Pages

TS 4.5-1  
TS 4.5-2  
TS 4.5-4

Insert Pages

TS 4.5-1  
TS 4.5-2  
TS 4.5-4

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO AMENDMENT NO. 232 TO FACILITY OPERATING LICENSE NO. DPR-32  
AND AMENDMENT NO. 232 TO FACILITY OPERATING LICENSE NO. DPR-37  
VIRGINIA ELECTRIC AND POWER COMPANY  
SURRY POWER STATION, UNIT NOS. 1 AND 2  
DOCKET NOS. 50-280 AND 50-281

## 1.0 INTRODUCTION

By letter dated May 14, 2002, Virginia Electric and Power Company (the licensee) proposed revising the Technical Specifications (TS) for the Surry Power Station, Units 1 and 2 (SPS1&2). The licensee's proposed amendment revises Surveillance Requirement (SR) 4.5.A.3 and SR 4.5.B.3 for the containment spray (CS) system nozzles and recirculation spray (RS) system nozzles, respectively. Currently, SRs 4.5.A.3 and 4.5.B.3 require periodic verification that the CS and RS spray nozzles are free of blockage. This verification is required to be performed once every 10 years to ensure that the CS and RS systems will operate as designed when needed. The verification tests are performed by an air or smoke flow test to verify that the spray nozzles are not obstructed. The proposed change would modify the surveillance frequency to those conditions following maintenance that could result in nozzle blockage. Routine maintenance activities with foreign material exclusion (FME) controls will not require performance of this surveillance. Only unanticipated circumstances will require performance of the surveillance (such as loss of foreign material control when working within the spray ring risers and headers). Spray system maintenance procedures establish FME controls and post-maintenance inspection when the spray system maintenance requires opening the system.

In response to the staff's request, the licensee provided additional information in a July 22, 2002, letter. This supplemental letter contained clarifying information only and did not change the initial no significant hazards consideration determination or expand the scope of the initial application.

## 2.0 BACKGROUND

The containment depressurization system is used to return the containment atmosphere to subatmospheric pressure after a loss-of-coolant accident (LOCA) by removing heat from the containment atmosphere and the containment structure. The containment depressurization system consists of two subsystems: (1) the CS subsystem, and (2) the RS subsystem. The CS subsystem transfers heat from the containment atmosphere to the CS, which is collected in the containment sump. The RS subsystem transfers heat, via the RS coolers, from the water collected on the containment floor and from the containment atmosphere to the service water (SW) system.

The containment depressurization system consists of two separate but parallel CS subsystems, each of 100-percent capacity, and four separate but parallel RS subsystems, each of approximately 50-percent capacity.

The licensee's May 14, 2002, letter stated that a smoke or air flow test has been performed five times on Unit 1 and four times on Unit 2. Except for some "dried-out" tape that blocked flow through three nozzles on the Unit 1 RS header during a 1983 test, the results of each test demonstrated unobstructed flow through each nozzle. After removal of the tape, all spray nozzles tested satisfactorily. Even with the three blocked nozzles, the spray system had sufficient redundancy so that the spray system remained operable. The tests confirmed that the systems were free from construction debris and also free from obstructions following startup and operation of the units.

The licensee provided the following justification for the requested revision: (1) the air flow tests impact fuel movement in containment, (2) the SR presents a personnel safety risk for the individuals required to access the top of containment to check the air flow through the nozzles, (3) performance of the SR is expensive, and (4) operating experience has demonstrated that nozzle blockage is predominantly associated with maintenance activities. The licensee is, therefore, proposing to change the surveillance frequency to those conditions following maintenance that could result in nozzle blockage. The licensee is also proposing that the verification could consist of a visual inspection of the nozzles in lieu of an air or smoke test.

### 3.0 EVALUATION

Each CS subsystem consists of two separate spray ring headers located in the containment dome and one common spray ring header located outside the crane wall. Each train is rated at 100-percent capacity. The CS ring headers have a total of 234 nozzles. The piping is fabricated of stainless steel and the spray nozzles are also stainless steel.

The CS pump discharge motor-operated valves (MOVs) and weighted check valves are maintained closed during normal operation to provide containment isolation. Each CS supply line to the containment contains a weight-loaded check valve to prevent air inleakage to the containment when it is at subatmospheric pressure. One-quarter-inch drain lines located downstream of the check valves inside containment will drain the CS manifolds should any water enter the manifolds during periodic testing. In addition, each train of CS has a 4-inch line downstream of the isolation valves that supplies water to the suction of the RS pumps for increased net positive suction head. The 4-inch line would also serve to prevent any water collection in the supply headers. Containment sump inleakage is monitored and recorded in the control room during plant operation, which provides another method to identify any leak-by of the CS and RS MOVs.

The RS subsystem is composed of two trains; each train includes an inside RS subsystem and an outside RS subsystem. Each subsystem is considered to be at 50 percent capacity, and consists of one RS pump, one RS spray heat exchanger and one 180° coverage spray header with stainless steel nozzles. The heat exchanger tubes are titanium.

Strainers are provided in the suction of the CS pumps. Three layers of screening are provided in the suction of the RS pumps. The strainers and the screen mesh are small enough to prevent any material that could plug the nozzles from passing through. Test spray nozzles are installed inside the refueling water storage tank for routine surveillance testing of the CS pumps. This provides an indication of possible blockage.

The NRC staff examined the performance history of the spray systems at SPS and failure mechanisms of spray nozzles revealed by past performance at SPS as well as at other plants, and the effectiveness of the air or smoke flow test with respect to those failure mechanisms. Based on these examinations, the NRC staff concluded that the impact of the proposed changes on the system reliability is negligible.

In addition to the flow tests, the licensee is proposing inspection as an alternate method of verifying the absence of blockage following maintenance that could cause nozzle blockage. The experience at another pressurized-water reactor (PWR) indicates that a thorough visual inspection of the piping is capable of finding debris in the spray headers that may not be found through the air or smoke blockage test. Therefore, the NRC staff considers inspection, if done thoroughly, is an acceptable alternative to the air or smoke flow test.

#### Performance History at SPS

In addition to the testing history discussed in the Background section of this Safety Evaluation, the licensee also did a thorough job of flushing the CS and RS subsystems prior to initial operation. No significant debris was found. Although work has been done on the CS and RS systems since that time that involved opening the system, subsequent testing has shown acceptable testing results.

The licensee's May 14, 2002, letter states that a review of the maintenance and modification history since the last flow blockage test indicates a limited number of work orders and modifications have been performed on CS and RS MOV isolation valves or the system piping. The modifications associated with the valves were for operator adjustment and would not have affected system cleanliness. The maintenance activities included: repositioning the spectacle flange and elbows for RS testing activities, repair and adjustment of weighted discharge check valves, installing blanks on CS piping to support MOV leak testing, and RS heat exchanger inspections. Cleanliness control practices, including post-work inspections, were used and documented in the work orders to ensure system cleanliness requirements were maintained.

#### Industry experience and failure mechanisms

Review of industry experience using the NRC's Sequence Coding and Search System for Licensee Event Reports indicates that spray systems of similar design are highly reliable (i.e., not susceptible to plugging). The NRC staff reviewed industry experience and found that, with a few exceptions, once tested after construction, CS nozzles have not been subject to blockage. There have been some exceptions. In the case of one PWR, a chemical added to the inner surface of a spray system pipe to eliminate a corrosion problem detached and the loose material blocked some spray nozzles. Spray piping in PWRs, and in particular at SPS, is corrosion-resistant; therefore, this failure mechanism is not applicable to SPS. The licensee for another PWR found debris, identified as construction debris, in the spray nozzle headers. The fraction of blockage was not significant and the sprays remained functional. The debris was found by visual observation, not by an air flow test. Another plant had corrosion in the spray piping due to water in the spray system and piping that was not stainless steel.

Other problems have been identified in CS and fire protection systems in which water leakage resulted in corrosion that resulted in some, but not complete, blockage. As described above, the SPS design effectively precludes this condition. The spray ring headers are maintained dry and are made of corrosion-resistant stainless steel and, therefore, formation of significant corrosion products is precluded.

Introduction of foreign material exterior to the headers is unlikely due to their location at the top of the containment. Since maintenance that could introduce foreign material is the most likely cause for obstruction, testing or inspection following such maintenance would suffice to verify the system's capability to perform its safety function. These reasons make the potential for nozzle obstruction very low and, therefore, the 10-year test frequency is unnecessary. Verifying that the nozzles are not obstructed following maintenance that could introduce foreign materials internal to the spray ring headers is a more appropriate frequency. This verification would consist of an inspection of the nozzles, or an air or smoke flow test.

Based on its review of the plant-specific and industry performance history as described above, the NRC staff concludes that the design of the SPS containment depressurization system (CS and RS), combined with the licensee's Post Maintenance Testing Program to address nozzle blockage when performing maintenance on the system, will minimize the potential for nozzle blockage. The NRC staff, therefore, concludes that the licensee's proposed TS change, which modifies the frequency of verifying the CS and RS nozzles are unobstructed from once every 10 years to conditions following maintenance that could result in nozzle blockage, is acceptable.

#### 4.0 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.

#### 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 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 (67 FR 42831). 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.

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

Principal Contributor: R. Lobel

Date: December 10, 2002