

VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

February 16, 1999

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555

Serial No. 99-033
SPS-LIC/CGL R0
Docket Nos. 50-280
50-281
License Nos. DPR-32
DPR-37

Gentlemen:

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION UNITS 1 AND 2
PROPOSED TECHNICAL SPECIFICATIONS CHANGE
REVISED AUGMENTED INSPECTION REQUIREMENTS
FOR REACTOR COOLANT PUMP FLYWHEELS

Pursuant to 10CFR50.90, Virginia Electric and Power Company requests amendments, in the form of revisions to the Technical Specifications to Facility Operating License Numbers DPR-32 and DPR-37 for Surry Power Station Units 1 and 2. The proposed change will revise the augmented inspection requirements for the reactor coolant pump flywheels based on topical report WCAP-14535A, entitled "Topical Report on Reactor Coolant Pump Flywheel Inspection Elimination". A discussion of the proposed Technical Specifications change is provided in Attachment 1.

The proposed Technical Specifications change has been reviewed and approved by the Station Nuclear Safety and Operating Committee and the Management Safety Review Committee. It has been determined that the proposed Technical Specifications change does not involve an unreviewed safety question, as defined in 10CFR50.59. Marked-up Technical Specifications that reflect the proposed change are provided in Attachment 2. Revised Technical Specifications that incorporate the proposed change are provided in Attachment 3. The basis for our determination that the Technical Specifications change does not involve a significant hazards consideration, as defined in 10CFR50.92, is provided in Attachment 4. A similar Technical Specification change request was previously submitted and approved by the NRC for North Anna Power Station Units 1 and 2 in a letter dated April 22, 1998.

Should you have any questions or require additional information, please contact us.

Very truly yours,



D. A. Christian
Vice President - Nuclear Operations

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Attachments:

1. Discussion of Change
2. Marked-Up Technical Specifications Change
3. Revised Technical Specifications
4. Significant Hazards Consideration Determination

Commitments made in this letter: None.

cc: U.S. Nuclear Regulatory Commission
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Mr. R. A. Musser
NRC Senior Resident Inspector
Surry Power Station

Commissioner
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COMMONWEALTH OF VIRGINIA)
)
COUNTY OF HENRICO)

The foregoing document was acknowledged before me, in and for the County and Commonwealth aforesaid, today by D. A. Christian, who is Vice President - Nuclear Operations, for J. P. O'Hanlon, who is Senior Vice President - Nuclear, of Virginia Electric and Power Company. He has affirmed before me that he is duly authorized to execute and file the foregoing document in behalf of that Company, and that the statements in the document are true to the best of his knowledge and belief.

Acknowledged before me this 16th day of February, 1999.

My Commission Expires: March 31, 2000.

Maggie McClure
Notary Public



ATTACHMENT 1

DISCUSSION OF CHANGE

**VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION UNITS 1 AND 2**

DISCUSSION OF CHANGE

Introduction

Pursuant to 10CFR50.90, Virginia Electric and Power Company requests a change to Technical Specification 4.2, "Augmented Inspections," Table 4.2-1, Item No. 1.3, associated with the Reactor Coolant Pump (RCP) flywheel for Units 1 and 2. The current Surveillance Requirement requires the flywheels to be inspected in accordance with Regulatory Position C.4.b of Regulatory Guide 1.14.

The proposed change will replace the augmented inspection requirements for the RCP flywheels specified by Regulatory Guide 1.14, "Reactor Coolant Pump Flywheel Integrity," Revision 1 dated August 1975, with those established by WCAP-14535A, "Topical Report on Reactor Coolant Pump Flywheel Inspection Elimination," dated November 1996.

An unreviewed safety question or significant hazards consideration is not generated by the proposed Technical Specification change. The change to the inspection requirements for the RCP flywheels is based upon the results documented in Westinghouse Energy Systems Topical Report WCAP-14535A. The Topical Report WCAP-14535A has been reviewed and accepted by the NRC as documented in their letter entitled, "Acceptance for Referencing of Topical Report WCAP-14535, Topical Report on Reactor Coolant Pump Flywheel Inspection Elimination," dated September 12, 1996.

Background

Current Licensing Basis

General Design Criterion 4, "Environmental and dynamic effects design bases" of Appendix A, "General Design Criteria for Nuclear Power Plants" to 10CFR50 requires that nuclear plant structures, systems, and components important to safety be protected against the effects of missiles that might result from equipment failures. Regulatory Guide 1.14 describes a method acceptable to the NRC staff for implementing this requirement with regard to minimizing the potential for failures of RCP flywheels.

Design Basis

The reactor coolant pumps located in each loop provide the motive force to circulate the reactor coolant throughout the Reactor Coolant System. The reactor coolant pumps are designed to move 88,500 gpm of reactor coolant through each loop. The RCP flywheels located above the motor upper bearing provide extended flow coastdown capability if power is lost to the RCPs. The stored kinetic energy/momentum of the flywheel provides the flow coastdown at an adequate rate to ensure core cooling.

Each RCP flywheel is fabricated from rolled, vacuum-degassed, ASTM A-533 steel plates. The flywheel blanks are flame-cut from the plate, with allowance for exclusion of flame-affected metal. A minimum of three Charpy tests are made from each plate parallel and normal to the rolling direction, to determine that each blank satisfies design requirements. A NDTT less than +10 degrees F is specified. The finished flywheels are subjected to 100% volumetric ultrasonic inspection. The finished machine bores are also subjected to magnetic particle or liquid penetrant examination (surface examination).

Discussion

Flywheel Inspection

Reactor coolant pump flywheels have been subjected to an augmented inspection program that satisfies the requirements of Regulatory Position C.4.b of Regulatory Guide 1.14, Revision 1, "Reactor Coolant Pump Flywheel Integrity," dated August 1975. Regulatory Guide 1.14, prepared in response to a concern over overspeed of the RCP and its potential for failure, describes an acceptable method to ensure RCP flywheel integrity. These inspections include an in-place volumetric ultrasonic (UT) examination of the areas of higher stress concentration at the bore and the keyway every 3 years, and a surface examination of all exposed surfaces and complete UT volumetric examination every 10 years.

A survey of Westinghouse Owners Group utilities, including Surry, reported on a total of 729 examination results. The survey found no indication which would affect the integrity of the flywheels. The inspection record, plus concerns over inspection costs and personnel radiation exposure prompted Westinghouse Energy Systems to prepare WCAP-14535A to demonstrate through fracture mechanics analysis that flywheel inspections can be eliminated without impairing plant safety. Therefore, Westinghouse Energy Systems prepared report WCAP-14535A, "Topical Report on Reactor Coolant Pump Inspection Elimination" to quantify the effects of eliminating flywheel inspections. The NRC has reviewed, evaluated and approved the technical basis of the report.

The following Summary and Conclusions are extracted from WCAP-14535A:

Reactor coolant pump flywheel inspections were implemented as a result of United States Nuclear Regulatory Commission Regulatory Guide 1.14, which was published in 1971 and revised in 1975.

- Flywheels are carefully designed and manufactured from excellent quality steel, which has a high fracture toughness.
- Flywheel overspeed is the critical loading, but leak-before-break has limited the maximum speed to less than 1500 rpm.

- Flywheel inspections have been performed for 20 years, with no indications of service induced flaws.
- Flywheel integrity evaluations show a very high flaw tolerance for the flywheels.
- Crack extension over a 60-year service life is negligible.
- Structural reliability studies have shown that eliminating inspections after 10 years of plant life will not significantly change the probability of failure.
- Inspections result in man-rem exposure and the potential for flywheel damage during assembly and reassembly.

Based on the above conclusions, continued inspections of reactor coolant pump flywheels are not necessary. Furthermore, overall plant safety could be increased by eliminating these inspections, because man-rem doses would be lowered, and the potential for flywheel damage during disassembly and reassembly for inspection would be eliminated.

Although accepting the technical arguments presented in WCAP-14535A, the NRC only granted partial relief from the RCP flywheel inspection requirements. The proposed Technical Specification change implements the NRC recommended inspection criteria specified in the conclusion of the NRC letter, "Acceptance for Referencing of Topical Report WCAP-14535, 'Topical Report on Reactor Coolant Pump Flywheel Inspection Elimination' dated September 12, 1996" as supplemented by Safety Evaluation Report, "Safety Evaluation by the Office of Nuclear Reactor Regulation, Topical Report on Reactor Coolant Pump Flywheel Inspection Examination."

Based upon the NRC recommended criteria, the proposed changes will require an inspection once every 10 years by a qualified in-place UT examination over the volume from the inner bore of the flywheel to the circle of one-half the outer radius or a surface examination (MT and/or PT) of exposed surfaces defined by the volume of the disassembled flywheels. Implementation of these inspection requirements will also address the concern of protecting against events or degradation that are not anticipated and have not been considered in the generic analysis. Furthermore, overall plant safety could be increased by reducing the frequency of these inspections due to the elimination of potential flywheel damage during disassembly and reassembly for inspection.

Specific Changes

The current Technical Specification (TS) 4.2, Augmented Inspections, Table 4.2-1, Item 1.3 Remarks, specifies the following Primary Pump Flywheel inspection requirement:

Examination to be conducted in accordance with regulatory position C.4.b of regulatory guide 1.14 Rev. 1, August 1975.

This TS is being replaced by the following requirement:

Inspect once every 10 years by a qualified in-place UT examination over the volume from the inner bore of the flywheel to the circle of one-half the outer radius or a surface examination (MT and/or PT) of exposed surfaces defined by the volume of the disassembled flywheels.

Safety Significance

- a) The proposed Technical Specification change for the reduction of inspection requirements proposed for the reactor coolant pump flywheels does not increase the probability of or the consequences of an accident or malfunction of equipment important to safety previously evaluated in the safety analysis report. The change also does not involve any physical modification to the plant or result in a change in a method of system operation. The conclusion is based upon the results documented in WCAP-14535A, which was reviewed and technically accepted by the NRC in their SER dated September 12, 1996.

The postulated concern analyzed as a result of reducing the inspection requirement was a crack which remained undetected in the flywheel and grew to the point of failure (critical size) prior to subsequent examination. WCAP-14535A determined that discontinuing the flywheel examinations after the first 10 years of operation had essentially no impact on the failure probability of the flywheel. The conclusion is based upon structural reliability calculations assuming conservatively a 10% probability of a flaw existing after preservice inspection and a 50% ISI flaw detection capability. In reality, flaws approaching the critical size necessary to fail the flywheel would most likely be detected in the preservice or subsequent inservice inspections given their larger size. Additionally, even if a flaw were not identified during the inspections, the flaw growth rate is negligible over the plant life.

- b) The proposed change for the reduction of inspection requirements for the reactor coolant pump flywheels does not create the possibility of an accident or malfunction of a different type than any evaluated previously in the safety analysis report.

The change only addresses an inspection requirement. There is no change in the method of plant operation or system design, as such no new or different kinds of accidents or malfunctions are created.

- c) The proposed change for the reduction of inspection requirements for the reactor coolant pump flywheels does not reduce the margin of safety of any Technical Specification. As stated previously, the reduction in inspection has a negligible affect on failure probability of the flywheel as documented by WCAP-14535A given that the initial preservice and inservice inspections were performed. No changes to methods of plant operation or design are proposed.