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 STEWART, W.L. Virginia Power (Virginia Electric & Power Co.)
 RECIP. NAME RECIPIENT AFFILIATION
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SUBJECT: Special rept: on 910815 & 24, quadrant-to-average power tilt exceeded 2% for more than 24 h. Caused by blown fuse & dropped rod runback. Cable w/insulation damage & rod control cabinet repaired.

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VIRGINIA ELECTRIC AND POWER COMPANY

RICHMOND, VIRGINIA 23261

September 13, 1991

United States Nuclear Regulatory Commission
Attention: Document Control Desk
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Serial No. 91-532
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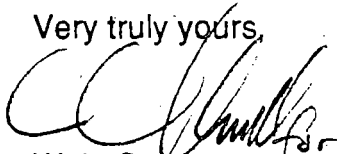
VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION UNIT 2
SPECIAL REPORT
QUADRANT TO AVERAGE POWER TILT
EXCEEDS 2.0% FOR GREATER THAN 24 HOURS

Surry Technical Specification 3.12.B.7.a requires an evaluation be performed and a special report be issued to the Nuclear Regulatory Commission under certain conditions when the quadrant to average power tilt exceeds 2% for greater than 24 hours. On August 15, 1991 and August 24, 1991, the Surry Unit 2 quadrant to average power tilt exceeded 2% for greater than 24 hours. A description of the circumstances surrounding these events are provided in the attachment to this letter.

This report has been reviewed and approved by the Station Nuclear Safety and Operating Committee.

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

Very truly yours,



W. L. Stewart
Senior Vice President - Nuclear

Attachment - Special Report for Quadrant to Average Power Tilt Exceeding 2% for Greater than 24 Hours

cc: U. S. Nuclear Regulatory Commission
Region II
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Mr. M. W. Branch
NRC Senior Resident Inspector
Surry Power Station

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ATTACHMENT

SPECIAL REPORT FOR
QUADRANT TO AVERAGE POWER TILT EXCEEDING 2%
FOR GREATER THAN 24 HOURS

On August 14, 1991 at 1753 hours with Unit 2 at 100% reactor power (795 MW), control rod D-4 in control bank C dropped into the core with blown fuse indications. An Individual Rod Position Indication (IRPI) dropped rod runback occurred and the unit was stabilized at 54% power (420 MW). Applicable Abnormal Operating Procedures were implemented and technical specification requirements were reviewed. Reactor power was verified to be less than 75% and initial Quadrant Power Tilt (QPT) from the excore detectors was determined to be 11.6% at 1825 hours. A shutdown margin calculation was also completed and verified to be satisfactory at 1828 hours. Following the determination that QPT was greater than 2%, at 2059 hours the High Flux Trip Setpoints were reduced to 72% and rod stop setpoints were reduced to 68% to allow power operation with control rod D-4 inoperable and fully inserted and with QPT greater than 2%. This action was taken to comply with Technical Specification 3.12.B.6.b which requires the High Flux Trip Setpoint to be reduced at least 2% for every 1% of QPT when hot channel factors are not determined within two hours.

Following discussions held with the nuclear steam supply system vendor, Westinghouse, the rod control cabinet was inspected and tested and the rod drive cables were meggered satisfactorily. A cable (with suspected insulation damage) in the rod control cabinet was repaired. The fuses were replaced and control rod D-4 retrieval was performed in accordance with AP-1.01. The rod was fully withdrawn and reactor power was raised to 100% at a ramp rate limited to 3% per hour for reactor power levels greater than 68%. This limitation on ramp rate was implemented in accordance with Westinghouse fuel conditioning guidelines.

On August 23, 1991 at 0435 hours with Unit 2 at 80% reactor power (625 MW), control rod D-4 in control bank C again dropped into the core. A second IRPI dropped rod runback occurred and the unit was stabilized at 50% power (370 MW). Applicable Abnormal Operating Procedures were implemented and actions similar to the first event were taken. Reactor power was verified to be less than 75% and a shutdown margin calculation was completed and verified to be satisfactory at 0503 hours. The High Flux Trip Setpoints were reduced to 72% and the rod stop setpoints were reduced to 68% at 0817 hours. Initial Quadrant Power Tilt (QPT) from the excore detectors was determined to be 14.5% at 1124 hours. Reactor operation continued at reduced power, in accordance with analyses performed, until September 7 when Unit 2 was shutdown to troubleshoot and make repairs to control rod D-4.

The core asymmetry due to operation with control rod D-4 inserted, coupled with the xenon transients and changes in T_{ave} associated with the dropped rod events, resulted in the observed excore tilts. For each of these events, manual QPT calculations were performed at least every two hours to monitor and trend the tilts. Following each event, preparations were also initiated to reduce Overpower ΔT and Overtemperature ΔT trip setpoints. These preparations were made to ensure the Technical Specification requirement to reduce these setpoints, if the excore tilt exceeded 2% for greater than 24 hours and either the hot channel factors had not been determined or had been exceeded, could be expeditiously implemented. Prior to QPT exceeding 2% (but less than 10%) for greater than a 24 hour period, the nuclear engineering staff concluded from full core flux maps taken at 1124 on August 15 (D-4 inserted), 0248 on August 16 (D-4 withdrawn), at 1123 on August 17 (D-4 withdrawn), and at 1405 on August 23 (D-4 inserted) that the limits placed on core peaking factors by TS 3.12.B.1 were not exceeded during these events. Since the core peaking factors remained within limits, it was not necessary to reduce the Overpower ΔT and Overtemperature ΔT trip setpoints during either event.