VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

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United States Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D. C. 20555

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Gentlemen:

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION UNIT 1
SPECIAL REPORT
ATWS MITIGATION SYSTEM ACTUATION CIRCUITRY

Surry Unit 1 installed ATWS Mitigation System Actuation Circuitry (AMSAC) in accordance with the requirements of 10 CFR 50.62 during the Fall 1990 refueling outage. After installation but prior to startup, the AMSAC was thoroughly tested. This testing included post-modification testing as well as functional testing. Based on these test results and the subsequent Technical Review required by our Design Change Program, the system was declared operable by the Station Nuclear Safety and Operating Committee and placed in service. However, shortly after unit startup on December 20, 1990, we began to receive spurious alarms and the system was placed in "Bypass."

Since the inoperability of AMSAC is not covered under existing Technical Specifications or applicable under 10 CFR 50.72, we are providing formal notification by this Special Report. The attached Special Report provides a description of the circumstances surrounding this event. A final report will be submitted when corrective actions are complete and the system is returned to service.

This Special Report has been reviewed and approved by the Station Nuclear Safety and Operating Committee. It has been determined that operation with AMSAC out of service does not present any undue risk to the health and safety of the public.

We will continue to aggressively pursue resolution of the AMSAC technical issues as well as keep you advised of our progress. Should you have any further questions, please contact us.

Very truly yours,

W. L. Stewart
Senior Vice President - Nuclear

Attachment

IE22

cc: U. S. Nuclear Regulatory Commission
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Mr. W. E. Holland
NRC Senior Resident Inspector
Surry Power Station

ATTACHMENT
SPECIAL REPORT
ATWS MITIGATION SYSTEM ACTUATION CIRCUITRY
(AMSAC)

The Anticipated Transient Without Scram (ATWS) Mitigation System Actuation Circuitry was installed in Surry Unit 1 during the recently completed refueling outage. In early December of 1990, engineering and testing personnel performed field verification testing as specified by the design document and also satisfactorily performed calibration and functional testing. Based on the results of this testing, the system was determined to be fully operable. On December 20, 1990, shortly after placing the system in service, we began to receive spurious alarms, and the system was placed in "Bypass" for troubleshooting.

On December 21, 1990, a problem was found and corrected in one of the analog input modules. The system was tested using the monthly performance test, and on December 22, 1990, it was placed back in "Normal". From December 22 through 28, a number of spurious "Trouble" alarms were received, and on December 28, 1990, the system was returned to "Bypass" for further troubleshooting.

On December 31, 1990, a problem was found with improper voltage ratings of the output relay modules interfacing with the Main Control Room annunciator circuits. Specifically, 125 volts DC was being applied to relay output module boards which were rated for only 30 volts DC. A Field Change to the original design was installed to correct this condition.

When the system was tested on January 12, 1991, following the Field Change, another problem was discovered. When the panel door was being closed, the door switch was initiating an unexpected "Armed" alarm, and troubleshooting was resumed using diagnostic software. Some components were found suspect and replaced, and the system was recalibrated and field verified. After a satisfactory technical review by engineering and the Station Nuclear Safety and Operating Committee on January 23, 1991, the system was returned to "Normal." Eighteen hours later, on January 24, 1991, spurious alarms were received again and the system was returned to "Bypass." The diagnostic software was reinstalled, and a defective input module was found in one of the programmable logic controllers. This module was replaced and the system was monitored using the diagnostic software for several days. No further problems were encountered and the system was returned to service on February 4, 1991, after recalibration and field verification.

Later that day, spurious alarms began to recur, including problems originating with the door switch, and the system was placed in "Bypass" for further troubleshooting. On February 6, 1991, troubleshooting located a short between two field wiring contacts on one of the system power supply status relays. Correction of this situation eliminated the abnormal symptoms observed that day from actuation of the panel door switch.

The AMSAC is redundant to the Reactor Protection System and is designed to trip the main turbine, initiate auxiliary feedwater flow, and trip the output breakers of the Rod Drive Motor Generator sets in the event the Reactor Protection System (RPS) fails to function. The RPS has been fully operable since the unit was returned to service. Therefore, the health and safety of the public were unaffected. Also, the Emergency Operating Procedures provide detailed manual actions to be taken by operations personnel in the event the RPS does not function when required. These manual actions include those performed automatically by AMSAC.

At the date of this letter, extensive troubleshooting, component replacement, and system grooming are still in progress. A final report will be submitted when the problems have been corrected and the system has been returned to service.