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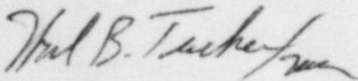
U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D. C. 20555

Subject: Oconee Nuclear Station, Unit 2
Docket No. 50-270
T.S. 3.17.1 Special Report

Dear Sir:

Please find attached a special report regarding inoperable fire detection instrumentation. This report is submitted pursuant to Oconee Nuclear Station Technical Specification 3.17.1 which concerns fire detection instrumentation which cannot be restored to operable status within 14 days, and describes an incident which is considered to be of no significance with respect to public health and safety.

Very truly yours,



Hal B. Tucker

PJN/04/sbn

Attachment

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DUKE POWER COMPANY
OCONEE NUCLEAR STATION

SPECIAL REPORT ON INOPERABLE FIRE DETECTORS

Introduction

On November 13 and 14, 1986, with Unit 2 at 94% full power, spurious fire alarms annunciated in the control room for strings No. 2 and No. 15 respectively. These alarms were associated with the Pyr-A-Larm detection system in the Reactor Building. The alarms were investigated and it was determined that the detectors in alarm were inside the secondary shield wall and thus inaccessible.

This incident was caused by two fire detectors in the Reactor Building giving an erroneous indication of a fire, for unknown reasons.

Immediate corrective action was a once per hour fire watch using the installed TV camera in the Reactor Building. The affected detectors were replaced during a shutdown on January 18, 1987.

Since no fire was observed and appropriate compensatory action was taken to monitor the Reactor Building for fire, the health and safety of the public were not affected by this incident.

Background

In the Unit 2 Reactor Building there are two fire zones. Each of these zones has redundant fire detection strings strategically located throughout the Reactor Building. Each string has 12 ionization type detectors with 11 in use. Four detectors on each string are located inside the secondary shield in close proximity to the reactor coolant pumps. The other 7 detectors are located outside of the secondary shield. The two strings are identified as string No. 2 for fire zone 2 and string No. 15 for fire zone 15. When a detector senses a combustible gas, the detector will send a signal to the Fire Indicating Unit and a local indicating lamp will flash. The Fire Indicating Unit for Unit 2 is located in Unit 1 and 2 control room. The fire indicating unit sends a signal to the operator control board for that particular unit. Besides smoke or other combustible gases, the detectors can be actuated by small amounts of other conductive contaminants which accumulate in the area covered by the detectors.

Description of Occurrence

On November 13, 1986 at 0828, with Unit 2 at 94% full power the control room received a fire alarm on the Pyr-A-Larm fire detection system string No. 2. Technicians entered Unit 2 Reactor Building to investigate the spurious alarm and repair as necessary. The investigation included changing the detector lamps and visually verifying no alarm condition existed on any of the 7 accessible detectors located outside of the secondary shield. There were 4 detectors inside the secondary shield that are normally not accessible during reactor operation thus they were not checked.

On November 14, 1986 at 1210, Unit 2 control room received an alarm on string no. 15. With both strings in alarm, a once per hour fire watch is required to comply with technical specification 3.17.1. The fire watch is accomplished by surveillance of the Reactor Building with a TV camera. The TV camera surveillance was initiated and no signs of fire were observed.

Operations personnel and technicians entered the Unit 2 Reactor Building to survey for fires, and investigate and repair alarming detectors on string No. 15. During this surveillance no sign of fire was detected. No accessible detectors on string No. 15 were found in alarm.

On November 15 at 0445, the alarms on both string No. 2 and string No. 15 cleared. There were no further alarms on these two strings and on November 17 at 1030, after 32 hours without alarms, strings No. 2 and 15 were declared operable.

At 0930 on December 6, alarms were again received on both strings No. 2 and No. 15. These alarms annunciated and cleared several times. Unit 2 was again surveyed with the TV camera for visible signs of fire. No signs of fire were observed during surveillance. At 0945, string No. 15 alarmed and locked in. Technicians investigated the problem at the Unit 2 Fire Indicating Unit located in the Unit 1 and 2 control room. No Reactor Building entry was made at this time. No problem was found at the Fire Indicating Unit. At 1055, string 2 alarmed and then cleared. At this time, the once per hour fire watch was reinitiated using the Reactor Building TV camera. There were no indications of fire observed during the TV surveillance. At 1300, the alarm on string No. 15 was reset. The alarm reset and did not come back in. The once per hour fire watch was secured at 1700 hours.

On December 23 at 2250, alarms were received on both strings No. 2 and No. 15. Hourly surveillance was once again initiated using the Unit 2 Reactor Building TV camera. Technicians investigated the alarm problem at the fire indicating unit. The leads on string No. 15 were disconnected and reconnected in the Fire Indication Unit and the alarm was reset. On December 31, technicians further investigated the string No. 15 alarm problem. During this investigation, no accessible detectors on string No. 15 were found in alarm. The accessible detectors were set off and the alarms were reset. At this time, a 91K resistor was installed on string No. 2 and string No. 15 to protect the Fire Indicating Unit alarm circuit. Operations was informed of this installation of resistors on both strings which causes them to be inoperable. The hourly fire watch was continued.

On January 18, 1987 Unit 2 went to hot shutdown. The loss of redundant fire detection strings was not a factor in the unit shutdown.

On January 18, 1987 technicians entered the Unit 2 Reactor Building to investigate the potential problem with the inaccessible detectors. Detectors 2F (string No. 2) and 15F (string No. 15) which are inside the secondary shield and inaccessible at power, were found in alarm with no indication of fire present. These detectors were replaced and the resistors were removed from the circuits. The two strings were functionally verified the Reactor Building fire detection system was declared operable.

Cause of Occurrence

The root cause of this event cannot be determined from the available facts. An evaluation of the replaced detectors was performed. The two detectors that were

replaced are located inside "B" cavity containing 2 reactor coolant pumps and a steam generator. The cavity is normally inaccessible during reactor operation due to high radiation. The physical location of the detectors is on the bottom of beams or supports which inhibit a visual inspection from the top of the cavity. It is speculated that a buildup of dust, oil fumes, water vapor, and/or other conductive contaminants over a period of time caused the detectors to alarm. This is not a recurring event.

Corrective Action

The Immediate corrective actions included:

- (1) Once per hour fire watch of the area covered by the two strings of detectors was established each time the redundant string of detectors alarmed.
- (2) The string circuit and accessible detectors were verified operable several times.
- (3) After December 31, 1986 once per hour fire watches were established with both strings of detectors inoperable.

Supplemental corrective actions were to replace and functionally verify detectors 2F and 15F as soon as the area was made accessible.

Analysis of Occurrence

Within the Reactor Building there exists several trains of fire detectors. These trains are strategically located so that specific areas of the building are monitored at all times. The area involved in this incident was the reactor coolant pump cavity. In this cavity, there are four locations that have two detectors from two separate strings. Each string alarms separately in the control room.

When this event started, both detectors in one location were in alarm. The operators promptly initiated action to verify whether a fire was in fact involved. Use of the television camera in the cavity provided assurance that no fire was present.

For the period of time that the two strings were out of service because of the installed resistors, Operations personnel kept an hourly fire watch using the TV camera. This was in accordance with Technical Specification 3.17.1.

Since no fire was observed and appropriate monitoring of the cavity was performed so that any fire could be detected, the safety and health of the public was not affected.