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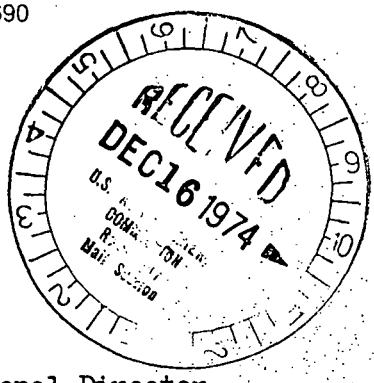
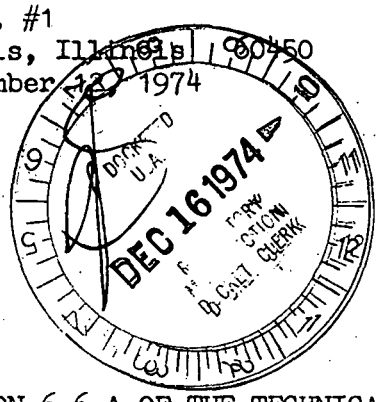


BBS Ltr. #881-74

Dresden Nuclear Power Station
R. R. #1
Morris, Illinois 60450
December 12, 1974



Mr. James G. Keppler, Regional Director
Directorate of Regulatory Operations-Region III
U. S. Atomic Energy Commission
799 Roosevelt Road
Glen Ellyn, Illinois 60137

SUBJECT: FINAL REPORT OF ABNORMAL OCCURRENCE PER SECTION 6.6.A OF THE TECHNICAL SPECIFICATIONS
SECONDARY CONTAINMENT BLOWOUT PANEL FAILURE

References: 1) Regulatory Guide 1.16 Rev. 1, Appendix A

2) Notification of Region III of AEC Regulatory Operations
Telephone: Mr. D. Knopf, 1600 hours on November 30, 1974
Telegram: Mr. J. Keppler, 1600 hours on December 2, 1974

3) Dresden Units 2 and 3 FSAR, Vol. 1, Section 5.3-2, Rev. 3-22-68.

4) Dresden Unit 3 Preoperational Test Report C-12-9, Section 6.

5) CRC Handbook of Applied Engineering Science, Table 5-23.

6) Dresden Letter to Region III, Dated December 9, 1974

Report Number: 50-249/74-35

Report Date: December 12, 1974

Occurrence Date: November 30, 1974

Facility: Dresden Nuclear Power Station, Morris, Illinois

IDENTIFICATION OF OCCURRENCE

Secondary Containment Blowout Panel Failure. Preliminary report issued on December 9, 1974 (Ref. 6).

CONDITIONS PRIOR TO OCCURRENCE

Unit 2 was in refuel mode, with core alterations in progress, and Unit 3 was in run mode, at a thermal power of 1614 MWt and a load of 517 MWe, just prior to the occurrence.

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The 2A, 3A, and 3B reactor building vent fans and the 2C, 3A and 3B reactor building exhaust fans were operating just prior to the occurrence.

DESCRIPTION OF OCCURRENCE

At about 1140 hours, the 3A and 3B reactor building exhaust fans tripped off and would not reset. Gusts of wind of about 30 m.p.h. were noted. At about the same time, it was reported by maintenance personnel and fuel handling personnel independently that a section of the west wall of the 2/3 reactor building superstructure had come loose. Investigation revealed that the Unit 3 (west) reactor building blowout panel had disconnected from its bottom edge support beam, breaking the bottom edge restraining bolts, and was standing open approximately ten inches at the bottom. All refueling activities on Unit 2 were immediately halted. At 1145 hours, the 2C reactor building exhaust fan tripped off, but was subsequently reset. The 3A and 3B reactor building vent fans were secured. It was noted that the reactor building atmospheric pressure was below outside atmospheric pressure. At 1158 hours, Unit 2 was put into shutdown mode. At 1208 hours, the 2C reactor building exhaust fan tripped off and could not be reset. The 2A reactor building vent fan was subsequently secured, and "A" standby gas treatment was started. Unit 3 began an orderly shutdown at a rate of 20MWe per hour. At 1300 hours, the load drop rate on Unit 3 was increased to 50 MWe per hour. At 2109 hours, Unit 3 turbine was tripped off line. At 2207 hours, Unit 3 reactor was put into refuel mode, cooling down at a rate of 50°F per hour. At 0505 hours on 12-1-74, 17 hours and 25 minutes after the occurrence, Unit 3 reactor was put into shutdown mode at a temperature of 211°F.

DESIGNATION OF APPARENT CAUSE OF OCCURRENCE (Other)

The Unit 2 and Unit 3 reactor buildings were apparently overpressurized due to the tripp off of the exhaust fans and failure of the vent fans to trip. The vent fans develop a total pressure of less than 9 inches of water (Ref. 4), or less than 47 pounds per square foot. A 30 m.p.h. wind can exert a vacuum pressure of at most 2.2 pounds per square foot, even accounting for gusting above the average velocity (Ref. 5). This totals 49.2 pounds per square foot.

The design blowout point of the panel is 70.0 pounds per square foot, which is determined by the aluminum restraining bolts that secure it. These bolts are certified to plastically deform at a specific tensile stress commensurate with 70 pounds per square foot (Ref. 3). The vent fans, even augmented by the wind, should thus be incapable of blowing out the panel. (It should require a wind velocity of at least 70 m.p.h., with the fans, to blow out the panel). The conclusion drawn is that the panel restraint bolts failed prematurely. Reactor building pressure transients following exhaust fan trips on windy days are not uncommon, and the cumulative straining of these bolts during their lifetime may have contributed to their premature failure.

Work request #11346 was issued to check the Units 2 and 3 reactor building vent fan pressure trip systems. This check completed on 11-30-74, revealed

that the systems will operate normally, i.e. the vent fans will trip off when the reactor building atmospheric pressure exceeds the outside atmospheric pressure by more than 1 inch of water (0.036 psi). This further lowers the apparent failure point of the blowout panel.

ANALYSIS OF OCCURRENCE

Secondary containment was breached, resulting in mandatory orderly shutdown of the operating unit. The probability of a reactor incident occurring during the time that the unit was operating and the secondary containment integrity was lost was no greater than under normal operating condition. The most probable potential hazard was the low level release of atmospheric contaminants, had the reactor building been in a condition of airborne radioactivity at the time of the incident. However, the reactor building airborne radioactivity levels were low at the time of the incident and no airborne radioactivity precautions were in effect. A possible secondary hazard was that the panel would disconnect completely from the building and fall to the ground, possibly injuring plant personnel. Outside weather conditions made it unlikely that personnel would have been in the area. In retrospect, no additional hazard to the health and safety of the public resulted.

CORRECTIVE ACTIONS

The immediate corrective actions were to stop refueling of Unit 2 and commence an orderly shutdown of Unit 3. Also, the ground area under the dangling panel and the interior area adjacent to the panel were roped off for safety to plant personnel. A work request (#11347) was issued to restore secondary containment integrity. This was accomplished by attaching cables to the bottom part of the panel and drawing the panel in with jacks. The cables and jacks remained in place to secure the panel. In addition, strong backs were utilized on the upper levels to further strengthen the panel. All edges joining the panel to the rest of the building were then caulked using a silicone rubber compound. Following the completion of the temporary repairs a check of secondary integrity was made. The results of this test demonstrated that the secondary integrity criterion was met.

The temporary repair of the blowout panel was resolved by communication between Commonwealth Edison and its consultant. The findings are summarized as follows:

1) Blowout panels make up approximately 50% of the total wall area.

2) The repairs represent approximately a 10% reduction of blowout panel area. This taken in light of the design margin will have no effect on the structure above the refueling floor. The roof panels are capable of relieving any excess pressure.

Subsequent to completion of the temporary corrective action summarized above and the secondary containment integrity test, an on-site review determined

that the conditions of 10 CFR 50.59 were met and startup was authorized.

A permanent repair program is forthcoming and the repairs will be reported in the semi-annual report following completion.

The blowout panel in question is an approximately 20-foot-square section of the reactor building superstructure west wall, fastened along the top and bottom edges by special aluminum restraining bolts on 6-inch centers to horizontal steel support beams. The remaining five panels were also inspected. All were in good condition with the exception of the south panel or the Unit 3 side where some bolts have failed. The condition of this panel has been evaluated. It has been concluded that its ability to perform its intended function has not been compromised. The south panel was originally installed, removed to bring in the Unit 3 reactor vessel and then reinstalled.

FAILURE DATA

No previous failures have been noted in this system.

Sincerely,

B. B. Stephenson
Superintendent

BBS:JGT:smp