Regulatory File Cy.

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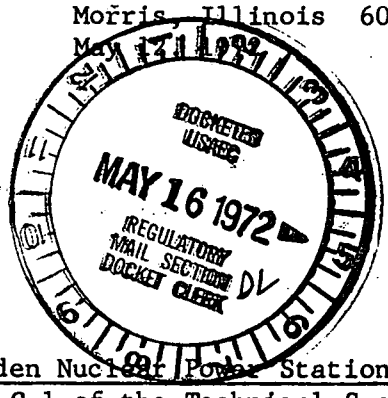
Dresden Nuclear Power Station
R. R. #1
Morris, Illinois 60450
May 13, 1972



Dr. Peter A. Morris, Director
Division of Reactor Licensing
U. S. Atomic Energy Commission
Washington, D.C. 20545

Subject: License DPR-19, Dresden Nuclear Power Station
Unit #2, Section 6.6.C.1 of the Technical Specifications

Reference: Letter to Dr. Morris from W. P. Worden on HPCI Flow Switches dated April 14, 1972.

Dear Dr. Morris:

This is to report additional information relating to the Peeco flow switches installed in Dresden 2.

PROBLEM AND INVESTIGATION

As a result of the recent discovery of a flow switch failure in the Dresden 2 HPCI system, (see reference) it was decided to inspect the additional thirteen Peeco flow switches installed in Unit 2.

The following Peeco switches were inspected and found to be intact:

(1) Cleanup system switches 2-1291-45 A & B and 2-1291-47
(2) Standby Liquid System switch 2-1151;
(3) Recirc pump seal switches 2-262-5A & B, 2-262-6A & B and 2-262-9 A & B.

The cleanup system switches are of the same type as the HPCI switch described in the reference letter. The Standby Liquid and recirc pump seal leak off switches are a different type (see attached sketch)

When the Shutdown Cooling System flow switches 2-1046'A, B, & C were inspected, it was found that all their paddles were missing.

An extensive search for the Shutdown Cooling Peeco switch paddles was initiated and two and a half of the three paddles were located. The "A" pump switch paddle was located in the Heat Exchanger while the "C" pump switch paddle was located in the suction strainer. Half of the "B" pump switch paddle was found in the Heat Exchanger. An

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examination of the "B" pump piping and "B" Shutdown Heat Exchanger was conducted to locate the 9 3/8" missing piece, without success. The paddles from the Shutdown Cooling System flow switches are stainless steel and have a cylindrical shpe, 3/8" diameter at one end, 3/4" diameter at the other end, and are about 14 3/8" long. (See attached sketch).

The rod extends through a flexure tube welded into a stainless steel ball fixture. Failure of all the shutdown cooling switches occurred at the point where the cylindrical shaped stainless steel paddle enters the body of the switch. Examination revealed that the paddles had broken off at this point.

In light of these Peeco flow switch failures, an inspection of Unit 3 HPCI flow switch was conducted immediately and no signs of damage were noted. The mounting screws were "peened over" to insure paddle integrity. The shutdown cooling flow switches on Unit #3 were not inspected since their paddles were removed during preoperational testing.

SAFETY ANALYSIS

A safety analysis was made to determine any possible effects of leaving the HPCI and Shutdown Cooling Peeco flow switch pieces in the systems and the following conclusions were reached:

(1) Shutdown Cooling System

The flow path downstream of the Peeco flow switch location follows a torturous path through long lengths of piping, elbows, valves, pump, heat exchanger and eventually to several places, the most important of which is the recirculation system piping.

There are many places for loose pieces to be retained. For instance, the flow stream goes through 1" diameter tubes in the heat exchanger, and one and one half pieces of the missing three switch paddles were found there. All other obvious places have been searched. The chances of the loose part flowing into the recirculation system through the torturous path, being pumped through the jet pump and into the lower planum of the reactor are small. However, for purposes of determining potential consequences, this is assumed to occur. Once swept into the lower planum of the reactor where coolant velocities in most locations are low because of the large clearances for coolant, the chance of a solid cylindrical metallic piece moving up and into a fuel flow passage are exceedingly small. Nevertheless, assuming that this does occur, the amount of fuel coolant channel blockage can be assessed. There are four 1½" to 2" diameter orifices leading to each fuel bundle. If the piece was still long enough and was forced against the orifice opening lengthwise, it would be partially

blocked and the other orifices would still be open. If the piece went through the opening end wise, it could travel up and lodge against the lower surface of the lower plate. This plate has 36 holes 3/8" diameter for flow distribution and has cross sectional area of the fuel bundle. Only a few of these holes can be blocked by the loose piece. Since it takes more than a 90% flow area reduction to cause a MCHFR 1.0, there are no severely damaging operating conditions associated with the as before described postulated possibilities. If the loose piece were worn down to the point where it could pass through one of the tie plat holes, it could become lodged in a fuel coolant passage and cause fuel overheating at a localized point in the fuel bundle. Failure of the fuel rod affected would not release sufficient radioactivity to do more than cause an offgas or other monitoring system alarm, allowing ample time for appropriate operator action. If failure of more fuel rods from multiple plugging is assumed, this would cause automatic isolation of the reactor or offgas system; and even an inconceivable failure of all 49 rods would not result in guideline values of 10 CFR 20 being exceeded.

Thus, the postulated sequence of events would not result in any safety problem and the chances of any observable effects are exceedingly small.

(2) HPCI System

The flow path downstream of the location of the Peeco flow switch is also long, torturous, and goes through pumps, valves, elbows, etc. There are also branches in it with lines leading to the condensate storage tank and the torus as well as to the reactor. (Attached to the feedwater line) In this case, the only time when the line to the reactor was open early in the startup program during the same time period when the flow switches had been observed to be all right. Thus, it is most likely that the missing has been swept on into one of the other systems where it is not likely to be moved by other torturous paths into the reactor.

However, in the unlikely event that the piece has gone or does go into the reactor pressure vessel and does reach fuel bundle inlet openings, the statements provided above for the Shutdown Cooling System would also apply here.

The safety analysis has been reviewed and approved by the Station and Nuclear Review Boards.

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CORRECTIVE ACTION

The Peeco switchee will be replaced in the near future by differential pressure type. Until then all the remaining Peeco switches on Unit 2 have had the ends of the mounting screws "peened over" to prevent them from vibrating out. The paddles in the Shutdown Cooling System have been removed.

Sincerely,

Fred S. Morris
for W. P. Worden
Superintendent

WPW:sds

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