



Wisconsin Electric POWER COMPANY
231 W. MICHIGAN, P.O. BOX 2046, MILWAUKEE, WI 53201

June 27, 1984

Mr. H. R. Denton, Director
Office of Nuclear Reactor Regulation
U. S. NUCLEAR REGULATORY COMMISSION
Washington, D. C. 20555

Attention: Mr. J. R. Miller, Chief
Operating Reactors, Branch 3

Gentlemen:

DOCKET NO. 50-266
HOT ROD DROP TESTS
POINT BEACH NUCLEAR PLANT, UNIT 1

This is to inform you of the results of the hot control rod drop testing conducted prior to startup of Point Beach Unit 1 Cycle 12.

Control rod drop tests in the hot full flow condition were completed at 2050 hours on April 6, 1984. The test results were satisfactory and all drop times were within Technical Specification limits.

Although not required by the Technical Specifications, Point Beach routinely conducts rod drop tests in the hot, zero flow condition. While performing these tests at 2145 hours on April 6, the control rod at core location H-6 in control bank "B" did not drop. Several unsuccessful attempts to drop the rod were made by pulling the stationary gripper coil fuse. Then an attempt was made to step the rod in five steps and out five steps according to the bank step counter. No motion was indicated by the rod position indicator. A subsequent attempt to drop the rod failed. The fuse was again pulled without success. Finally, opening the reactor trip breaker was also unsuccessful in causing the rod to drop. The rod was verified to be fully withdrawn by observing the characteristic signal in the stepping trace while stepping the rod out.

After cooldown to a temperature less than acceptable for performing the test, one reactor coolant pump was started to heat up a few degrees. The reactor trip breakers were opened again and the rod dropped. The trip breakers were closed and stepping traces verified that rod H-6 had dropped.

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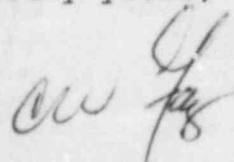
The second reactor coolant pump was started to bring the reactor coolant system back up to temperature before continuing the rod drop testing. After reaching an acceptable temperature, both reactor coolant pumps were secured. The hot, zero flow rod drop tests were completed without further incident. After the normal zero flow rod drops were completed, H-6 was dropped three additional times at zero flow with no abnormalities. Since proper behavior of the rod had been verified by dropping it several times, the normal sequence for recovering from the outage was resumed. The Senior Resident Inspector was notified of this event.

The failure of H-6 to drop has been attributed to magnetite crud binding the drive mechanism, even though a nitrogen purge was maintained on the head to the extent possible during the six month refueling and steam generator replacement outage. This was apparently an isolated case which cleared up as the mechanism working environment returned to normal.

Additional information which is pertinent to the failure of rod H-6 to drop includes the following. The fact that the rod was fully withdrawn indicates that there was probably no hangup in the internals in this location. There was no split pin nut missing at H-6. The guide tube removable insert flexure pins were intact. The other cold and hot rod tests of H-6 showed normal results. Rod exercises were conducted at power weekly for four weeks following Unit 1 startup. No abnormality was observed.

Attachment "A" is a listing of control rod stepping problems in Unit 1. Attachment "B" summarizes the reactor vendor's experience with similar incidents.

Very truly yours,



Vice President-Nuclear Power

C. W. Fay

Attachments

Copy to NRC Resident Inspector

ATTACHMENT A
POINT BEACH NUCLEAR PLANT, UNIT 1
CONTROL ROD STEPPING PROBLEM HISTORY

- 12/31/70 - H-6 would not move until lift coil energizations were performed manually for 10 steps. This enabled a longer lift time to be effected. It then stepped normally.
- 02/28/73 - Eight control rods did not step properly. After tripping the rods in, the stepping test was repeated. This time the rods stepped normally. The cause was postulated to be abrasive oxide which had built up during the period between reactor vessel head replacement and reactor coolant system fill and vent.
- 03/30/75 to
04/07/75 - Some 25 control rod drives stuck and could not be stepped. The sticking occurred as reactor coolant temperatures were raised during heatup. The higher the temperatures were raised, the more the number of rods that began sticking increased. The cause was attributed partly to crud getting into the drive mechanisms during recovery from a long shutdown with the reactor vessel level at half pipe. The drive mechanisms freed up following hydrazine injection down the control rod drive mechanisms housings. The cause was also partly attributed to differential thermal expansion between mechanism parts acting in conjunction with the crud and reducing mechanism operating clearances. One drive mechanism was removed and evaluated by the reactor vendor. The vendor was unable to find anything obviously wrong with the mechanism although it seemed to have a greater than normal amount of black oxide in the mechanism.
- 11/20/79 - While withdrawing rods for hot rod drops, 5 control rods did not move at various times. About 8 hours later, after cooling down about 40°F, all the rods started moving again. The reactor vendor was consulted. One vendor engineer had previously investigated sticking problems and had come to the conclusion that the problems were caused by differential expansion between the stainless steel internals and carbon steel vessel head during heatup. This might explain why the rods had operated properly cold, began sticking following heatup, and started moving again after the reactor coolant system had been at or near operating temperature for some time.
- 12/12/79 - While withdrawing rods for cold rod drop tests, H-6 gave no indication of movement. However, subsequent visicorder traces indicated the stepping mechanism was functioning properly.
- 12/21-
22/79 - H-6 did not move during rod exercises prior to heatup. The rod position indicator was verified operable. H-6 began moving again when the system was heated up to 300°F.

ATTACHMENT B

VENDOR SUMMATION OF CONTROL ROD INCIDENTS

The reactor vendor was asked to furnish a summary of vendor experience with control rod drive incidents.

The following tabulation was furnished:

| <u>Cause</u> | <u>Number of Incidents</u> |
|-----------------------|----------------------------|
| Debris | 10 |
| RCCA/Vane Malfunction | 10 |
| CRDM | 2 |
| Fuel Assembly | 2 |
| Drive Shaft | 1 |
| Unknown | <u>3</u> |
| TOTAL | 28 |