



Rensselaer

August 7, 1991

Department of Nuclear Engineering & Engineering Physics

U. S. Nuclear Regulatory Commission
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Washington, DC 20555

Subject: Corrective Actions for July 31, 1991 Reportable Occurrence

Reference: Letter to USNRC from D. R. Harris dated 8/1/91

On July 31, 1991 at 1:00 PM there was a Reportable Occurrence (Technical Specification 1.Q.4, . . . safety system component failure . . .) at the Rensselaer Polytechnic Institute Reactor Critical Facility. The referenced letter described the incident and the immediate actions taken. This letter will describe additional corrective actions that will improve the system and prevent recurrence.

The cause of the failure has been identified as excessive wear to the brass gears that drive the coarse position indicator and limit switch system. The wear was such that the gears could slip teeth when the rod was dropped. This caused the coarse position indication to read incorrectly and the out-limit switch to activate at the incorrect rod height. The gears are made of brass in order to prevent damage to the rod drive shafts and motors in the event of failure of the in-limit switch.

Several actions are being taken to prevent recurrence of this incident:

- 1) Scribe masks have been placed on the brass gear that drives the limit switch/coarse position indicator system and the matching gear on the drive shaft. When the rod is at the mechanical rod bottom position, the scribe marks coincide. After the functional rod drop test has been completed in the daily check, the correspondence of the scribe marks will be checked as part of the daily pre-startup checks. This action has been completed.
- 2) During the semiannual rod drop surveillance tests, the actual withdrawal height when the rod is at the out-limit will be checked. This check will be added to the rod drop surveillance check procedure.
- 3) A limit switch will be added to the rack that raises the rod. The action of this limit switch is independent of the gears in question. This limit switch will activate in the range 37.0 - 37.5 inches, one inch above the normal out-limit switch activation point. This limit switch will stop the rod drive motor and prevent

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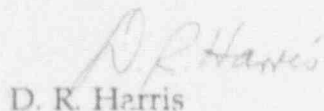
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further withdrawal just as the current out-limit switch does. The two limit switches will be wired in series so that either limit switch can stop the out-motion of the rod. The operator will be able to identify which limit switch has activated by the coarse position indication at the point where the switch activates and the rod stops moving. In addition, the normal out-limit switch that activates at 36.0 - 36.5 inches will light the rod out-limit indicator with a steady light. The second limit switch will activate the red out-limit indicator with a flashing light. The second switch gives a positive indication of the rod position and is independent of the gear train in the coarse position indicator/limit switch assembly.

- 4) Proper operation of the second out-limit switch will be checked as part of the rod drop surveillance check.
- 5) The rod drop surveillance check procedure and daily pre-startup check procedures will be modified to reflect these changes.
- 6) The operating procedures will be modified to include corrective actions to be taken in the event that the second out-limit switch activates.



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