



University of Lowell

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May 20, 1991

U.S. Nuclear Regulatory Commission
Region I
Document Control Desk
Washington, D.C. 20555

Dear Sir,

On May 7, 1991 the University of Lowell reactor was operated at 1 MW for about 15 minutes without all core grid positions filled. This is a violation of our operating license, specifically, Technical Specification 3.1.3 which states "The reactor shall not be operated unless ... All core grid positions are filled with fuel elements, irradiation baskets, source holders, regulating rod, graphite reflector elements or grid plugs." At approximately 8:15AM the reactor was started up with one of the radiation baskets removed from the core. The basket had been removed from the core after the previous reactor run to remove a flux wire and had not been replaced in its position. The reactor operator performing the pre-critical checkout (Procedure RO-9) failed to notice the open core position. The procedure does call for the operator to verify all core positions filled. During subsequent loading of samples to the reactor core after the reactor startup, this same operator noted the open core position, and the reactor was immediately shutdown. The NRC was notified by telephone and an emergency meeting of the Reactor Safety Sub-committee(RSSC) was called.

The RSSC analyzed the effect of this open position on the reactor core to determine if any Safety Limit was exceeded. Normal flow through a basket is approximately 18 gal/min and has a cross sectional flow area of approximately 3.2 sq in. With the basket removed this cross sectional flow area increases to less than 9 sq. in. If we assume the flow varies directly with the flow area, the resultant flow through the open position is about 60 gal/min. or

about 42 gal/min being diverted from the rest of the core. Since flow at the time of the incident was 1600 gpm and our Safety Limit for 1MW operation is 1200 gpm, we could not have exceeded our Safety Limit.

The following steps have been implemented to assure that this will not happen in the future:

- 1) Procedure RO-2 "Reloading The Core to a Known Configuration" has been revised to include all core manipulations not just fuel movement. This revision also includes a requirement that the core status board be updated after all movements.
- 2) Procedure RO-9 "Reactor and Control System Checkout" has been revised to require that the SRO review previous core manipulations and if there have been any manipulations, that he independently verify proper core loading. This is in addition to the verification during the actual system checkout.
- 3) This incident has been reviewed with the operating staff to ensure their understanding of the potential significance of this type of error.

If you have any questions concerning this event, please contact me at (508) 934 3365.

Sincerely yours,



Thomas J. Wallace,
Reactor Supervisor