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SCHOOL OF ENGINEERING AND APPLIED SCIENCE  
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ATLANTA, GEORGIA

DEPARTMENT OF NUCLEAR ENGINEERING AND ENGINEERING PHYSICS  
REACTOR FACILITY

TELEPHONE: 804-924-7136

*July 1*  
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June 30, 1983

Mr. James P. O'Reilly  
U.S. Nuclear Regulatory Commission  
Suite 2900  
101 Marietta Street, N.W.  
Atlanta, GA 30303

Re: Docket No. 50-62  
License No. R-66

Dear Mr. O'Reilly:

This letter is to amend the June 9, 1983 letter informing you of a reportable occurrence as required by the UVAR Technical Specifications, Facility License R-66, Docket No. 50-62. The continuing investigation following the incident now indicates that the period of operation with a shutdown margin lower than the Limiting Condition of Operation (LCO) shutdown margin was longer than originally reported in the June 9, 1983 letter.

The June 9, 1983 letter detailed the results of our initial investigation of the reportable occurrence involving reactor operation with a shutdown margin below the 0.4%  $\Delta k/k$  LCO shutdown margin. This initial investigation indicated that the UVAR had been operated for a 16 hour and 25 minute period beginning on May 25, 1983 with a shutdown margin of 0.19%  $\Delta k/k$ . This was due to an error in assessing the reactivity worth of a partial fuel element which was added while the reactor core was not xenon-free (as defined by the section 3.1.0 definition of Reactivity Limits). The error was discovered on May 30, 1983, when the shutdown margin was determined with the reactor core in a xenon-free condition. After a series of measurements of the reactivity worth of several experiments and graphite elements, as experiment was removed from the reactor core region and the shutdown margin measured to be 0.71%  $\Delta k/k$ . The reactor was then taken to a 2 megawatt power level at 9:48 pm on May, 30, 1983. The reactor was operated with this core loading until it was shutdown on June 6, 1983.

Messrs M. Shymlock and J. Leachman of your office were at our facility on June 2 and June 3, 1983 to investigate the incident. It was concluded that the UVAR should be shutdown on or before Tuesday, June 7, 1983 at the conclusion of an experimental run. Additionally, before resuming full power reactor operation, the control rod worths should be remeasured, and procedures for shutdown margin and experimental

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reactivity worth determinations be written, and subsequently reviewed and approved by the Reactor Safety Committee (RSC).

The RSC has met on June 9, June 16 and June 22, 1983 to review both the existing and proposed changes to the UVAR Standard Operating Procedures (SOP). An additional meeting was held on June 27, 1983. The UVAR has only been operated at low powers to perform these measurements and calibrations since it was shutdown on June 6, 1983.

As reported in several telephone conversations with Austin Hardin since June 13, 1983, we had tried to reconstruct numerous fuel and experiment loadings to measure reactivity worths and to calibrate control rod worths. Based on the data collected from June 9, 1983 through June 29, 1983, we now feel that the control rod reactivity worth curves which were used from December 1982 through June 6, 1983 were not applicable for the last portion of this period. Thus, our analysis now indicates the UVAR was operated with a shutdown margin below 0.4%  $\Delta k/k$  from May 18, 1983 through June 6, 1983. The changes in control rod worths resulted from fuel burnup, and the insertion and removal of experiments, fuel elements (to offset burnup), and graphite elements.

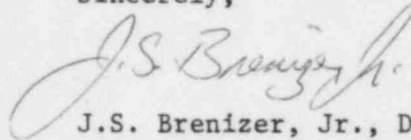
The UVAR was operated for 3844 MW-hrs between December 20, 1982 and June 6, 1983. We have evaluated the cores used from May 16, 1983 through June 6, 1983. The total operation over this period was only 558 MW-hrs, and thus, we feel that the control rod calibrations and reactivity measurements made after June 9, 1983 are valid. It is not possible to experimentally evaluate the fuel and experiment loadings used between December 1982 and May 1983 due to fuel burnup. Based on both the December 20, 1982 and similar June, 1983 calibration curves, the core used between May 16, 1983 and May 18, 1983 had a shutdown margin of greater than 0.4%  $\Delta k/k$ . We have concluded that the loadings preceding the May 16, 1983 loading probably had shutdown margins above 0.4%  $\Delta k/k$  also, as the only significant change between the December 20, 1982 loading when the control rods were calibrated and the subsequent loadings until the May 16, 1983 loading was the addition of 1 full fuel element and 1 partial fuel element.

The staff has rewritten the operations section of the UVAR SOP to address the areas discussed in the June 3, 1983 NRC exit interview. Procedures have been written and approved by the RSC on June 22 and June 27, 1983 for shutdown margin and experiment reactivity worth determination. In addition, criteria have been added to determine what constitutes a core configuration change, and when control rod calibrations must be performed.

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I am confident that these changes in the UVAR SOP will prevent a reoccurrence of this type of incident in the future.

Sincerely,

A handwritten signature in cursive script, appearing to read "J.S. Brenizer, Jr.", is written over the typed name.

J.S. Brenizer, Jr., Director  
UVAR Reactor Facility