



October 16, 2000

Nuclear Regulatory Commission  
Document Control Desk  
Washington, DC 20555

Re: Reportable Occurrence: Violation of Tech Spec 3.2.3 and 3.2.4  
License No. R-2, Docket No. 50-005

Dear Sir or Madame:

This 14-day report is being submitted in accordance with Sections 6.5.2 and 6.6.2 of the PSBR Technical Specifications (TS). Initial verbal notification of this reportable occurrence was made to Marvin Mendonca, NRC Headquarters, and Tom Dragoun, NRC Region 1, at approximately 1330 hours on October 4, 2000. This telephone notification was confirmed in writing the same day with copies mailed to the Document Control Desk as well as to Mendonca and Dragoun.

TS 3.2.3 states: "The reactor shall not be operated unless the measuring channels listed in Table 1 are operable." TS 3.2.4 states: "The reactor shall not be operated unless all of the channels and interlocks described in Table 2a and Table 2b are operable." A violation of TSs 3.2.3 and 3.2.4 occurred when the power range channel (PR) was inoperable while the reactor was not secured during approximately 30 minutes of operation on October 4, 2000.

#### Description of Event:

On October 4, 2000 at approximately 1028 hours a routine startup for operation at 700 kW was in progress when a reactor stepback, due to a mismatch in power indication between the two power measuring channels, was received. The stepback drives the safety, shim, and regulating rods to their lower limits. Upon receipt of the stepback the reactor operator took steps to drive the transient rod in, secured the reactor and notified the duty SRO. The reactor stepback was caused by the lack of signal on the PR. When the indicated power on the wide range channel (WR) exceeded the deviation setpoint between the PR and WR, the stepback was produced. After the reactor was secured appropriate management and maintenance personnel were notified and a "Do Not Operate" (DNO) tag was placed on the reactor console.

#### Review of the Event:

The initial investigation determined that the signal and HV cables for the PR channel were separated from their connectors in the area under the floor of the reactor bridge. Further investigation determined that on the previous day, October 3, 2000, during a movement of the reactor bridge the high voltage and signal cables for the PR had been stressed and the cables pulled out of the connectors. The reactor was secured at the time and the separation was not observable by normal observation. No operations took place after the failure on that day. A normal checkout was performed prior to operation on October 4, 2000. The checkout can not and did not detect the loss of cabling. On October 4, 2000 prior to the startup during which the stepback took place the reactor was started (~0917 hours), operated at 3 kW, and shutdown (~0939 hours). This power level is not sufficient to produce a reading on the PR channel and thus the failure was not detected.

At approximately 1020 hours a startup for operation at 700 kW was begun; at the time of the stepback the reactor was in AUTO control on a period of ~20 seconds and at a power level of approximately 329 kW. Upon initiation of the stepback, the three rods began insertion thus reversing the power increase and shutting down the reactor. The maximum power reached was 329 kW. The stepback setpoint is 300 kW. The stepback function requires ten cycles of verifying the deviation (slightly over two seconds) before initiation of the stepback. Due to the characteristics of the gamma chamber that provides the signal for the PR, it was essentially impossible for the operator to have detected there was no signal prior to the time of the stepback.

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Interviews of operations personnel involved with the activity on the preceding day which produced the cable separation, as well as with the personnel involved with reactor operations on the morning of the event were conducted. The historical trend capabilities of the console were utilized to correlate the results of those interviews with the event to assure that all aspects were addressed and understood.

It was determined that repairs for abrasion of the PR cabling in September, 1999 had resulted in shortening the cables by about six inches thus leading to the stress when the reactor bridge was moved to the extremes of travel.

Corrective and Preventative Actions:

The affected cables were replaced; other bridge wiring was checked for similar stressing; the physical stops for movement of the bridge as well as the cable allowance for such movement were checked, and the physical stops moved to provide more protection against stressing the cables. The replacement cables are of sufficient length to prevent stress at the extremes of movement.

After the cable replacement, testing was conducted to verify proper operation. The testing included console checkout and controlled operation at power with comparisons against hourly readings from prior operation. Following that testing and the verification that the PR was fully operational, the oncoming operators were briefed and authorization was given for return to normal operation at 1734 hours on the afternoon of October 4, 2000.

The event as well as corrective and preventative actions were reviewed with the operating staff at a status meeting on October 5, 2000 and again during a requalification training session on October 6, 2000.

If you have any questions regarding this event, please call Dr. Sears, the RSEC Director, at 814-865-6351.

Sincerely,



Dr. Eva J. Pell  
Vice President for Research  
Dean of the Graduate School

cc: Mendonca (NRC Headquarters)  
Dragoun (NRC Region I)  
Sears (RSEC Director)  
Burton (Assoc. Dean, College of Engineering)  
Sathianathan (PSRSC Chairman)  
Flinchbaugh (RSEC Manager, Operations & Training)

