



STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS

RHODE ISLAND ATOMIC ENERGY COMMISSION

Nuclear Science Center
South Ferry Road
Narragansett, R.I. 02882-1197

February 25, 1988

U. S. Nuclear Regulatory Commission
Region 1
475 Allendale Road
King of Prussia, Pa. 19406

Attn: Edward C. Wenzinger, Chief
Projects Branch No. 3

License R-95
Docket 50-193

Gentlemen:

This letter concerns the description of the servo regulating element which is contained in the technical specifications of the Rhode Island Nuclear Science Center reactor. Some of this information was transmitted to Mr. Ebe McCabe by telephone at about 1120AM on February 8, 1988.

This facility is in the process of retyping the technical specifications for this reactor in order to incorporate all approved amendments into the body of the specifications. During the proof reading of the retyped specifications, a staff member brought to my attention a possible discrepancy in the description of the servo regulating element. This occurred on February 8, 1988.

The servo regulating element is described in several places in the technical specifications. The following specifications are pertinent to this letter.

Page 9: The stroke of the element is 26 inches maximum.

Page 27: The maximum reactivity addition rate by the servo regulating element is 0.0002/sec.

Page 27: The maximum worth of the servo regulating element is 0.007.

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Page 29: The servo regulating element drive withdrawal rate shall not be more than 78 inches/minute.

These four specifications have never been amended and are part of the original technical specifications. In addition, the hardware to provide the performance according to these specifications is as originally installed in the reactor system (except as described later in this letter) and has had only comparable component replacement during maintenance.

When the servo regulating element is withdrawn with the reactor in manual control, its speed is the 78 in/min as described in the technical specifications. When the servo regulating element is withdrawn by the servo system with the reactor in automatic control, the speed varies from 78 in/min for large corrections to about 19 in/min for small corrections. The operation of the servo system is such that only small corrections are necessary to maintain constant power.

This reactor is normally operated using the automatic servo mode. For the rare occasions when operation has continued following failure of the servo system, reactivity changes to maintain constant power have been achieved using a control element.

Using the four specifications stated above, the maximum reactivity addition rate when the element is withdrawn manually is 0.000699/sec obtained as follows:

The average worth of the element is 0.007/26 or 0.000269/in average.

Assuming a peak/average of 2 in the worth of this element, this becomes 0.000538/in maximum.

Therefore, 0.000538 times 1.3 in/sec is 0.000699.

For servo operation, however, the maximum reactivity rate can be as low as 0.000175/sec obtained by using 1/4 the drive speed.

Because of this and because the technical specifications always refer to a "servo regulating element" (instead of a

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"regulating element"), we believe that the 0.0002/sec was intended to refer to only the servo operation of the reactor.

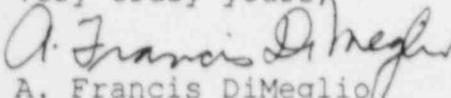
The start up procedure for this reactor requires that the servo regulating element be fully withdrawn before control elements are withdrawn. This is because the reactor can only be switched to automatic control if the servo regulating element is at its up limit. In addition because it is physically possible to move the servo regulating element at full speed when the reactor is not in servo control, we decided to change the gear box between the drive motor and the servo regulating element so that the condition of 0.0002/sec would not be exceeded for any mode of operation. On February 9, a new calibration for the regulating element was experimentally determined. On February 9 and 10 a replacement gear box was selected and ordered. The replacement arrived on February 12 and was installed before startup on February 15, 1988.

The maximum differential worth of the servo regulating element was determined to be 0.0004/in. The withdrawal speed of the servo regulating element with the new gear box was measured as 28.6in/min. Therefore the maximum reactivity addition rate cannot be more than 0.00019/sec. When operating in servo, the addition rate will be a value up to 0.00019/sec.

It should be noted that following the discussion with Mr. McCabe on February 8, 1988, the reactor was operated in servo control with the servo regulating element positioned so that even at the original full speed, the reactivity addition rate could not exceed the specification.

Thank you for your consideration.

Very truly yours,


A. Francis DiMeglio
Director

cc: T. Michaels, NRC Headquarters
RIAEC
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