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ADDITIONAL INFORMATION ON THE PROPOSED CHANGE TO
THE SCRAM INSERTION TIME
TECHNICAL SPECIFICATION 3/4.3.C (TAC No. 60217)

In response to an October 22, 1987 NRC request, this letter's attachment provides additional information supporting Boston Edison's November 19, 1985 proposed change to Pilgrim Nuclear Power Station Technical Specification 3/4.3.C.

The attachment also withdraws information provided in our February 18, 1987 letter.


R.G. Bird

Attachment: Responses to NRC Questions on the Proposed Scram Insertion Time
Technical Specification Change

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NRC Question

This change appears to reduce the probability of detecting unsatisfactory performance (i.e., beyond allowed insertion time) of a control rod: Why is the reduction not significant?

Responses

The probability of detecting scram insertion times which exceed technical specification limits will be decreased.

For technical specifications 3.3.C.1 and 3.3.C.2, which concern average scram insertion times, the decrease in probability will depend on the magnitude by which the mean scram times exceed the technical specification limits as well as on the distribution of scram times for the individual control rods. Since a review of past records indicates that technical specification 3.3.C.1 and 3.3.C.2 have never been violated at PNPS, no data is available to quantify the change in probability.

For technical specification 3.3.C.3, which restricts the maximum scram insertion time for 90% insertion to 7.00 seconds or below, the probability of detecting scram insertion times which exceed technical specification limits varies directly with the sample size. Thus, reducing the sample size from 50% to 10% serves to decrease the probability of detecting excessive scram insertion times by a factor of five (5).

Although a reduction of the sample size decreases the probability of detecting excessive scram insertion times, the decreased probability is not a safety concern; technical specification 4.3.C.2, which describes the surveillance frequency, is only meant to provide a qualitative indication of any deterioration in control rod performance during a cycle. The quantitative assessment of control rod performance for technical specification section 3/4.3.C is obtained through the section 4.3.C.1 surveillance, which requires measurement of the scram insertion times for all operable control rods following each refueling outage, but prior to exceeding 40% of rated core thermal power.

We conclude that a 10% sample size is adequate to qualitatively assess whether any deterioration of control rod performance has occurred during a cycle. This conclusion is based on the following:

1. A review of over 1000 scram time measurements for the period April 25, 1980 to May 2, 1985 indicates PNPS scram times have always been below technical specification 3.3.C limits.
2. The same data indicates PNPS scram times have never experienced significant deterioration during a cycle.
3. Slow deterioration of scram insertion time, coupled with the large margin between past recorded PNPS scram insertion times and technical specification limits, indicates adverse trends would be detected before technical specification 3.3.C limits are exceeded.

4. The sample size is a reasonable compromise between the need for surveillance of scram speeds during a cycle and the increased wear and tear on components more frequent surveillances would entail.
5. A 10% sample size is specified in the Boiling Water Reactor Standard Technical Specification (STS).
6. There is no reason to expect a sudden deterioration in scram times during a cycle.

NRC Question

Does industry-wide data on out-of-specification scram insertion times indicate reduced probability of detection will result from reducing the sample size from 50% to 10%?

Response

BECO contacted GE for information on out-of-specification scram insertion times. GE responded it did not have such data, and stated the sample size found in STS is a compromise between the need for surveillance of scram speeds and the minimization of surveillance induced wear and tear on equipment. GE emphasized that this sample size was not based on a statistical analysis of scram insertion times.

In response to our "Nuclear Network" inquiry, other utilities reported they had not experienced out-of-specification scram insertion times.

The reduced probability of detection resulting from a reduced sample size cannot be determined precisely because insufficient failure data is available. However, this lack of data implies exceeding scram time limits is not a frequent occurrence.

Information Withdrawal

We withdraw our February 18, 1987 letter on this issue because further review indicates the statistical methodology supporting the letter used an inappropriate assumption.