



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

JUN 25 1982

MEMORANDUM FOR: Joseph D. LaFleur, Jr., Assistant Director for  
International Cooperation

FROM: W. F. Kane, Project Manager, Licensing Branch No. 1, DL

SUBJECT: EXPERT REVIEW OF KRSKO STEAM GENERATOR CHANGES

On June 18, 1982 you forwarded a Telex which requested responses to four additional questions related to the subject changes. This memorandum responds in part to questions 1 and 2 and in full to questions 3 and 4. Our expert in this area, R. Kendall, has contacted Westinghouse regarding questions 1 and 2 and complete responses should be available in a few days.

Question 1 Which Westinghouse U. S. plants are operating without the low feed flow trip (steam flow/feed flow mismatch and low steam generator level)?

Answer 1 A substantial number of operating reactors designed by Westinghouse have been modified to delete the low feed flow trip. A list of the specific plants which have incorporated this modification is not available at this time. We have forwarded a request for this information to Westinghouse, and anticipate a response in the near future.

Question 2 From which Westinghouse U. S. operating plants was the low feed flow trip deleted prior to an OL and after an OL?

Answer 2 The low feed flow trip has been deleted from a number of Westinghouse plants with OLs. A list of specific plants from which this trip function was deleted subsequent to issuance of an OL is not available at this time. We have forwarded a request for this information to Westinghouse and anticipate a response in the near future. This trip function has been deleted from all Westinghouse plants, starting with the SNUPPs plants (Callaway Units 1 & 2 and Wolf Creek Unit 1), which have applied for an OL.

Question 3 What is the present NRC position with respect to the low feed flow trip? In case of deletion, are there any alternate means of protection?

Answer 3 The low feed flow trip function was added in Westinghouse-designed reactors because the steam generator low-low level trip did not meet the control/protection system interaction criteria of IEEE Standard 279-1971 (Section 4.7). Specifically, one of the level channels used for the low-low level trip function was also used for steam generator level control. Therefore, a failure of the channel controlling steam generator level (the initiating event) in conjunction with a single failure in one of the two remaining level channels, would preclude a low-low level trip. Thus the

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feed flow trip was added to meet regulatory requirements. The Westinghouse fix was to add another steam generator low-low level channel for level control which is independent of the protection system channels, such that the low-low level trip function in itself complies with the requirements of IEEE-279. In addition, the low feed flow trip input to the reactor protection system was replaced with a high steam pressure rate signal which is time delayed to prevent spurious trips. This alleviated operational problems of frequent spurious trips from the low feed flow function. The NRC staff position is that this modification is acceptable.

The alternate means of protection is the high steam pressure rate trip function which replaced the low feed flow trip function. In addition, all trip functions diverse to the steam generator low-low level trip have remained unaffected by deletion of the low feed flow trip.

Question 4      Where there any best estimate comparative analysed performed for the loss of feedwater accident for the case of the low-low steam generator level trip versus the low feed flow trip?

Answer 4      The Westinghouse accident analyses have never taken credit for the low feed flow trip for the mitigation of anticipated operational occurrences or accidents. Credit is taken for the steam generator low-low level trip instead. The low feed flow trip occurs prior to a steam generator low-low level trip and is therefore considered to be an anticipatory trip which is not required for safety ~~but~~ which did provide additional margin.

  
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