



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

JUL 6 1982

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

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. In my memorandum to you dated June 25, 1982 preliminary responses were provided for questions 1 and 2 and complete responses for questions 3 and 4. Since that time, further information was received from Westinghouse. ~~The following responses to questions 1 thru 4 supersede those provided in my June 25, 1982 memorandum.~~

- 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 Based on discussions with Westinghouse only McGuire, Unit 1 is operating without the trip. We were informed that it has been proposed for deletion on several other operating plants.
- 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 Based on discussions with Westinghouse the trip was deleted on McGuire, Unit 1 prior to the OL. Westinghouse was not aware of any plants for which the trip was deleted after the OL. The trip has been proposed for deletion on most Westinghouse plants currently under operating license review.
- 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 system/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 low 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. The NRC staff position is that this modification is acceptable. 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.

An 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 Were there any best estimate comparative analyses 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 No. 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.

Sincerely,



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