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U. S. Nuclear Regulatory Commission
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Subject: Indian Point 3 Nuclear Power Plant
Docket No. 50-286
Methodology for Postulating Service Water System (SWS) Breaks

References:

(1) Letter from NYPA (J. C. Brons) to NRC, dated November 13, 1987, (IPN-87-053), transmitting the Authority's Responses to Safety System Outage Modification Inspection (SSOMI) Report 50-286/87-013.

(2) Letter from NYPA (J. C. Brons) to NRC, dated December 30, 1987, (IPN-87-061), entitled: Revisions to Previous Authority Letters, correcting editorial errors made in Attachment 2 to Reference (1) above.

(3) Letter from NRC (S. A. Varga) to NYPA (J. C. Brons), dated September 8, 1987, entitled: Safety System Outage Modification Inspection (Design) 50-286/87-013.

Dear Sir:

This letter submits, for the Commission's review and approval, the Authority's revised methodology for postulating single passive failures of the Indian Point 3 (IP-3) Service Water System (SWS) piping during post-LOCA recirculation. Submittal of a revised methodology was proposed in the Authority's responses to the Safety System Outage Modification Inspection (SSOMI) findings 2.3.1 and 2.8. The responses were transmitted by References (1) and (2). Information supporting the Authority's revised methodology is presented in Attachment I. This Attachment was previously transmitted to the Commission as Attachment 2 to Reference (1) and subsequently corrected by Reference (2). Additional revisions to the Attachment are indicated by bold solid lines in the right margin.

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The Authority proposes the utilization of limited size breaks (through-wall leakage cracks) in the analysis of passive failures of SWS piping during the post-LOCA recirculation phase. Postulating guillotine and slot ruptures in the SWS piping is overly conservative. The Indian Point Probabilistic Safety Study (IPPSS) underscores the fact that the probability of failure of the service water piping during the critical 24 hour period after a LOCA is so low that it does not constitute a credible event. Additionally, crack locations and sizes postulated under the guidance of Standard Review Plan (SRP) Sections 3.6.1 and 3.6.2 are applicable and bounding in terms of the consideration of passive failures as addressed in SECY-77-439 and ANSI/ANS58.9-1981, and are thus applicable to the IP-3 SWS pipe failure analysis.

In accordance with the IP-3 Licensing basis and as stated in the IP-3 Final Safety Analysis Report (FSAR), the SWS was designed to provide a continuous flow of cooling water to those systems and components necessary for plant safety either during normal operation or under abnormal and accident conditions. During accident conditions, the SWS must provide the cooling water necessary to allow the engineered safety features to perform their intended function when subjected to:

a. The single failure of any active component used during the injection phase of a postulated Loss-of-Coolant Accident, or

b. The single failure of any active or passive component used during the long-term recirculation phase.

Reference (3) provided the NRC's findings and conclusions of the design portion of the IP-3 SSOMI. The findings described in subsections 2.3.1 and 2.8 of the SSOMI Report noted a discrepancy between the network utilized for the SWS break study presented in Subchapter 9.6 of the IP-3 FSAR, and the actual system configuration. The model used for the break analysis presented in the FSAR took credit for backflow through the diesel generator coolers. It was noted, however, that the presence of two check valves, one on each main SWS header, prevents backflow under certain break conditions. Specifically, if during post-LOCA recirculation a guillotine break is postulated in the 24-inch essential service water header upstream of the pump discharge check valves, service water flow would be lost to 2 of the 3 emergency diesel generators. Two of the three diesel generators are required to satisfy minimum safeguards requirements.

In response to the aforementioned concern, an evaluation of the piping network and pipe break criteria was performed and is described in Attachment I. The evaluation supports the following statements which are instrumental in accepting the Authority's position:

1. The Commission's Safety Evaluation Report (SER), issued on September 21, 1973, and its supplements identified the passive failure, during post-LOCA recirculation, of the 10 inch diesel generator supply line as the design basis for the IP-3 Service Water System (SWS) and concluded that the existing SWS could accommodate this failure. The analysis of breaks at other locations was not included in the SER as a condition for the issuance of the operating license for IP-3.

2. The conclusions of the original pipe break analysis performed by Con Edison are valid for all of the breaks postulated in that study except for a guillotine break of the 24-inch essential header, during post-LOCA recirculation, upstream of the header check valves.

3. The IP-3 SWS is capable of performing its intended safety function under active and passive failure conditions. Nuclear Safety Evaluation NSE 87-03-181-SWS confirms that the present configuration of the IP-3 SWS satisfies the conditions of the Commission's SER.

A revised Flow Network Model, reflecting the actual SWS configuration, was prepared to allow computerized verification of SWS flows for all normal and emergency operating modes, with active and passive failures. Passive failure criteria in accordance with the Standard Review Plan for moderate energy piping systems was applied in performing the analysis. The results of the evaluation show that the presently configured system can satisfy the flow requirements of essential components during abnormal and accident conditions.

Revisions to FSAR Subchapter 9.6 to reflect the presently configured SWS network and flow distributions were made and submitted with the 1988 FSAR Update. FSAR changes reflecting the revised methodology for postulating SWS breaks are being prepared but will not be incorporated in the updated FSAR until approval of this position is received from the Commission.

Should you have any questions regarding this matter, please contact Mr. P. Kokolakis of my staff.

Very truly yours,

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