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January 15, 1982
IPN-82-5

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Director of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Attention: Mr. Steven A. Varga, Chief
Operating Reactors Branch No. 1
Division of Licensing

Subject: Indian Point 3 Nuclear Power Plant
Docket No. 50-286
Systems Interaction Study

Dear Sir:

This letter transmits twenty (20) copies of the final report of a document entitled, "Systems Interaction Study", for the Indian Point 3 Nuclear Power Plant (IP-3).

The first draft of this report was submitted to the Commission on March 26, 1981 (IPN-81-23) and presents the methodology proposed for the conduct of a systems interaction study at IP-3 as well as the results of the application of the methodology to the auxiliary feedwater system.

Attachment I contains the final report of the above study (two volumes) which incorporates NRC Staff comments resulting from staff review of the first draft study, meetings with Authority personnel (April 2, 1981; July 24, 1981; September 10, 1981; and September 23 and 24, 1981) and numerous telephone conversations with various Authority personnel (November 7, 1980; June 8, 1981; June 26, 1981; August 13, 1981; August 18, 1981; and September 18, 1981).

Attachment II contains a discussion of an evaluation of significant occurrence reports. The results of this evaluation were incorporated into the final report as recommended by the NRC staff.

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In addition, the Authority will transmit a report of simulator experiments conducted to investigate the usefulness of the simulator to identify non-safety control system interactions. The results of this report have been incorporated into the final report (Attachment I). The simulator report will be submitted under separate cover within one week of this writing.

Very truly yours,

George M. Wilverding

George M. Wilverding
Manager-Nuclear Licensing

cc: Resident Inspector
Indian Point Unit 3
U. S. Nuclear Regulatory Commission
P. O. Box 38
Buchanan, NY 10511

Mr. Ron Barton
United Engineers & Constructors, Inc.
30 S. 17th Street
Philadelphia, PA 19101

ATTACHMENT I

IP-3 SYSTEMS

INTERACTION STUDY

FINAL REPORT

POWER AUTHORITY OF THE STATE OF NEW YORK
INDIAN POINT 3 NUCLEAR POWER PLANT
DOCKET NO. 50-286

ATTACHMENT II

SIGNIFICANT OCCURRENCE

REPORT EVALUATION

POWER AUTHORITY OF THE STATE OF NEW YORK
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POWER AUTHORITY OF THE STATE OF NEW YORK
INDIAN POINT NUCLEAR POWER PLANT
SYSTEMS INTERACTION STUDY

SIGNIFICANT OCCURRANCE REPORT REVIEW

INTRODUCTION:

A review of the IP-3 Significant Occurrence Reports (SOR) for 1980 and 1981 was conducted to ascertain if any of these occurrences would have been identified by a Systems Interaction (SI) review. The logic utilized to identify potential SI's for this SOR review is shown on the attached diagram.

Although none of the reported occurrences directly involved the Auxiliary Feedwater System, several events, as described in the attached table, were extrapolated to demonstrate how they would have been disclosed by a SI review utilizing the methodology currently proposed by the Authority.

BACKGROUND:

Recognizing that examination of historical data could assist in identification of future potential interactions, as review of Licensee Event Reports (LER's) having potential systems interactions significance. The LER's investigated, as part of the Authority Study, proved to be outside the Scope of the Systems Interactions Study (i.e., Operation error systems not included in the study) The results of this investigation were considered inconclusive. However, both the Authority and the NRC SI Staff agreed that consideration of operating experience is an important element in SI analysis. Examination of Significance Occurance Reports were expected to be more productive in identification of potential future interaction. Furthermore, the effectiveness of a proposed SI analysis methodology can be demonstrated if it can be shown that application of that methodology will identify and lead to correction of adverse SI's similar to those that have occurred in the past. Thus the NRC staff will be utilizing SOR's as a measure of the effectiveness of any proposed SI methodology.

CONCLUSIONS:

From the attached table it can be seen that similar events, had they occurred on the Auxiliary Feedwater System, would have been identified by a SI review. Conversely, had the effected system identified in the SOR's been subjected to a SI review, the potential interaction would have been identified.

POWER AUTHORITY OF THE STATE OF NEW YORK
INDIAN POINT NUCLEAR POWER PLANT
SYSTEMS INTERACTION STUDY

SIGNIFICANT OCCURRENCE REPORT REVIEW
EXTRAPOLATION TABLE

SOR No.	Date	Nonsafety Component or System Failure	Safety Related System Failure	Systems Interaction Extrapolation
0-3-T	3/9/80	Heat Tracing	Boric Acid Injection	The logic diagrams would have identified the importance of heat tracing to maintain the temperature of boric acid mixture for injection and therefore the desired safety function.
80-3-21	5/19/80	Instrument Bus	Feedwater	Logic diagrams would have identified the relationship between the instrument bus and the control of the feedwater flow and the steam flow/feedwater flow mismatch signal and associated safety functions.
80-3-40	7/15-80	Service Water Piping	Reactor Coolant	The walk down phase of nonconnected systems would have identified the proximity of the service water line (source) to the electrical penetration (target). An evaluation of the assumed failure modes of the service water line would have identified the potential interactions.
8-3-46	8/23/80	Relay	Control Rod Drive	The logic diagrams would have identified the relationship of the relay to the functioning of the CRD system.
81-3-33	8/25/81	Relay	Reactor Protection Logic	The logic diagrams would have identified the relationship of the relay to the functioning of the reactor protection logic.
81-3-34	8/26/81	Breaker Cell Switch Support	Reactor Trip Logic	The logic diagrams would have identified the relationship between the breaker auxiliary switches and the reactor trip logic system.

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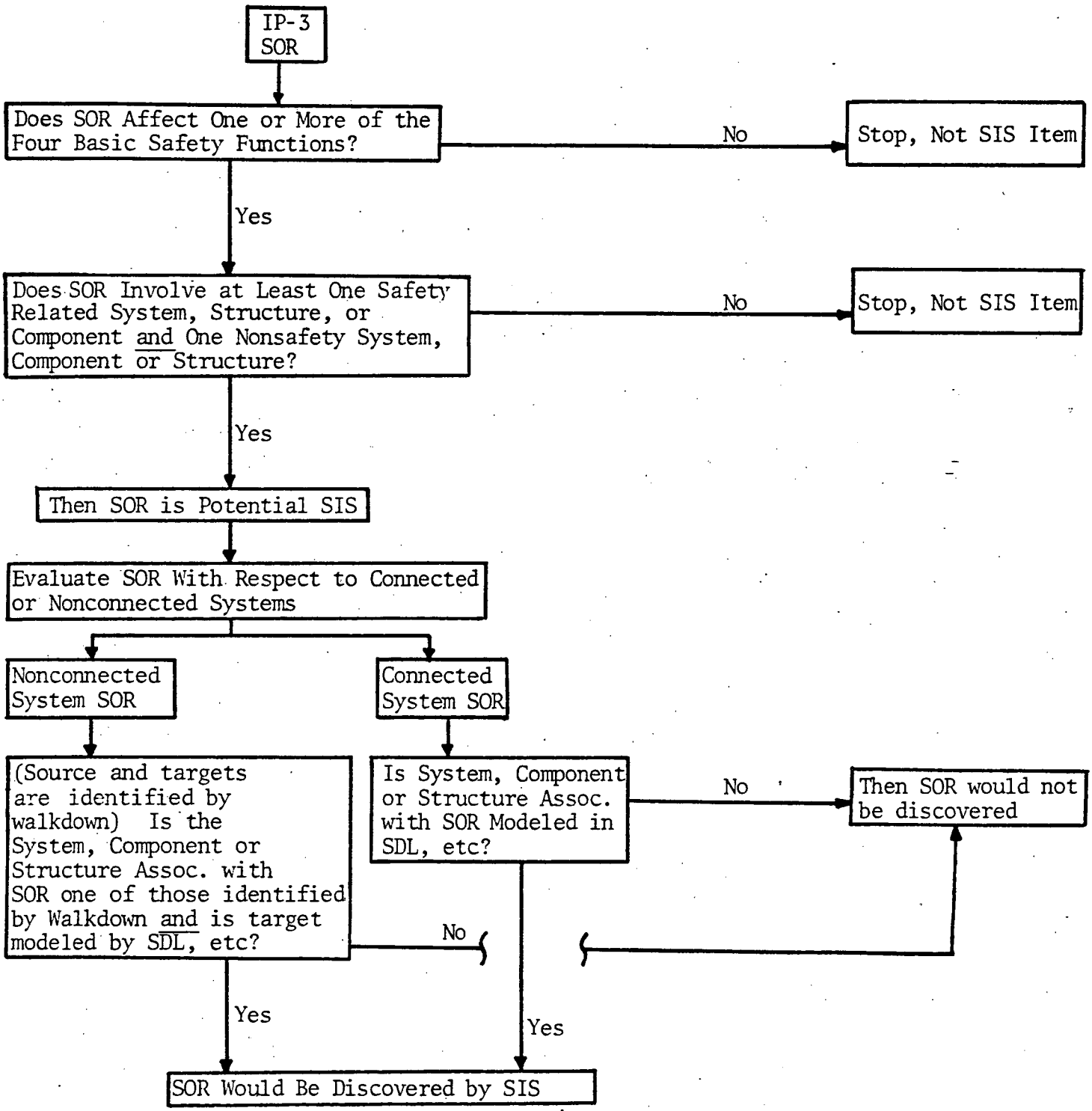
Client: Power Authority of the State of New York

Project: Indian Point Nuclear Power Plant: Systems Interaction Study

Subject: Significant Occurrence Report Review Logic Diagram