

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)

Indian Point Unit 3

DOCKET NUMBER (2)

05000286

PAGE (3)

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TITLE (4) Operation With Safety Injection Accumulators Cross-tied Placed the Plant In an Unanalyzed Condition That May Affect Plant Safety and Prevent a Safety Function Caused By An Inadequately Evaluated Procedure and Technical Specification

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
02	23	96	96	-- 005 --	00	03	24	96	FACILITY NAME	DOCKET NUMBER

OPERATING MODE (9)	N	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)								
POWER LEVEL (10)	000	20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)					
		20.405(a)(1)(i)	50.36(c)(1)	✓ 50.73(a)(2)(v)	73.71(c)					
		20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	OTHER					
		20.405(a)(1)(iii)	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	(Specify in Abstract below and in Text, NRC Form 366A)					
		20.405(a)(1)(iv)	✓ 50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)						
		20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)						

LICENSEE CONTACT FOR THIS LER (12)

NAME

Dennis J. Celentano, Licensing Specialist

TELEPHONE NUMBER (Include Area Code)

(914) 736-8033

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE).	✓ NO	EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
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ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On February 23, 1996, it was discovered that in the past the plant was operated with the safety injection (SI) accumulators cross-tied, for reasons other than to meet Technical Specification (TS) requirements. This was done to sluice water or nitrogen from one accumulator to another for the purpose of make-up. The TS requires tying an SI accumulator to another for the purpose of performing a channel check when either its second pressure or level instrument channel was inoperable. Such channel checks included tying two or more accumulators together for infrequent and short durations. This event is reportable for operation of the plant being in an unanalyzed condition that could have potentially affected plant safety and prevented a safety function. The cause of the event is an inadequately evaluated basis for the procedure and TS. Corrective action includes changing a procedure to disallow cross-tying SI accumulators, reviewing other procedures for tying systems or components together, reviewing the affect on the design basis analyses and submitting a TS change. This event had no significant effect on the health and safety of the public because of the low probability of an intermediate or large break LOCA occurring concurrent with the infrequent and short durations of cross-tying the SI accumulators.

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TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

Note: The Energy Industry Identification System codes are identified within brackets{ }.

DESCRIPTION OF EVENT

On February 23, 1996, with the plant in cold shutdown, it was discovered that in the past the plant was operated with two safety injection (SI) accumulators {BP} cross-tied for reasons other than to meet Technical Specification (TS) requirements. A Deviation Event Report (DER), numbered 96-0551, was written to document this finding as part of an investigation from a previous DER, numbered 96-0413. The previous DER 96-0413, questioned whether the SI accumulators could still complete their safety function during a postulated loss of coolant accident concurrent with them cross-tied to meet the TS requirement. A TS note in the surveillance section requires cross-tying at least two SI accumulators to perform a channel check once per shift with either its second pressure or level instrument channel inoperable. The licensing and design basis was reviewed and no other documentation was found to support this note, which has existed since the original 1976 TS for full power operation. The system operating procedure, SOP-SI-1, "Safety Injection System," was revised in 1980 to provide an alternate method to fill an accumulator by cross-tying two accumulators, but without limitation on the activity duration or frequency or the associated plant mode.

As part of the investigation into DER 96-0413, System Engineering reviewed the effect of cross-tying two accumulators. Cross-tying two accumulators would result in less than three accumulators injecting if an intermediate or a large break LOCA occurred on one of the loops associated with either cross-tied accumulator. This is because the expected depressurization of the accumulator on the broken loop would affect the other tied accumulator such that its depressurization will precede the depressurization of the reactor coolant system and thereby not inject fully. Although the safety analysis report did not consider the affect of less than three accumulators injecting, it was believed the safety function of the system would be accomplished based on information in the IP3 Individual Plant Examination (IPE). The IPE for severe accident vulnerabilities provides a systematic examination for possible risk contribution. The IPE identifies the system's success criteria to be the injection of two SI accumulators for the design basis accidents that credit this system, that is an intermediate or a large break loss of coolant accident (LOCA).

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Additionally, as part of the investigation into DER 96-0413, some current and previously licensed operators were interviewed to determine to what extent the SI accumulators were cross-tied. Based on these interviews, cross-tying the SI accumulators had been infrequent and for short durations during past plant operation. On two occasions in 1978 (LER 78-027 & LER 78-029), they were cross-tied for short durations to perform channel checks and to identify the inoperable instrument. On these occasions, tightening a ball valve to the instrument returned the channel to operable status. An operator believed that in the 1970's four SI accumulators were cross-tied concurrently for about three hours one time. This may have occurred during one of these events. It is believed that cross-tying four accumulators may have been done for channel checks. When considering the one time of three hours added to the estimated duration that channel checks were done (about one hour per year) then this activity was done for an estimated duration of no more than about 4 hours in that year. The interviews also identified that some cross-tying of SI accumulators was done for reasons other than the TS requirement, hence DER 96-0551 was written. The interviews were used to determine a bounding value for the time that two accumulators may have been cross-tied and supports the determination that this activity occurred for about 11 hours per year. Based on the interviews, about ten percent of this cross tying time was attributed to channel checks.

Engineering did a probabilistic evaluation to determine the maximum duration that accumulators can be cross-tied without exceeding the Electric Power Research Institute (EPRI), PSA Application Guide core damage probability (CDP) screening criteria of $1.0E-6$. For four accumulators cross-tied, the maximum duration per year this could be done without exceeding the CDP is 9.6 hours and 18.4 hours, for an intermediate and a large break LOCA, respectively. For two accumulators cross-tied, the maximum duration per year this could be done without exceeding the CDP is 19.2 hours and 36.7 hours for an intermediate and a large break LOCAs, respectively. Based on the findings for each type of case, in comparison to the probability review, it was estimated that the cross-tying durations were within the EPRI guideline.

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Even though it was unlikely that a postulated event would occur while two or more SI accumulators were cross-tied, reactor engineering performed a separate effects review using the EPRI GOTHIC code for containment analysis. They calculated the accumulator pressure response on the broken loop and the cross effect on the other accumulator through the one-inch cross-tie piping for the conditions of a large break LOCA. On March 8, 1996, the results confirmed that the cross-tied accumulator to the accumulator on the broken loop would not inject as designed. Engineering, with confirmation from Westinghouse, suspected that the PCT would exceed 2200 degrees using the design basis model, but calculations could not be done because the models never considered less than three accumulators injecting. Based on this information, a four hour non-emergency report (numbered 30087) was made at 2106-hours in accordance with 10 CFR 50.72.

CAUSE OF THE EVENT

The cause of cross-tying the accumulators for reasons other than the Technical Specifications was personnel error in that the basis for changing the procedure in the year 1980 was inadequately evaluated. It is not known why the procedure was changed without an adequate basis but most likely the TS note was considered. The current procedure change process requires two technical reviewers knowledgeable in the affected area and a qualified safety reviewer to ensure changes are within design basis of the plant.

The cause of the original full power Technical Specification (since 1976) not having an adequately documented basis for cross-tying the SI accumulators is indeterminate. Current procedures require safety reviews of the specification and their basis for TS amendments.

CORRECTIVE ACTIONS

Operations revised (TPC 96-0232) SOP-SI-01, "Safety Injection System Operations," to prevent cross-tying accumulators with the reactor coolant system temperature greater than 350 degrees F. This action is complete.

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Operations issued a shift order to heighten awareness and provide interim guidance to the operators when cross connecting systems or components. This action was completed on March 11, 1996.

Licensing submitted (IPN-96-025) a TS change to remove the note requiring the cross tying of at least two accumulators together. The request for change is complete and has been submitted.

Operations has developed an action plan (IOPS-APL-96-006) to address both short term and long term issues. This action plan will be tracked as part of our Action Tracking System (ACT#16673). In the short term, Operations reviewed some of the key operating procedures to assure they do not have steps or directions that could cross connect systems or components that are not part of the IP3 analyzed basis. Operations did not identify any immediate concerns. The long term actions will review the broader implications and identify corrective actions, which may include enhancing the biennial review process and/or performing a design basis review for our critical/safety related procedures. The long term actions will be developed by July 1, 1996.

Reactor Engineering will further review the cross-tied operations of the SI accumulators to better understand the affect on the design basis accident analyses. This review will be completed by May 15, 1996.

ANALYSIS OF THE EVENT

This event is reportable in accordance with 10 CFR 50.73 (a)(2)(ii)(A), in that operation with the SI accumulators cross-tied, for both TS requirements and for other than TS requirements, placed the plant in an unanalyzed condition that potentially could affect plant safety. This is based on the absence of calculations for the SI accumulators cross-tied during an intermediate or a large break LOCA. Engineering's preliminary review using the design basis model with only two accumulators injecting indicates that the PCT limit could be exceeded. This condition by itself may have prevented fulfillment of the safety function of the SI accumulator system and therefore is also reportable under 10CFR50.73 (a)(2)(v).

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Similar events that occurred within the last two years involving an inadequately evaluated procedure or TS resulted in the following reports: LER 94-010-00; LER 95-011-00; LER 95-014-01; LER 95-016-00; and LER 96-001-00.

SAFETY SIGNIFICANCE

This event had no significant effect on the health and safety of the public because of the low probability of an intermediate or large break LOCA occurring concurrent with the infrequent and short durations of cross-tying the SI accumulators. It is estimated that past operation with the accumulators cross-tied was within the EPRI PSA guideline.

Also, even though not approved for use to determine design basis, models, analyses, or codes, there may be reason to believe that two accumulators are a success path based on the IP3 plant specific IPE that used an analytical code to show two accumulators (for intermediate and large break LOCAs) as success criteria. This analysis for the large break LOCA considered success criteria with a PCT at or below 2200 degrees F (10CFR50.46 criteria).