Indian Point 3
Nuclear Power Plant
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NewYorkPower Authority

Mr. Fred R. Dacimo
Plant Manager

June 3,1999
IPN-99-060

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

SUBJECT: Indian Point 3 Nuclear Power Plant
Docket No. 50-286
License No. DPR-64
Licensee Event Report # 1999-005-00, "A Condition Prohibited by Technical Specifications, Incomplete Testing of Emergency Power Supply Tie-Breaker Interlocks due to Personnel Error."

Dear Sir:

The attached Licensee Event Report (LER) 1999-005-00 is submitted as required by 10 CFR 50.73. This event is of the type defined in 10 CFR 50.73(a)(2)(i)(B).

The Authority is making no new commitments in this LER.

Very truly yours,

Fred Dacimo
Plant Manager
Indian Point 3 Nuclear Power Plant

Attachment

cc: see next page

cc: Mr. Hubert J. Miller
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U.S. Nuclear Regulatory Commission
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U.S. Nuclear Regulatory Commission
Resident Inspectors' Office
Indian Point 3 Nuclear Power Plant

NRC FORM 366 (6-1998) U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER)

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

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Indian Point 3	05000286	1 OF 5

TITLE (4)
A Condition Prohibited by Technical Specifications, Incomplete Testing of Emergency Power Supply Tie-breaker Interlocks due to Personnel Error.

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
05	18	1999	1999	-- 005 --	00	06	03	1999	N/A	05000
									FACILITY NAME	DOCKET NUMBER
									N/A	05000

OPERATING MODE (9)	N
POWER LEVEL (10)	100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)

	20.2201(b)		20.2203(a)(2)(v)	✓	50.73(a)(2)(i)		50.73(a)(2)(viii)
	20.2203(a)(1)		20.2203(a)(3)(i)		50.73(a)(2)(ii)		50.73(a)(2)(x)
	20.2203(a)(2)(i)		20.2203(a)(3)(ii)		50.73(a)(2)(iii)		73.71
	20.2203(a)(2)(ii)		20.2203(a)(4)		50.73(a)(2)(iv)		OTHER
	20.2203(a)(2)(iii)		50.36(c)(1)		50.73(a)(2)(v)		Specify in Abstract below or in NRC Form 366A
	20.2203(a)(2)(iv)		50.36(c)(2)		50.73(a)(2)(vii)		

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
Angelo Vai, Design Engineering Supervisor	(914) 788-2647

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

SUPPLEMENTAL REPORT EXPECTED (14)			EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
	YES (If yes, complete EXPECTED SUBMISSION DATE).	✓ NO				

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On May 18, 1999, it was determined that in the past, both above cold shutdown and in cold shutdown, a Technical Specification (TS) surveillance requirement for emergency power system testing was not met. There was incomplete testing of the emergency power supply breaker closure permissive when the tie-breakers were placed in positions different than the tested configuration. When the tie-breaker is not in the connect/closed position a permissive is provided for the emergency power supply breakers to close upon a loss of offsite power. The permissive consists of a parallel set of contacts, one from the switchgear cell switch and one from the tie-breaker auxiliary switch. The permissive circuit contacts were tested in parallel, but were not tested individually. Currently, these tie-breakers are controlled in the test/open position, the same position as tested. Prior to 1992 or when the plant was the cold shutdown condition, the tie-breakers were placed in positions other than the tested position, in which only one of the two contacts provides the permissive. Since the contacts were not tested individually, a postulated high resistance contact failure could cause an undetected failure of the permissive. The cause of the event is cognitive personnel error in writing and revising the surveillance test. Prior to Generic Letter 96-01, the importance of testing both circuit paths of a parallel circuit was generically not understood. More recently, the error was a misunderstanding that the TS surveillance requirement did not need to be met for the cold shutdown condition. Corrective actions include controlling the configuration as tested until individual contact testing can be performed, disseminating information on the applicability of the surveillance in cold shutdown and reviewing for extent of condition. This event did not have a significant effect on the health and safety of the public because the risk was found to be acceptable upon review and actual plant experience has demonstrated the emergency power permissive circuit capability upon loss of offsite power.

Note: The Energy Industry identification system codes are identified within the brackets {}

DESCRIPTION OF THE EVENT

On May 18, 1999, design engineering determined that past surveillance testing did not fully meet Technical Specification (TS) surveillance requirements for testing the tie-breaker interlocks {IEL} of the 480 volt safety bus {BU} (5A, 2A, 3A, 6A) {ED} emergency power supply breakers {BKR}. Currently, the test does fully test the interlock as long as the tie-breaker position is not changed. Design engineering was reviewing the potential for this incomplete testing identified on April 30 by the Independent Safety Engineering Group (ISEG). ISEG was looking at this because Operations questioned whether or not preventative maintenance could be performed on the bus tie-breakers (2AT5A and 3AT6A) {BKR} with the plant at power. The plant was operating at 100% power.

Emergency power supply breakers include three emergency diesel generator (EDG) {EK} output breakers that independently energize buses 5A, 2A and 6A. Additionally, the system design provides a bus tie-breaker 2AT3A to automatically connect bus 2A to bus 3A upon emergency conditions. Bus tie-breakers between bus 2A and 5A (2AT5A) and between bus 3A and 6A (3AT6A) are normally in the test/open position and may be placed in the connect/closed position only during cold shutdown. Above cold shutdown these tie-breakers are maintained opened per TS requirements as originally licensed in 1975. Tie breakers 2AT5A and 3AT6A are interlocked with their associated emergency power supply breakers such that they provide a permissive allowing the emergency supply breakers to close on their respective buses upon an emergency condition if the tie-breaker is not in the connect/closed position. The permissive circuit for each emergency supply breaker consists of two parallel contacts: a tie-breaker auxiliary switch contact (52b) and an associated switchgear {SWGR} cubicle cell switch contact (33h).

Testing of the bus tie-breaker interlocks is performed with the tie-breakers (2AT5A and 3AT6A) installed in the test/open position which is the current configuration for above cold shutdown. This testing verified the permissive circuit with the contacts 52b and 33h in parallel but did not verify each circuit path independently. In 1992 the design configuration was changed to require these tie-breakers to be in the test/open position above cold shutdown, which is their tested position. However, prior to 1992, these tie-breakers had been in the connect/open position above cold shutdown. Also, with the plant in cold shutdown, these tie-breakers have been in various positions other than the tested position. The different positions of the breaker are "connect", "test" or "disconnect." Having these tie breakers in different positions other than tested results in the emergency power system being in an untested configuration.

With the tie-breakers removed, the switchgear cubicle cell switch contact (33h) is relied on to make-up the emergency power supply breaker permissive circuit. With the breaker in the connect/open position the auxiliary switch contact 52b is relied on to make-up the permissive circuit. Since the continuity of each contact on the cell switch or auxiliary switch is not tested individually, the emergency power supply breaker auto closure was susceptible to failure (e.g., postulated high resistance contact failure) due to the individually untested permissive circuit paths through the cell switch or auxiliary switch. Recently, the breaker preventative maintenance (PM) has required verification of continuity of breaker contact (52b), but this is done on the bench and not with the breaker installed as a single circuit path. Additionally, the PM requires cycling of the cell switch while the tie-breaker is removed resulting in the momentary opening of the permissive circuit for two emergency power supply breakers.

The design of the emergency power scheme for a safety injection or non-safety injection/blackout event results in an automatic sequence to restore vital equipment to the bus. The EDG starts and the non-essential equipment is shed off the bus and vital equipment is sequenced onto the bus after the emergency power supply breaker automatically closes. In cold shutdown the safety injection signal is blocked, but the emergency power supply breakers are still required to close automatically. Also, in cold shutdown, vital equipment will sequence on to the bus, including the essential service water pumps, component cooling water pumps and auxiliary feedwater pumps, if not deactivated, after the emergency power supply breaker closes. If the permissive circuit has failed, the emergency power supply breaker will not automatically close and must be manually closed to connect to the bus. TS surveillance 4.6.A, "Emergency Power System Periodic Tests," requires verification of bus load shedding, automatic start of each diesel generator and restoration to operation of vital equipment, via the diesel generator, assuming the required load within 60 seconds after the initial start signal for a safety injection (SI) with loss of off-site power. This surveillance is performed every 24 months by simulating a loss of all normal AC station service power supplies in conjunction with a simulated safety injection signal. Even though SI actuation is not required in cold shutdown, the FSAR credits TS surveillance to demonstrate the readiness of the emergency power system upon a loss of all normal 480 volt AC station service power. TS requires two EDGs to be operable with the plant in the cold shutdown condition. Therefore, in cold shutdown, the applicable portions of the surveillance requirement, which includes the automatic closure of the emergency power supply breakers, must be met, but at times it was not.

IP3's Improved Technical Specifications submitted by letter IPN-98-139, dated 12/15/98, though not yet approved, states in part of section 3.8.2, "AC Sources - Shutdown," that the surveillance requirement for verifying that the EDGs energize the permanent connected loads within 10 seconds must be met. Also, the EDG must be capable of accepting required loads within assumed loading sequence intervals. This premise has been modeled directly from the standard TS.

CAUSE

The cause of the incomplete test is cognitive personnel error. Prior to 1992 when the test configuration did not match the Check-off List (COL) specifying the tie-breaker position for above cold shutdown, the personnel involved with the surveillance most likely missed the importance of testing each individual circuit path of the permissive. During the testing review for Generic Letter (GL) 96-01, it was recognized that the tie-breaker was maintained in the test/open position above cold shutdown, and therefore there was no need for testing the circuit other than in parallel. But, as in the past, personnel did not consider that this surveillance requirement is applicable in the cold shutdown condition because the surveillance requires testing for a loss of normal 480V AC power with a SI signal and it is known that the SI is not required in cold shutdown. The GL-96-01 review personnel determined that there was no requirement to test the cell switches (i.e., 33h contact) but suggested testing the cell switches when the tie-breakers are removed.

CORRECTIVE ACTIONS

Corrective actions include maintaining administrative controls that ensure the tie breakers are in their tested condition until further testing can be performed, reviewing for extent of condition and developing and implementing tests for the next refueling outage, scheduled for September 10, 1999.

For the misunderstanding associated with the EDG surveillance being applicable in cold shutdown, information will be disseminated to IP3 personnel by July 15 1999, which is prior to the next planned cold shutdown period.

Corrective actions have been taken as part of the findings from a previous event (i.e., LER-97-011-01, "Incomplete Testing of Safety Related Logic Circuits Fails to Fully Demonstrate Technical Specifications Requirements; A Condition Prohibited by Technical Specifications"). LER-97-011-01 resulted from the engineering reviews performed to address Generic Letter 96-01. This previous event had corrective actions taken that included revising procedures, performing those revised procedures satisfactorily and subsequently providing training to personnel responsible for maintenance of the procedures. It is expected that corrective actions taken for LER-97-011-01 would preclude recurrence of an untested configuration where the operating configuration of the tie-breakers was different than the tested configuration, such as those tests prior to 1992 when the plant was above cold shutdown. This conclusion is based on engineering reviews recognizing that it is unlikely that the tie-breakers would be removed above cold shutdown and therefore further testing was not required unless the tie-breaker was removed. However, corrective actions did not prompt the consideration for applicability of the surveillance requirement in cold shutdown. Rather the heightened awareness, which was afforded by the corrective actions, is believed to have provided the catalyst to identify this event and preclude future events.

ANALYSIS OF EVENT

This event is being reported for a condition prohibited by Technical Specifications in that required emergency power system testing was incomplete. Prior to 1992 the test did not uniquely verify the circuit path through the auxiliary contact to coincide with the tie-breaker position as specified for above cold shutdown. While in cold shutdown, when the tie-breakers were in the connect or disconnect position, the surveillance requirement was not met, in that the permissive circuit paths were not individually verified. This type of event is reportable under 10CFR50.73(a)(2)(i)(B).

Prior to the 1992 configuration change, with the plant above cold shutdown, the tie-breakers were specified to be in the connect/open position per the COL. This placed the cell switch contact 33h to open, and the auxiliary switch 52b contact was closed and made-up the permissive but this was not a uniquely tested condition. The COL required the breaker to be in the connect/open position with control power fuses installed. It is expected that the control room operators would see if the auxiliary switch mechanically failed (not for a postulated high resistance contact failure) because the tie-breaker power indicating green light comes from another contact in the auxiliary switch.

After the 1992 configuration change, with the plant above cold shutdown, administrative controls were prescribed to have the tie-breakers in the test/open position which is the tested configuration. In cold shutdown, the duration of the untested configuration as a result of tie-breakers being in the connect or disconnect position is indeterminate. As part of the safety significance, an assessment of failure rates used a conservative estimation for duration of time.

SAFETY SIGNIFICANCE

This event had no effect on the health and safety of the public because past operating experience has shown that, upon loss of normal AC power, the emergency supply breakers have closed in a manner demonstrating the permissive circuit capability. Also, manual action could have been taken from the control room or locally to close the 480 volt bus emergency power supply breaker(s) upon loss of AC power. Additionally, above cold shutdown the operations procedures required the tie-breakers be in the test/open position (the tested configuration) since the configuration change in 1992.

A risk review was performed and the risk was determined to be acceptable as explained below:

To compute the conditional probability of failure during shutdown, a duration range with a minimum of 60 days and a maximum of 100 days was assumed. Although failure of two EDG output breakers to auto-close does not directly result in core damage, the resultant increased probabilities fall below the 1.00E-6 threshold for risk significance of the EPRI PSA Applications Guide. Under these conditions Operations personnel would still be able to manually close the circuit breakers, which would lower these probabilities further.

To assess the past operation prior to 1992 that did not uniquely verify continuity of the tie-breaker auxiliary contact circuit path, a review was performed that shows an increase in frequency of about 3.00E-6 per year for failure in this case. It is expected that an actual core damage frequency increase arising from this configuration would be lower than this value. The PSA Application Guide defines a threshold for risk significance for permanent configuration changes as a function of core damage frequency. For IP3 this threshold value is computed to be 15 percent. Since the actual increase is only about 6.8 percent, the risk increase is considered acceptable. Further reduction in probability for this auxiliary switch to fail mechanically (this does not include a postulated high resistance contact failure) would be realized because the operators would have had the ability to detect this type of failure using the control room indication. If a permissive circuit failed undetected (a postulated high resistance contact failure), the operators could manually, from either the control room or at the breaker, close the emergency supply breaker.