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IPN-00-084

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 # 2000-011-00
Reactor Core Quadrant Power Tilt Ratio Exceeded Technical Specification Limit During Startup and Specified Actions Not Taken;
A Condition Prohibited by Technical Specifications

Dear Sir:

The attached Licensee Event Report (LER) 2000-011-00 is hereby submitted as required by 10 CFR 50.73. This event is of the type defined in 10 CFR 50.73 (a)(2)(i)(B) for a condition recorded in Entergy's corrective action process as Deviation Event Report DER 00-02781.

Entergy is making no new commitments in this LER.

Very truly yours,

Robert J. Barrett
Vice President Operations
Indian Point 3 Nuclear Power Plant

cc: See next page

IE22

cc: Mr. Hubert J. Miller
Regional Administrator
Region I
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)

APPROVED BY OMB NO. 3150-0104 EXPIRES 06/30/2001
Estimated burden per response to comply with this mandatory information collection request: 50 hrs. Reported lessons learned are incorporated into the licensing process and fed back to industry. Forward comments regarding burden estimate to the Records Management Branch (T-6 F33), 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. If an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Indian Point 3	05000286	1 OF 4

TITLE (4)
Reactor Core Quadrant Power Tilt Ratio Exceeded Technical Specification Limit During Startup and Specified Actions Not Taken; A Condition Prohibited by Technical Specifications

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 05000
10	27	2000	2000	-- 011 --	00	11	27	2000	FACILITY NAME	DOCKET NUMBER 05000

OPERATING MODE (9)	N
POWER LEVEL (10)	45

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)
Dennis Main, Operations Engineer	914-736-6205

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 October 27, 2000, during startup at approximately 45% reactor power, Operations identified a condition which was not in accordance with Technical Specification (TS) 3.10.3.1. TS 3.10.3.1 requires that "Whenever the indicated quadrant power tilt ratio (QPTR) exceeds 1.02, except for physics tests, within two hours the tilt condition shall be eliminated or the following actions shall be taken: a) Restrict core power level and reset the power range high flux setpoint three percent of rated value for every percent of indicated power tilt ratio exceeding 1.0." During operator adjustment and assessment for exceeding a QPTR limit, a review of earlier startup QPTR records showed a previous QPTR calculation of greater than 1.02 at a lower power. Because an indicated QPTR calculation is expected at low powers when the tilt alarm is by design not functional, no action was taken. This is consistent with the TS basis. However, in subsequent review, Operations concluded the event was a condition prohibited by TS, based on the exact wording of TS 3.10.3.1. The cause of the condition was inadequate TS due to written communication as a result of personnel error, in that TS 3.10.3.1 does not specify that the limiting condition for operation is only applicable above 50% Rated Thermal Power, as implied in the TS basis. Failure to comply with the exact statements of the TS was due to inconsistency between the TS definition of QPTR and its application in the TS basis. Corrective actions include adjustment of the flux setpoints per the TS and the revision of the TS when the Improved TS (ITS) is implemented. The event had no effect on public health and safety.

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

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

DESCRIPTION OF EVENT

On October 27, 2000, during startup at approximately 45% reactor power, Operations secured power increase at approximately 1900 hours due to an indicated reactor core {AC} quadrant power tilt ratio (QPTR) of 1.03 (3% tilt). Technical Specification (TS) 3.10.3.1 requires that "When ever the indicated quadrant power tilt ratio (QPTR) exceeds 1.02, except for physics tests, within two hours the tilt condition shall be eliminated or the following actions shall be taken: a) Restrict core power level and reset the power range high flux setpoint three percent of rated value for every percent of indicated power tilt ratio exceeding 1.0." At 2114 hours, the Nuclear Instrumentation System (NIS) {IG} Power Range (PR) overpower trip setpoints were reset to 94% in accordance with System Operating Procedure (SOP)-RPC-5, "Quadrant Power Tilt Calculations." Operations reviewed prior recordings of tilt (QPTR) on the critical function monitoring system (CFMS) {ID} and identified a QPTR recording of greater than 2% tilt that occurred at approximately 0930 hours while at approximately 17% rated thermal power (RTP). Operations determined that there were no adjustments of flux setpoints for this previous tilt condition prior to 1130 hours. In keeping with the exact wording of TS, Operations took the conservative position that the earlier tilt (QPTR) condition was not in accordance with TS 3.10.3.1, because the action statement (AS) time limit of two hours was not met. A failure to perform the AS of TS 3.10.3.1.a apparently resulted in a condition prohibited by TS. Operations initiated a Deviation Event Report (DER-00-02781), entered a Limiting Condition of Operation (LCO-2000-0918), initiated corrective actions to conform to the TS, and notified plant management, Licensing and the NRC Resident Inspector. Instrumentation & Control (I&C) personnel reset the power range high flux trip setpoints to 94% based on verified QPTR of approximately 3% prior to exceeding 50% power.

An extent of condition review indicated that a QPTR of greater than 1.02 is a routine condition during plant startup because the power range nuclear instrumentation is more sensitive to slight deviations in signal when the plant is at low powers. Furthermore, for startups occurring under non-equilibrium xenon conditions in the core, a low-power tilt is more likely due to xenon redistribution in the core; such redistribution is expected to burn out as the plant is increased in power.

The NIS and its associated alarms do not recognize QPTR below 50% RTP, and neither does the design basis of the plant. Alarm Response Procedure (ARP)-004, "Panel SBF-1 - Safeguards," notes for the alarm "NIS Power Range Upper/Lower Detector High Flux Deviation or Auto Defeat," that the alarm is normally raised (i.e., panel indicator lit) with reactor power less than 50% (auto defeat), and that a cause of the alarm could be reactor power less than 50%. ARP-004 further states if a positive flux tilt of greater than or equal to 1.75% is indicated, then perform SOP-RPC-5 to determine the magnitude of the flux tilt and if valid then refer to TS 3.10.3.

Other than reliance on the continuous function of this alarm (as implied by the words "whenever the ... QPTR exceeds 1.02" in TS 3.10.3.1), there is no TS surveillance requirement for QPTR indication. Although the alarm does not register QPTR below 50%, the CFMS is capable of calculating QPTR at any power. Based on shift turnover information, Operators knew a tilt existed and that Reactor Engineering was monitoring it. When the Operators checked the CFMS tilt page at 45%, they were taking proactive steps to anticipate what QPTR might be trending towards when the time came for the alarm to clear, at 50% RTP. Since the CFMS page calculated a QPTR of greater than 1.02, and because the TS did not provide specific guidance on the applicability of the QPTR specification at low RTP, the Operators took the conservative position of assuming that the TS was applicable to all RTPs. Therefore, the AS was applied as noted above, and a DER was prepared.

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

It should be noted that QPTR can be extremely high as reactor power approaches zero. For example, QPTR calculated at the first stable point during power ascension (approximately 3-5% RTP) could far exceed 1.02, to the extent that application of the TS AS would reset the high flux trip bistables to below 0% RTP.

CAUSE OF EVENT

The cause of the condition was inadequate written instructions due to written communications as a result of personnel error. TS 3.10.3.1 does not specify that the limiting condition for operation (LCO) was only applicable above 50% power, although this is implied in the TS basis. Contributing to this is the fact that the flux tilt alarm is actuated by a bistable whose input is the CFMS QPTR calculation which is always up (actuated/lighted) below 50% RTP. Operators are knowledgeable of ARP-004, its references to alarm below 50% RTP, and the reason the alarm is actuated when below 50% RTP.

An additional contributing cause is the fact that there had been (circa 1986) verbal communication between the New York Power Authority (NYPA) and the NRC, in which NYPA was advised that the applicability of the TS was adequately defined in the TS Basis and that no formal amendment was required.

CORRECTIVE ACTIONS

The following corrective actions have been or will be performed under the Indian Point 3 corrective action program to address the causes of this event.

- Instrumentation & Control (I&C) personnel reset the power range high flux setpoints to 94% based on verified QPTR of approximately 3% prior to exceeding 50% RTP.
- TS 3.10.3.1 will be changed to state that this specification does not apply until greater than 50% RTP. The TS are being revised in this manner by conversion to the Improved Standard TS (ITS). A line item change may be submitted prior to ITS conversion.

ANALYSIS OF EVENT

The event is reportable under 10 CFR 50.73 (a) (2) (i) (B). The licensee shall report any operation or condition prohibited by the plant's Technical Specifications. This event meets the reporting criteria because the QPTR limit of 1.02 was not clearly excluded from low power operation therefore the specified TS action was not performed. A literal reading of this TS implies that the plant was outside its TS requirements, despite the fact that QPTR is not a meaningful parameter below 50% RTP as described in the TS Basis. The event would not be a TS prohibited condition under the proposed Indian Point 3 Improved Standard TS (ITS) which is scheduled to be implemented in March of 2001. This interpretation of QPTR applicability is an industry standard.

The plant was in conformance with TS 3.10.3 when I&C personnel performed the required action specified in TS 3.10.3.1.a by resetting the power range high flux setpoints to 94% based on verified QPTR of approximately 3% prior to exceeding 50% RTP. At 0116 hours, Operations verified a QPTR of 1.018 and exited the LCO (2000-0918) for reactor core tilt greater than 2%

A review of Licensee Event Reports (LER) for the previous two years identified LER 2000-010 dated November 13, 2000, regarding isolation of the sodium hydroxide tank due to misinterpretation of TS.

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SAFETY SIGNIFICANCE

This event had no effect on the health and safety of the public. There were no actual safety consequences for the event because the conditions for the basis of the QPTR limit were not present. The QPTR limit is based on some asymmetric perturbation which the most likely is a misaligned rod or inlet temperature mismatch. There were no misaligned control rods {AA} or core inlet temperature mismatch during the event to cause a radial power asymmetry (tilt). A dropped or misaligned rod would be detected by the rod position indication system or core instrumentation.

As discussed in the basis of TS 3.10, a large tilt could be initiated during startup and power escalation and the TS is written to prevent escalation above 50% power if a large tilt is present. Spatial oscillations of power distribution for the core can be high at low power due to the redistribution of xenon in the respective quadrants during a startup and result in tilt that exceeds the TS limit. Power range instrumentation used to measure tilt has inherent sensitivity to random fluctuations when the signal is low. Because the tilt is due to xenon and not a misaligned rod or core inlet temperature mismatch, as power is increased, the xenon burns out naturally and the tilt stabilizes to within normal bands.

There were no potential safety consequences of this event. The reactor protection system (RPS) {JC} acts to shut down the reactor by means of various reactor trips which are designed to occur when a measured plant variable exceeds predetermined limits. The RPS protective trips were functional during the event [e.g., Overpower Differential Temperature (OPDT), Overtemperature Differential Temperature (OTDT), High Neutron Flux) and would have automatically initiated protective action to prevent exceeding a safety limit. The RPSs were designed so that the most probable modes of failure (loss of voltage, relay failure) in each protection channel results in a signal calling for a protective trip (e.g., Power Range High Neutron Flux trip). The QPTR is derived from the excore nuclear instrumentation system (NIS) {IG} via isolated input signals to the plant process computer system. The QPTR limit is an administrative limit which ensures that the gross radial power distribution remains consistent with the design values used in the safety analysis. The QPTR limit of 1.02, at which corrective action is required, provides a margin of protection for both the Departure from Nucleate Boiling (DNB) ratio and linear heat generation rate contributing to excessive power peaks resulting from X-Y plane power tilts.

In accordance with Standard TS (STS) for Westinghouse plants (NUREG-1431), applicability of QPTR in Mode 1 (power operation) with RTP less than or equal to 50% (and in other modes) is not required because there is either insufficient stored energy in the fuel {AC}, or insufficient energy being transferred to the reactor coolant {AB} to require the implementation of a QPTR limit on the distribution of core power.

Review of this event against the guidelines of NEI 99-02 Rev. 0, "Regulatory Assessment Performance Indicator Guideline," concluded it was not a safety system functional failure (SSFF). Safety systems were not made inoperable or incapable of performing their safety function as a result of this event.