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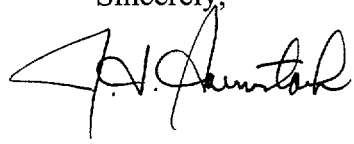
September 5, 2000

Re: Indian Point Unit No. 2
Docket No. 50-247
LER 2000-006-00
NL-00-114

Document Control Desk
US Nuclear Regulatory Commission
Mail Station PI-137
Washington, DC 20555

The attached Licensee Event Report 2000-006-00 is hereby submitted in accordance with the requirements of 10 CFR 50.73. There are no commitments contained in this correspondence.

Sincerely,



Attachment

cc: Mr. Hubert J. Miller
Regional Administrator - Region I
US Nuclear Regulatory Commission
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Mr. Patrick D. Milano, Project Manager
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NRC FORM 366 (6-1998) U.S. NUCLEAR REGULATORY COMMISSION

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.

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 No. 2	05000-247	1 OF 4

TITLE (4)

Source Range Detector High Flux Trip Circuitry Outside of Plant Design Basis Due To Revised Local Cabinet Temperature Uncertainty

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
08	03	2000	2000	-006-	00	09	05	2000		05000
									FACILITY NAME	DOCKET NUMBER
										05000

OPERATING MODE (9)	000
POWER LEVEL (10)	N

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)	X	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)
Robert T. Allen, Manager Regulatory Affairs	914-734-5129

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).	X NO				

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

The original set point for the source range detector high flux trip, supplied by Westinghouse, was 1.0E5 counts per second (cps). Data taken during Cycle 1 startup physics testing in 1973 showed the source range and intermediate range detector overlap curve to be slightly different than expected. To prevent unnecessary reactor trips due to high source range indications, Westinghouse recommended changing the trip set point from 1.0E5 cps to 5.0E5 cps. An internal review of the existing source range detector set point analysis determined that the temperature errors associated with the maximum Central Control Room (CCR) design temperature limit of 120 degrees F had not been explicitly accounted for based on information available and the set point methodologies used in 1973. For a set point of 5.0E5 cps, the instrument loop uncertainties are higher than those for 1.0E5 cps at higher CCR temperatures due to the logarithmic nature of the channel. As such, with a set point of 5.0E5 cps, saturation of the source range detector level amplifiers could occur at high CCR temperatures, precluding a reactor trip when required to terminate a power excursion. Corrective actions were taken to revise the statistical instrument loop uncertainty analysis to account for the temperature error associated with the maximum CCR design temperature of 120 degrees F. The analysis determined that an upper set point limit of 3.0E5 cps is required to prevent saturation of the source range detector level amplifiers. For additional conservatism, the nominal trip set point was lowered to 2.3E5 cps to assure system operability during maximum expected operating temperatures in the CCR.

PLANT AND SYSTEM IDENTIFICATION

Westinghouse 4-Loop Pressurized Water Reactor
Nuclear Instrumentation System Source Range Detector Circuitry

EVENT IDENTIFICATION

Source Range Detector High Flux Trip Circuitry Outside of Plant Design Basis Due to Revised Local Cabinet Temperature Uncertainty.

EVENT DATE

August 3, 2000

REFERENCES

Condition Reporting System Number: 200005734

Westinghouse letter LEE-1417, "Consolidated Edison Company Indian Point Unit 2 Precautions, Limitations & Setpoints Nuclear Source Range Reactor Trip," K. R. Ludwig (Westinghouse) to C. Jackson (Con Edison), dated July 30, 1973.

PAST SIMILAR EVENTS

None.

EVENT DESCRIPTION

On August 3, 2000, with the plant at cold shutdown, a determination was made that the source range portion of the Nuclear Instrumentation System (NIS) was outside of the plant design basis. This event was identified during an internal review of the instrument loop uncertainty calculations for the source range detector channels. The review determined that the temperature errors associated with the maximum Central Control Room (CCR) design temperature limit of 120 degrees F had not been explicitly accounted for in establishing the current high flux trip set point of 5.0E5 counts per second (cps). The original Nuclear Instrumentation System (NIS) source range detector high flux trip set point supplied by Westinghouse was 1.0E5 cps. Data taken during Cycle 1 startup physics testing in 1973 showed the source range and intermediate range detector overlap curve to be slightly different than expected. To prevent unnecessary reactor trips on high source range indications, Westinghouse recommended, in the referenced letter, to change the trip set point from 1.0E5 to 5.0E5 cps. This set point change also provided an entire decade (1.0E1 cps) of margin between the power level at which the source range detector trip can be bypassed (P-6 permissive) during power ascension and when the source range detector high flux trip occurs. However, the temperature errors associated with the maximum CCR design temperature limit of 120 degree F were not explicitly accounted for based on information available and the set point methodologies used in 1973.

The existing set point of 5.0E5 cps corresponds to 95 percent of the signal span (0 to 10 Vdc for 1E0 to 1E6 cps or 1.667 Vdc/decade) for the source range level amplifiers. Establishing set points at the high end of an instrument's signal span is generally not considered a good practice due to the potential for instrument uncertainties precluding a bistable from changing state at the appropriate value. For the existing set point of 5.0E5 cps, the instrument loop uncertainties are higher than those for 1.0E5 cps at higher CCR temperatures due to the logarithmic nature of the channel. As such, with the existing set point of 5.0E5 cps, saturation of the source range detector level amplifiers could occur at high CCR temperatures precluding a reactor trip when required to terminate a power excursion.

EVENT ANALYSIS

The cause of the plant being outside the design basis was that the temperature errors associated with the maximum CCR design temperature of 120 degrees F were not explicitly accounted for when the set point was changed from 1.0E5 cps to 5.0E5 cps in 1973. The change in the set point was based on the information available at the time and the set point methodologies used in 1973, which did not evaluate temperature effects. The instrument loop errors associated with the Reactor Protection System (RPS) and the Engineered Safety Features Actuation System (ESFAS) set points were analyzed and determined for operating conditions. The only set point identified to be effected by the Control Room temperature limits was the NIS source range set point.

This event is reportable in accordance with 10CFR50.73(a)(2)(ii)(B), which requires a report of, "Any event or condition ... that resulted in the nuclear power plant being: ... In a condition that was outside the design basis of the plant."

EVENT SAFETY SIGNIFICANCE

There were no operational or safety consequences, or implications attributed to the failure to properly account for the instrument loop uncertainty associated with the maximum CCR design temperature of 120 degrees F in establishing the current source range detector high flux trip set point of 5.0E5 cps because:

(1) The Indian Point 2 Technical Specifications do NOT include any reactor trip set point limits for the NIS source range detector channels.

(2) The source range high flux trip is NOT credited in any of the Updated Final Safety Analysis Report (UFSAR) Chapter 14 accident analyses.

(3) If the maximum CCR design temperature limit of 120 degrees F was approached and the source range detector level amplifiers were to saturate, thereby preventing a source range high flux trip, then the Intermediate Range High Flux Trip (25%) and Power Range High Flux Trip (Low Set Point (25%)) would be available to provide redundant protection for termination of a power excursion during a reactor start-up or low power operation condition.

Based on the above, it can be concluded that the public's health and safety was assured at all times.

CORRECTIVE ACTIONS

A statistical instrument loop uncertainty re-analysis was performed by Westinghouse for the source range detector channels. This analysis determined that an upper limit of 3.0E5 is required to prevent saturation of the source range level amplifiers when the maximum CCR design basis temperature limit of 120 degrees F is applied. For additional conservatism, the nominal source range detector high flux trip set point was set at 2.3E5 cps.

The new set point of 2.3E5 cps was established considering the impact of instrument inaccuracies on the high end of the instrument range and the impact of channel noise on the low end of the range. Reducing the set point from 5.0E5 to 2.3E5 cps has resulted in:

a. a reduction in the instrument loop errors,

b. a more conservative value which assures that a reactor trip will occur earlier in time while, at the same time, minimizing the occurrences of spurious, noise related trips,

c. a set point that is located at 89.4 percent of the source range detector signal range,

d. providing system operability during maximum expected operating temperature in the CCR, and

e. a slight reduction (i.e., approx. 13 percent) in the margin between the power level at which the source range detector trip can be bypassed (P-6 permissive) during power ascension and when the source range detector high flux trip occurs. However, this reduction should not pose an operational concern related to spurious trips.