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NL-14-037

April 7, 2014

U.S. Nuclear Regulatory Commission
Document Control Desk
11545 Rockville Pike, TWFN-2 F1
Rockville, MD 20852-2738

SUBJECT: Licensee Event Report # 2014-001-00, "Technical Specification (TS)
Prohibited Condition Due to Failure to Comply with TS 3.4.3 Reactor
Coolant System Pressure-Temperature Limits During Vacuum Refill "
Indian Point Unit Nos. 2 and 3
Docket No. 50-247, 50-286
DPR-26, 64

Dear Sir or Madam:

Pursuant to 10 CFR 50.73(a)(1), Entergy Nuclear Operations Inc. (ENO) hereby provides Licensee Event Report (LER) 2014-001-00. The attached LER identifies an event where there was a Technical Specification (TS) Prohibited Condition due to violation of the reactor coolant system pressure-temperature limits during vacuum refill, which is reportable under 10 CFR 50.73(a)(2)(i)(B). This condition was recorded in the Entergy Corrective Action Program as Condition Report CR-IP2-2014-00877.

There are no new commitments identified in this letter. Should you have any questions regarding this submittal, please contact Mr. Robert Walpole, Manager, Regulatory Assurance at (914) 254-6710.

Sincerely,

A handwritten signature in black ink, appearing to read "JAV/cbr", followed by the word "for" in a cursive script.

JAV/cbr

cc: Mr. William Dean, Regional Administrator, NRC Region I
NRC Resident Inspector's Office, IPEC
Ms. Bridget Frymire, New York State Public Service Commission

JE22
NRR

LICENSEE EVENT REPORT (LER)

Estimated burden per response to comply with this mandatory collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose 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.

1. FACILITY NAME: INDIAN POINT 2

2. DOCKET NUMBER
05000-2473. PAGE
1 OF 4

4. TITLE: Technical Specification (TS) Prohibited Condition Due to Failure to Comply with TS 3.4.3 Reactor Coolant System Pressure-Temperature Limits During Vacuum Refill

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV. NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
02	20	2014	2014-	001 -	00	04	07	2014	Indian Point Unit 3	05000-286
									FACILITY NAME	DOCKET NUMBER
										05000

9. OPERATING MODE	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)			
1	<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(vii)
	<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)
10. POWER LEVEL 100%	<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)
	<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)
	<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)
	<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(4)
	<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(5)
	<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> OTHER
	<input type="checkbox"/> 20.2203(a)(2)(vi)	<input checked="" type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	
				Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

NAME	TELEPHONE NUMBER (Include Area Code)
Ardesar Irani, Licensing Engineer, Regulatory Assurance	(914) 254-6618

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

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

14. SUPPLEMENTAL REPORT EXPECTED

☐ YES (If yes, complete 15. EXPECTED SUBMISSION DATE) ☒ NO

15. EXPECTED SUBMISSION DATE

MONTH	DAY	YEAR

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

On February 20, 2014, Entergy identified a failure to comply with Technical Specification (TS) 3.4.3 [Reactor Coolant System (RCS) Pressure and Temperature (P/T) Limits] after review of a Westinghouse PWR Owners Group (PWROG) correspondence (OG-14-66) dated February 19, 2014. The PWROG correspondence discussed a Non-cited Violation at Perry Nuclear Plant for failure to comply with their TS for RCS P/T limits when operating the plant with a vacuum in the reactor pressure vessel (RPV) during cold startups and cooldowns. A review of the Indian Point Units 2 and 3 TS 3.4.3 determined that TS 3.4.3 P/T limits for heatup and cooldown only provide for values greater than or equal to 0 psig. TS 3.4.3 requires that the RCS pressures and temperatures be maintained within limits at all times specified in TS Figures 3.4.3-1 and 3.4.3-2. The P/T Figures provide curves with a pressure starting at 0 psig. During past operation at both units, TS 3.4.3 P/T limits were not complied with when performing vacuum refill in Mode 5 as this process results in RCS pressures less than 0 psig. Cause of the event was a failure to recognize that a negative pressure was not allowed by the TS. Corrective actions for Unit 2 was a TS amendment that was processed and approved by the NRC to include the acceptability of the vacuum refill condition. Corrective actions for Unit 3 will be to submit a change to the TS to support this condition. The event had no effect on public health and safety.

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Indian Point Unit 2	05000-247				2 OF 4

NARRATIVE (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 February 20, 2014, Entergy identified a failure to comply with Technical Specification (TS) 3.4.3 [Reactor Coolant System (RCS) Pressure and Temperature (P/T) Limits] after review of a Westinghouse PWR Owners Group (PWROG) correspondence (OG-14-66) dated February 19, 2014. The PWROG correspondence discussed a Non-cited Violation at Perry Nuclear Plant for failure to comply with their TS for RCS P/T limits when operating the plant with a vacuum in the reactor pressure vessel (RPV) during cold startups and cooldowns. A review of the Indian Point Units 2 and 3 TS 3.4.3 determined that TS 3.4.3 P/T limits for heatup and cooldown only provide for values greater than or equal to 0 psig. TS 3.4.3 requires that the RCS pressures and temperatures be maintained within limits at all times specified in TS Figures 3.4.3-1 and 3.4.3-2. The P/T Figures provide curves with a pressure starting at 0 psig. During past operation at both units, TS 3.4.3 P/T limits were not complied with when performing vacuum refill in Mode 5 as this process results in RCS pressures less than 0 psig. The condition was recorded in the Indian Point Energy Center corrective action program (CAP) as CR-IP2-2014-00877.

TS 3.4.3, RCS Pressure and Temperature (P/T) Limits, Limiting Condition for Operation (LCO) requires RCS pressure, temperature and RCS heatup and cooldown rates be maintained within the limits specified in Figure 3.4.3-1 and Figure 3.4.3-2. Applicability is at all times. All components of the RCS are designed to withstand the effects of cyclic loads due to system pressure and temperature changes. The LCO limits the pressure and temperature changes during RCS heatup and cooldown, within the design assumptions and the stress limits for cyclic operation. Figure 3.4.3-1 and Figure 3.4.3-2 contain P/T limit curves for heatup, cooldown, in-service leak and hydrostatic testing, and data for the maximum rate of change of reactor coolant temperature. Each P/T limit curve defines an acceptable region for normal operation. The usual use of the curves is operational guidance during heatup or cooldown maneuvering, when pressure and temperature indications are monitored and compared to the applicable curve to determine that operation is within the allowable region. The TS LCO establishes operating limits that provide a margin to brittle failure of the reactor vessel and piping of the reactor coolant pressure boundary (RCPB). The P/T limit curves are composite curves established by superimposing limits derived from stress analyses of those portions of the reactor vessel and head that are the most restrictive. The P/T curves do not graphically go below 0 psig and no basis explanation is provided for vacuum refill conditions.

The RCS P/T limits LCO provides a definition of acceptable operation for prevention on non-ductile failure in accordance with 10CFR50, Appendix G. 10CFR50, Appendix G requires the establishment of P/T limits for specific material fracture toughness requirements of the Reactor Coolant Pressure Boundary (RCPB) materials. These limits represent an adequate margin to brittle failure during normal operation, anticipated operational occurrences, and system hydrostatic tests. The P/T curves are composite curves established by superimposing limits derived from stress analysis of those portions of the reactor vessel and head that are the most restrictive. The primary concern for the reactor vessel, in terms of pressure, is a low temperature overpressure condition. A pressure greater than an allowable value increases the likelihood of non-ductile failure. The P/T limits represented by the TS figures are considered acceptable limits because they preclude operation in an unanalyzed condition

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TS 3.4.3 Condition A (Requirements of LCO not met in Mode 1,2,3 or 4), Required Action A.1 is to restore parameter(s) to within limits in 30 minutes, and A.2 determine RCS is acceptable for continued operation in 72 hours. Condition C (Requirements of LCO not met any time in other than Mode 1,2,3 or 4), Required Action C.1 is to initiate action to restore parameter(s) to within limits immediately and C.2, determine RCS is acceptable for continued operation prior to entering Mode 4.

After refueling activities have been completed, the RCS must be filled completely with coolant water to support reactor startup and power operations functions of the RCS. During the filling process it is necessary to remove air and non-condensables from the reactor vessel and steam generator tubes. Failure to remove all the unwanted gases can lead to entrapped gas in the RCS coolant.

The process to remove unwanted gases in the RCS is a vacuum fill and vent process. The process requires connecting vacuum hoses to vents in the RCS or systems connected to the RCS. An educator is used to remove air and non-condensables from the RCS by pulling a vacuum on the system. Once a stable vacuum is obtained on the RCS and entrapped air has been removed from the RCS, makeup coolant water is injected into the RCS to fill the system.

The Indian Point Units 2 and 3 limits on RCS pressure only go down to 0.0 psig. However, during past operation following each refueling outage, with the plant in Mode 5 (Cold Shutdown), core loading completed and the reactor head bolts fully tensioned, the RCS pressure is reduced to less than 0.0 psig for RCS vacuum fill and vent activities

Cause of Event

The cause of the event was a failure to recognize that a negative pressure was not allowed by the TS. The change to the use of vacuum fill of the RCS had technical justification that there was no adverse impact on the RCS but the safety evaluation for the change concluded there was no affect on the TS. Direction in procedures and reinforced during training stressed that compliance with the governing TS P/T curves is preserved as long as the conditions within the RCS are maintained to the right of the effective curve.

Corrective Actions

The following corrective actions have been or will be performed under Entergy's Corrective Action Program to address the cause and prevent recurrence:

- A proposed change to Indian Point Unit 2 TS 3.4.3 was submitted to the NRC by Entergy letter dated February 24, 2014, and amendment number 274 was issued by NRC letter dated March 5, 2014, that included changes to TS 3.4.3 for P/T limits for vacuum fill.
- A proposed change to TS 3.4.3 will be prepared and submitted to the NRC for amending the Unit 3 TS 3.4.3 for P/T limits for vacuum fill.

Event Analysis

The event is reportable under 10CFR50.73(a)(2)(i)(B). The licensee shall report any operation or condition which was prohibited by the plant's TS. This condition meets the reporting criteria because during past operation following each refueling outage, the RCS pressure was reduced to less than 0.0 psig for RCS vacuum fill and vent activities.

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

The Indian point Unit 2 and Unit 3 TS 3.4.3, Figures 3.4.3-1 and Figure 3.4.3-2 heatup and cooldown limits only contain values for RCS pressures equal to or greater than 0.0 psig. TS 3.4.3 requires that RCS pressures and temperatures be maintained within the limits specified in the TS at all times. During startup from previous refueling outages, the RCS was made water solid, and during filling of the RCS, a vacuum was drawn so as to expel any air/non-condensibles from the RCS. During this evolution, the RCS was below 0.0 psig, which is outside the range of the TS 3.4.3 figures. The TS 3.4.3 requirements were not complied with during vacuum fill of the RCS and is therefore a TS prohibited condition.

The condition is not reportable in accordance with 10CFR50.73(a)(2)(ii), Any event or condition that resulted in (A) The condition of the power plant, including its principal safety barriers, being seriously degraded; or (B) the nuclear power plant being in an unanalyzed condition that significantly degraded plant safety. The heatup, cooldown limitation curves remain valid during vacuum fill in accordance with current regulations. These limitation curves were established in compliance with the methodology used to calculate and predict effects of radiation embrittlement of the Reactor Pressure Vessel beltline materials and remain valid during vacuum fill. Since operation was within the limitation curves, the RCS materials behaved in a non-brittle manner consistent with the original design basis. Therefore, there was no principal safety barriers seriously degraded nor was there any condition that significantly degraded plant safety.

Past Similar Events

A review was performed of the past three years for Licensee Event Reports (LERs) reporting a TS prohibited condition due to a non-compliant TS. No LERs were identified.

Safety Significance

This event had no effect on the health and safety of the public. The RCS pressure boundary is a barrier against the release of radioactivity generated within the reactor and is designed to ensure a high degree of integrity throughout the life of the plant. The RCS pressure boundary is capable of accommodating the temperatures and pressures associated with operational transients. The RCS components containing the reactor coolant (i.e., reactor vessel, reactor coolant pumps, pressurizer, steam generator tubes, and RCS piping) are designed with sufficient wall thickness to withstand full system pressure. The minimum wall thickness for the RCS components to withstand full vacuum (0 psia) is below the existing wall thickness of the reactor vessel, pressurizer, steam generator tubes, and the RCS piping. Performance of RCS vacuum fill and vent process to reduce RCS pressure up to and including full vacuum will not adversely affect the integrity of RCS components. The NRC review of the proposed changes to the TS P/T figures that included reference to vacuum fill of the RCS performed in Mode 5 under sub-atmospheric pressure and isothermal condition, verified that the proposed P/T limits are in accordance with Appendix G to Section XI of the ASME code and satisfy the requirements of Appendix G to 10CFR50. Therefore, RCS vacuum fill and vent is not considered to be safety significant.