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John A. Ventosa
Site Vice President

NL-12-073

May 24, 2012

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Mail Stop O-P1-17
Washington, D.C. 20555-0001

SUBJECT: Licensee Event Report # 2012-005-00, "Technical Specification Prohibited Condition Caused by a Main Steam Safety Valve Outside Its As-Found Lift Setpoint Test Acceptance Criteria Due to Spring Skew/Spindle Wear"
Indian Point Unit No. 2
Docket No. 50-247
DPR-26

Dear Sir or Madam:

Pursuant to 10 CFR 50.73(a)(1), Entergy Nuclear Operations Inc. (ENO) hereby provides Licensee Event Report (LER) 2012-005-00. The attached LER identifies an event where there was a Technical Specification prohibited condition for an inoperable Main Steam Safety Valve, 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-IP2-2012-01311.

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

Sincerely,

Patrick W. Conway for J.A. Ventosa

JAV/cbr

cc: Mr. William Dean, Regional Administrator, NRC Region I
NRC Resident Inspector's Office, Indian Point 2
Mrs. Bridget Frymire, New York State Public Service Commission
LEREvents@INPO.org

*Lead
NRK*

LICENSEE EVENT REPORT (LER)

Estimated burden per response to comply with this mandatory collection request: 80 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 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects.resource@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 05000-247	3. PAGE 1 OF 4
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4. TITLE: Technical Specification Prohibited Condition Caused by a Main Steam Safety Valve Outside its As-Found Lift Setpoint Test Acceptance Criteria Due to Spring Skew/Spindle Wear

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
3	2	2012	2012	005 - 00		05	24	2012	FACILITY NAME	DOCKET NUMBER 05000

9. OPERATING MODE 1	10. POWER LEVEL 100%	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)							
		<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)				
		<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 Steven Manzione, Component Engineering Supervisor	TELEPHONE NUMBER (Include Area Code) (914) 254-6772
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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
X	SB	RV	C710	Y					

14. SUPPLEMENTAL REPORT EXPECTED <input type="checkbox"/> YES (If yes, complete 15. EXPECTED SUBMISSION DATE) <input checked="" type="checkbox"/> NO	15. EXPECTED SUBMISSION DATE
	MONTH DAY YEAR

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

On March 2, 2012, during the performance of surveillance procedure 3-PT-R006A, main steam safety valve (MSSV) MS-46D failed its As-Found lift set point pressure test. In accordance with the test, these valves must lift at +/- 3% of their required setting. Valve MS-46D lifted at 1136.9 psig, 24.9 psig outside its acceptance range of 1048 to 1112 psig. The other 9 MSSVs tested passed their As-Found test criteria. Technical Specification (TS) 3.7.1, "Main Steam Safety Valves," requires the MSSVs to be operable in accordance with TS Table 3.7.1-1 and Table 3.7.1-2. TS Surveillance Requirement (SR) 3.7.1.1 requires each MSSV be verified to lift per Table 3.7.1-2 in accordance with the Inservice Testing Program. Operability of the MSSVs includes the ability to open within the setpoint tolerances. As valve MS-46D was found outside its limit it failed As-Found testing and was declared inoperable. Valve MS-46D was adjusted and returned to operable. Subsequent disassembly and evaluation identified the cause. The direct cause of MSSV MS-46D failing its pressure test was lifting outside its acceptable range (greater than 3% of its nominal set point). The apparent cause was internal friction caused by spring skew and spindle wear. Corrective actions included valve disassembly/inspection and repair, valve adjustment to the operability set-pressure band, and re-testing. A modification approved in 2011 will install bronze wear sleeves along the inner diameter of the spindle contact points (adjusting bolt inner diameter, upper and lower spring washer inner diameter). The event had no effect on public health and safety.

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Indian Point Unit 2	05000-247	2012	- 005	- 00	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 March 2, 2012, while at 100% reactor power, at approximately 10:52 hours, during the performance of surveillance procedure 2-PT-R006A, main steam (MS) {SB} safety valve (MSSV) {RV} MS-46D failed its As-Found lift set point pressure test. In accordance with the test, MSSVs must lift at +/- 3% of their required setting. Valve MS-46D lifted at 1136.9 psig, 24.9 psig outside its acceptance range of 1048 to 1112 psig. The other nine MSSVs valves tested passed their As-Found test criteria and were left within +/- 1% of their required setting in accordance with the test procedure. Adjustments were made to MS-46D in accordance with the test procedure and subsequent re-testing was successful in getting the valve to lift within the accepted range. Technical Specification (TS) 3.7.1, (Main Steam Safety Valves), requires the MSSVs to be operable in accordance with TS Tables 3.7.1-1 and 3.7.1-2. TS Surveillance Requirement (SR) 3.7.1.1 requires each MSSV be verified to lift per Table 3.7.1-2 in accordance with the Inservice Testing (IST) Program. Operability of the MSSVs is determined by periodic surveillance testing in accordance with the TS and IST program. As valve MS-46D was found outside its acceptable range it failed its As-Found test criteria and was declared inoperable. MSSV MS-46D is associated with SG-34. The condition was recorded in the Indian Point Energy Center (IPEC) Corrective Action Program (CAP) as Condition Report CR-IP2-2012-01311.

There are five code safety valves (MSSVs) and one atmospheric dump valve (ADV) {RV} on each main steam (MS) line outside the Reactor Containment {NH} and upstream of the MS isolation valves {ISV}. The MSSVs consist of four 6-inch by 10-inch and one 6-inch by 8-inch valve per SG on each of four MS lines for a total of 20 valves. The MSSV's provide a heat sink for the reactor coolant system if the Main Condenser is unavailable and the Atmospheric Dump Valves can not relieve steam line pressure. The five valves on each steam line are set to open at 1065, 1080, 1095, 1110, and 1120 psig. The operability of the MSSVs is defined as the ability to open within the set point tolerances, relieve SG overpressure, and reset when pressure has been reduced. The accident analysis requires five MSSVs per SG to provide overpressure protection for design basis transients occurring at 102% reactor thermal power. The MSSVs are Code relief valves, manufactured by Crosby-Ashton {C710}. Valve MS-46D is a 6-inch by 10-inch Crosby-Ashton valve Model # HA-65W.

An extent of condition (EOC) was performed that As-Found tested two additional valves in In-Service Test (IST) Group II for the subject failure (2 additional valves total). Both EOC valves were found satisfactory. All the IST Group II valves (MSSVs) have been tested within the last four years. All MSSVs have been tested in the last four years per the IST program. The condition applies to the remaining 19 MSSVs at Unit 2 and the 20 MSSVs at Unit 3.

Cause of Event

The apparent cause for valve MS-46D lifting at greater than 3% of its nominal set point was due to internal friction caused by spindle wear and spring skew. All springs exhibit some spring skew causing the spindle and internals to not remain perpendicular to the centerline of the valve and creating contact with the guide. In most cases the spring skew is acceptable but if the spring skew is too great it will push the moving internal parts off to one side and produce frictional forces that will affect the set point. The typical result is the relief valve initially lifts above its setpoint.

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Indian Point Unit 2	05000-247	2012	- 005	- 00	3 OF 4

During performance of the 6 year internal inspection Preventive Maintenance (PM) on March 11, 2012, the spindle of valve MS-46D was found to have areas of wear around its circumference in the form of small steps. The condition is commonly found with larger valves and is generally caused by the spring pushing the spindle slightly off of the valve centerline and creating contact with the valve guide. An assessment by the valve vendor concluded that it was likely that the failure of the valve to lift at the required set pressure was caused by one the steps coming in contact with the adjusting bolt/spring washer bore at some point along the length of the spindle. This type of wear is attributed to system vibration during power operation. In a high flow system, the result would be increased wear along the spindle in the form of steps which were found with MS-46D. It is known that all valves experience wear and in most cases the wear is low level and does not have any adverse affect on valve operation. However, in some cases, spindle wear can cause additional friction and out-of-specification set point during As-Found testing. The MSSV's are installed in a high flow, high pressure system causing the spindles to touch their contact points including the spring washer inside diameter (ID) and adjusting bolt ID, resulting in wear in the form of steps on the spindle. When the valves are actuated during set pressure testing, it is possible for these steps to come in contact with the adjusting bolt/spring washer bore at points along the length of the spindle causing increased friction in the opening direction and resulting in elevated As-Found set pressures. This is the cause of the test failures for MS-46D.

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:

- Adjusted and tested valve MS-46D and left valve within the +/- 1% As-Left set point criteria.
- In accordance with the In-service Test (IST) program two additional valves in IST Group II were tested for the subject failure (2 additional valves). Both extent of condition (EOC) valves tested satisfactorily.
- Performed Preventive Maintenance (PM) on valve MS-46D and returned valve to service after successful testing.
- A modification has been approved to install bronze wear sleeves in the spring washers and adjusting bolts during future PMs on the MSSVs.

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 TS. TS 3.7.1, "Main Steam Safety Valves," requires the MSSVs to be operable in accordance with TS Tables 3.7.1-1 and 3.7.1-2. TS Surveillance Requirement (SR) 3.7.1.1 requires each MSSV be verified to lift per Table 3.7.1-2 in accordance with the Inservice Testing Program. Operability of the MSSVs includes the ability to open within the setpoint tolerances. On March 2, 2012, valve MS-46D was found outside its limit therefore, it failed its As-Found testing criteria. Subsequently, valve MS-46D was disassembled, inspected and an evaluation performed to determine the cause of the condition. On March 25, 2012, the apparent cause was determined to be internal friction caused by spindle wear and spring skew during the operating cycle. Spindle wear and spring skew are not normal drift therefore the valve may have been inoperable during past operation. As it is not possible to determine when the valve would not have met its set point lift pressure range, the valve was concluded to be inoperable for greater than the TS allowed completion time.

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Indian Point Unit 2	05000-247	2012	- 005	- 00	4 OF 4

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

An apparent cause evaluation per CR-IP2-2012-01311 concluded the condition resulted in inoperability of the valve. An evaluation of the accident analysis was performed to determine the impact of one MSSV with a higher opening set point. The analysis concluded the condition would not result in loss of safety function. Therefore, this condition is not reportable under 10CFR50.73(a)(2)(v) as a safety system functional failure.

Past Similar Events

A review was performed of Licensee Event Reports (LERs) for the past three years for any events reporting TS prohibited conditions due to multiple test valve failures. LER-2010-002 reported two MSSV's failures, one of which was due to valve spring skew and the other was set point drift. The inner diameter of both valves' guide bearings were increased to reduce the potential for spring skew. The work history of the valve reported in LER-2010-002 was determined to have had its guide bearing inner diameters increased to the vendor recommended maximum. A corrective action (CAs) for one valve (MS-48C) reported in LER-2010-002 was to polish out a mark on the spindle where it had been coming in contact with the guide bearing. The valve spindle was not replaced. After reviewing the collective issues from the past events, the frequency of the PM for the MSSVs was increased from 8 to 6 years. This event was not prevented by the change in PM frequency as the PM frequency change implementation was still outstanding for this valve.

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 there were no accidents or transients requiring the MSSVs.

There was no significant potential safety impact of the condition under reasonable and credible alternate conditions. Had an accident or transient occurred during the condition of the out of tolerance MSSV, the condition would not have significantly affected accident mitigation capability and the MSSVs overpressure function would have been adequate. The design basis of the MSSVs is to limit the secondary system pressure to 110% of design pressure when passing 100% of design steam flow. The combined MSSVs are sufficient to relieve 108% of design steam flow. Each MS line has an ADV capable of releasing steam to the atmosphere. The ADVs have the capability to relieve approximately 10% of total steam. The combined pressure relief capability of the MSSVs and ADVs is approximately 118% of rated steam flow and adequate pressure relief was available with 19 of 20 MSSVs and 4 ADVs as a result of 1 of the 20 MSSVs being out of tolerance. The limiting UFSAR Chapter 14 transients which do not credit the ADVs and which are impacted by the higher MSSV set point, were evaluated and it was concluded that the acceptance criteria for the transients would have been met with the one out of tolerance MSSV.