



Benjamin C. Waldrep
Vice President
Harris Nuclear Plant
5413 Shearon Harris Rd
New Hill NC 27562-9300

919-362-2502

10 CFR 50.73

May 11, 2015
Serial: HNP-15-042

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Shearon Harris Nuclear Power Plant, Unit No. 1
Docket No. 50-400/Renewed License No. NPF-63

Subject: Licensee Event Report 2015-001-00, Safety Valve Settings Outside Technical
Specification Tolerance

Ladies and Gentlemen:

Duke Energy Progress, Inc., submits the enclosed Licensee Event Report 2015-001-00 in accordance with 10 CFR 50.73 for Shearon Harris Nuclear Power Plant, Unit 1. This report describes a condition where surveillance testing identified safety valve settings outside of technical specification allowed tolerance. The safety valve settings were restored to within the allowed tolerance.

This document contains no new regulatory commitments.

Please refer any questions regarding this submittal to Dave Corlett, Regulatory Affairs Manager, at (919) 362-3137.

Sincerely,

A handwritten signature in black ink, appearing to read "B. C. Waldrep".

Benjamin C. Waldrep

Enclosure: Licensee Event Report 2015-001-00

cc: Mr. J. D. Austin, NRC Sr. Resident Inspector, HNP
Ms. M. Barillas, NRC Project Manager, HNP
Mr. V. M. McCree, NRC Regional Administrator, Region II



LICENSEE EVENT REPORT (LER)

(See Page 2 for required number of digits/characters for each block)

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 FOIA, Privacy and Information Collections 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 Shearon Harris Nuclear Power Plant, Unit 1	2. DOCKET NUMBER 05000400	3. PAGE 1 OF 4
---	-------------------------------------	--------------------------

4. TITLE
Safety Valve Setpoint Drift

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
03	12	2015	2015	001	00	05	11	2015	None	
									FACILITY NAME	DOCKET NUMBER
									None	

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)
	<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)
10. POWER LEVEL 100	<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

LICENSEE CONTACT Dave Corlett, Manager, Regulatory Affairs	TELEPHONE NUMBER (Include Area Code) 919.362.3137
---	--

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

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX
B	SB	RV	Crosby	N	B	AB	RV	Crosby	N

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

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

On March 12, 2015, while operating at 100% power in mode one, surveillance testing identified the lift setting of main steam (MS) safety valve (SV) 1MS-49 was outside of the technical specification (TS) allowed tolerance. Testing of all other installed MSSVs identified four additional MSSVs that were also outside of the TS allowed tolerance. On April 9, 2015, while shutdown for a refueling outage, pressurizer SV 1RC-127 was found outside its TS allowable tolerance. The primary cause of the SV lift settings being outside of the TS allowed tolerance was setpoint drift incompatible with analysis specified criteria. 1RC-127 was also determined to have an operating history of being outside of tolerance when tested. The valve installed as 1RC-127 was removed from service, and all six valve lift settings have been restored to within the allowable tolerance. The 1% TS tolerance is more restrictive than the American Society of Mechanical Engineers code allowed tolerance of 3%. The primary corrective action to preclude recurrence will be implementation of a revised safety analysis that accommodates increased setpoint drift and supports revised technical specification setpoints. The condition is similar to that reported in licensee event report 2013-002-00. The small deviations beyond the allowable tolerance result in a very low safety significance.



**LICENSEE EVENT REPORT (LER)
CONTINUATION SHEET**

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 FOIA, Privacy and Information Collections 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	2. DOCKET	6. LER NUMBER			3. PAGE		
Shearon Harris Nuclear Power Plant, Unit 1	05000400	YEAR	SEQUENTIAL NUMBER	REV NO.	2	OF	4
		2015	- 001	- 00			

NARRATIVE

Energy Industry Identification System (EIS) and component codes are identified in the text as [XX].

On March 12, 2015, while operating at 100% power in mode 1, safety valves (SVs)[RV] in the main steam (MS) system [SB] were being tested in accordance with technical specification (TS) surveillance requirement (SR) 4.7.1.1. The Harris design has a total of 15 MSSVs, and five of the 15 are tested each operating cycle on a rotating basis in accordance with the Harris inservice testing program.

On April 9, 2015, while shutdown for a refueling outage, a pressurizer SV [RV] in the reactor coolant system (RCS) [AB] was being tested in accordance with TS SR 4.4.2.1. The Harris design has a total of three pressurizer safety valves (PSVs), and one is scheduled for testing each refueling outage on a rotating basis in accordance with the Harris inservice testing program.

The MSSVs and PSVs were manufactured by Crosby, models DS-C-57374 and DS-C-56964 respectively. No other systems, structures or components were inoperable at the time that contributed to the event.

This event is reportable in accordance with 10 CFR 50.73(a)(2)(i)(B) because there is evidence the valve lift settings were outside of the tolerance prescribed by technical specifications prior to discovery.

Event Description

Five MSSVs are scheduled to be tested every operating cycle. Of the five scheduled to be tested in operating cycle 19, 1MS-55 was tested on July 10, 2014, and 1MS-49 was tested on March 12, 2015. Both were found to have lift settings outside of Technical Specification (TS) allowed tolerance as specified in table 3.7-2 of TS 3.7.1, turbine cycle SVs. The scope of the testing was expanded and the other ten MSSVs, not originally scheduled to be tested at this time, were tested to determine the extent of condition. Of those ten additional valves, 1MS-45, 1MS-51, and 1MS-53, were also found outside of the TS allowed tolerance. Upon completion of testing of each of the valves, the lift setting was adjusted and all 15 of the tested valves were confirmed to be left within the TS allowed tolerance. Because the condition was discovered during routine surveillance testing, and multiple valves were discovered outside of tolerance, there is evidence the condition occurred prior to discovery as discussed in NUREG-1022, Revision 3. The specific date and time at which the valves became out of tolerance is not known and cannot be determined. Testing of the MSSVs does not cause the main valves to lift to relieve pressure, so there is no transient caused by testing of the valves. No other systems, structures or components were inoperable at the time that contributed to the event. There were no automatically or manually initiated safety system responses to the out of tolerance conditions identified.

One reactor coolant system (RCS) pressurizer SV (PSV) is scheduled to be tested every refueling outage. 1RC-127 was tested on April 9, 2015, and found with a lift setting outside of tolerance. A spare PSV was installed in the 1RC-127 location and confirmed to be left within the allowed tolerance. Because the condition was discovered during routine surveillance testing, a review of data was performed which revealed that 1RC-127 has been found on multiple occasions with a lift setting outside of the allowed tolerance. Therefore, there is evidence the condition occurred prior to discovery as discussed in NUREG-1022, Revision 3. The specific date and time at which the valve became out of tolerance is not known and cannot be determined. Testing of the PSV is accomplished by removing the valve from the system during a refueling outage and having the valve tested by a vendor. Therefore, the testing does not cause a system transient. No other systems, structures or components were inoperable at the time that contributed to the event. There were no automatically or manually initiated safety system responses to the out of tolerance conditions identified.

**LICENSEE EVENT REPORT (LER)
CONTINUATION SHEET**

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE		
Shearon Harris Nuclear Power Plant, Unit 1	05000400	YEAR	SEQUENTIAL NUMBER	REV NO.	3	OF	4
		2014	- 003	- 00			

NARRATIVE

Causal Factors

The cause of the MSSV lift settings being out of tolerance was determined to be setpoint drift incompatible with analysis specified criteria. As described in Electric Power Research Institute report TR-105872S and Nuclear Regulatory Commission Information Notice 2006-24, setpoint drift is a common phenomenon and the timing or degree of the drift cannot be predicted or determined with a high level of confidence. The common causal factors are an aggregate of aging, binding, bonding, and corrosion. Each of these alone are failure causes in their classic definition. The factors above preclude accurate determination or prediction of when and how much setpoint drift can occur on the MSSVs. Therefore, the MSSV setpoint out of tolerance conditions at Harris are principally driven by the close tolerance between technical specification requirements and the ability of the valve to perform within the required pressure band.

In addition to the observed setpoint drift, the cause of the PSV lift setting being out of tolerance was historical poor performance of the specific valve. In each of the last four tests, the valve failed low with as-found values ranging from 1.09% to 1.45% below setpoint. Therefore, the evaluation concluded that the lift setting drift is specific to the valve in question and not applicable to the entire population of PSVs.

Corrective Actions

Following discovery of the out of tolerance conditions on MSSVs scheduled for testing, the scope of the testing was expanded and all installed MSSVs were tested and lift settings confirmed or readjusted to within the TS tolerance. The pressurizer SV was replaced with another confirmed to have a lift setting within the TS tolerance. Because the setpoint drift does not have a highly reliable resolution path, avoiding the condition of SVs not meeting acceptance criteria can be accomplished by revision of the safety analysis and changing the TS tolerance to accommodate the observed drift, which is consistent with American Society of Mechanical Engineers code requirements. Therefore, the corrective action to preclude recurrence will be implementation of a revised safety analysis that accommodates increased setpoint drift and supports revised technical specification setpoints. Because the MSSV lift settings have been observed to drift beyond the 1% tolerance when tested at a three-cycle interval, the testing interval has been reduced to every operating cycle. A subset of five MSSVs that historically have drifted more than the others will be tested within twelve months of start-up from the current refueling outage. In addition, upon replacement of an MSSV, the valve will be tested within three months of installation.

Safety Analysis

MSSVs

The upper limits of MS System Overpressure are 110% of the MS design pressure for American Nuclear Society (ANS) Condition II events (Anticipated Operational Occurrences or AOOs) and 120% of the MS System Design Pressure for ANS Condition III and IV events (Limiting Faults and Design Basis Accidents). The limits are presented in Final Safety Analysis Report (FSAR) Chapter 15 for the respective events.

The event with the smallest amount of overpressure margin is Turbine Trip. The event is analyzed crediting the MSSVs at the nominal settings with the TS tolerance of 1.0% added. The as-found average lift settings, adjusted to consider the impact of measurement uncertainty, are lower than lift settings modeled in the analysis, so there is no safety significance.

The main feed line break analysis is run to the point where MS pressure is controlled by the MSSVs. Only the first and second bank of MSSVs open. The observed lift settings would not cause over-pressurization of the steam system.

**LICENSEE EVENT REPORT (LER)
CONTINUATION SHEET**

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE		
Shearon Harris Nuclear Power Plant, Unit 1	05000400	YEAR	SEQUENTIAL NUMBER	REV NO.	4	OF	4
		2014	- 003	- 00			

NARRATIVE

The Small Break LOCA (SBLOCA) is affected by the MSSV lift setting because the steam generator is a heat sink to the RCS in the early phase of the event. The lowest banks of MSSV are analyzed to open at 2% above their nominal setpoint to control secondary temperature. The MSSVs banks with higher pressure settings remain closed. Therefore the observed lift settings for the MSSVs have no impact on SBLOCA.

PSV

Premature operation of the PSV could adversely impact departure from nucleate boiling ratio conditions in events such as the reactor coolant pump seized rotor. A review of FSAR chapter 15 events for a PSV tolerance of +/- 4% concluded that there would be no adverse impact due to the reported low opening pressure.

Additional Information

Harris licensee event report (LER) 2013-002-00 reported a similar condition, where two MSSVs had lift settings outside technical specification tolerances. The cause reported in that LER was setpoint drift incompatible with analysis specified criteria. The corrective action to preclude recurrence was implementation of a revised safety analysis that accommodates increased setpoint drift and supports revised technical specification setpoints. The root cause and corrective action to prevent recurrence were appropriate; however the revised safety analysis and corresponding change to the technical specifications were not completed prior to the next scheduled test, nor were interim actions established to prevent recurrence. Note that if the safety analysis and TS lift setting tolerance for the MSSVs and PSVs had been increased as planned, the as-found lift settings would have been within the 3% tolerance. Because the MSSV lift settings have been observed to drift beyond the 1% tolerance when tested at a three-cycle interval, the testing interval has been reduced to every operating cycle. A subset of five MSSVs that historically have drifted more than the others will be tested within twelve months of start-up from the current refueling outage. In addition, upon replacement of an MSSV, the valve will be tested within three months of installation.

This report contains no regulatory commitments.