



T. PRESTON GILLESPIE, JR.  
Vice President  
Oconee Nuclear Station

Duke Energy  
ON01VP / 7800 Rochester Hwy.  
Seneca, SC 29672

864-873-4478  
864-873-4208 fax  
T.Gillespie@duke-energy.com

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10CFR50.73

U.S. Nuclear Regulatory Commission  
Document Control Desk  
Washington, D.C. 20555

Subject: Oconee Nuclear Station  
Docket No. 50-287  
Licensee Event Report 287/2012-01, Revision 0  
Problem Investigation Program No.: O-12-4008

Gentlemen:


Pursuant to 10 CFR 50.73 Sections (a)(1) and (d), attached is Licensee Event Report 287/2012-01, Revision 0, regarding the discovery of three (3) Main Steam Relief Valves (MSRVs) with as-found lift setpoints out of tolerance with the Inservice Test (IST) program criteria which is a requirement to satisfy Technical Specification (TS) Surveillance Requirement 3.7.1.1.

Although the out-of-tolerance conditions were discovered during scheduled surveillance testing, and per NUREG 1022 the failures are normally considered to have occurred at time of discovery, further guidance in the NUREG also states that the failure of multiple components creates the likelihood that the condition existed during the mode of applicability (inferring that the condition existed beyond that allowed by the TS completion time) and thus is likely to be an operation or condition prohibited by Technical Specifications. Therefore, based on the NUREG guidance this report is being submitted in accordance with 10 CFR 50.73 (a)(2)(i)(B) "Any operation or condition prohibited by the plant's Technical Specifications."

There are no regulatory commitments contained in this report.

Any questions regarding the content of this report should be directed to David Haile at (864) 873-4742.

Sincerely,

  
T. Preston Gillespie, Jr.  
Vice President  
Oconee Nuclear Station

Attachment

IE22  
MRR

cc:

Mr. Victor McCree  
Administrator, Region II  
U.S. Nuclear Regulatory Commission  
Marquis One Tower  
245 Peachtree Center Ave., NE, Suite 1200  
Atlanta, GA 30303-1257

Mr. John Boska  
Project Manager  
U.S. Nuclear Regulatory Commission  
(Copy via E-mail)  
One White Flint-North, M/S O-8G9A  
11555 Rockville Pike  
Rockville, MD 20852-2746

Mr. Andrew Sabisch  
NRC Senior Resident Inspector  
Oconee Nuclear Station

INPO (Word File via E-mail)

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 e-mail to [infocollects.resource@nrc.gov](mailto: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.

# LICENSEE EVENT REPORT (LER)

1. FACILITY NAME Oconee Nuclear Station, Unit 3	2. DOCKET NUMBER 05000- 287	3. PAGE 1 of 5
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4. TITLE  
Three Main Steam Relief Valves (MSRV) lift pressure exceeds +1% tolerance.

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
04	13	2012	2012	-01-	00	06	7	2012	FACILITY NAME	DOCKET NUMBER

9. OPERATING MODE  1	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)						
10. POWER LEVEL  079	<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 - Specify in Abstract below or in NRC Form 366A						
	<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)							

12. LICENSEE CONTACT FOR THIS LER

NAME David C Haile	TELEPHONE NUMBER (Include Area Code) (864) 873-4742
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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	N					

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

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

On 4/13/2012, prior to shutdown of Unit 3 for refueling, all 16 of the Unit 3 Main Steam Safety Valves, referred to as Main Steam Relief Valves (MSRV) at Oconee, were tested to satisfy Technical Specification (TS) Surveillance Requirement (SR) 3.7.1.1. The testing found that the as-found lift pressure for 3 valves was higher than allowed by SR 3.7.1.1; the remaining 13 MSRVs all met the SR. Guidance from NUREG 1022 characterizes the test failure of multiple MSRVs as an indicator that the valves likely exceeded their acceptance criteria during Unit 3 operation, and thus is considered an operation in a condition prohibited by TS and reportable in accordance with 10 CFR 50.73(a)(2)(i)(B).

The cause of the MSRV test failures was determined to be setpoint drift, in parallel with current plant design restrictions which limits the upper setpoint tolerance to a maximum of +1% of nameplate set pressure. Although the lift pressures were above the acceptance criteria of +1%, [3MS-1 (1.6%), 3MS-3 (1.1%) and 3MS-4 (2.2%)], this condition is bounded by safety analysis limits and assumptions.

Plant modifications will be made to increase plant/design margins such that setpoint drift can be accommodated and procedure revisions will enhance MSRV maintenance.

Four previous similar occurrences at Oconee were reported by LER 270/2008-02-01.

## LICENSEE EVENT REPORT (LER)

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		2012	01	00	

## 17. NARRATIVE

## EVALUATION

## BACKGROUND

There are two steam lines with eight self-actuated safety valves on each line designed to limit over-pressurization of the Main Steam System [EIS: SB] to 110% of design pressure under all conditions. The Main Steam Relief Valves (MSRV) [EIS: RV] actuate to relieve excess steam during plant accidents or events such as Turbine/Reactor trips, rod withdrawal accident at power, etc. These valves have staggered set pressures with nominal values that vary from 1050 psig up to 1104 psig and an allowable tolerance of +1% to -3%, which represents an Owner established acceptance criteria that is maintained in the Updated Final Safety Analysis Report (UFSAR), Section 10.3.3.

Number of Valves per line	Nominal Set Pressure (psig)	Allowable As-Found Relief Pressures (psig)
1	1050	1018 - 1061
1	1065	1033 - 1076
1	1080	1048 - 1091
1	1090	1057 - 1101
2	1100	1067 - 1111
2	1104	1070 - 1115

The Limiting Condition for Operation (LCO) 3.7.1 states: "Eight MSRVs shall be OPERABLE on each main steam line," and is applicable in Modes 1, 2 and 3. The only Condition in TS 3.7.1 is Condition A, which is entered when one or more MSRV is inoperable. Required Action A.1 requires entry into Mode 3 within 12 hours and, A.2 requires entry into Mode 4 within 18 hours, if any MSRV is inoperable.

The only Surveillance Requirement (SR) for this specification is SR 3.7.1.1 and states: "Verify each MSRV lift setpoint in accordance with the Inservice Test Program." The TS 3.7.1 bases states: "To be OPERABLE, lift setpoints must remain within limits, specified in the UFSAR." The Inservice Test (IST) Program requires compliance to the ASME OM Code.

Prior to this event, Unit 3 was in Mode 1 at 79% power. There are no safety systems or components that interact with the MSRV's ability to function, thus no other safety system or component could have contributed to this event.

Guidance from NUREG 1022 characterizes the test failure of multiple MSRVs as an indicator that the valves likely exceeded their acceptance criteria during Unit 3 operation, and thus is considered an operation in a condition prohibited by TS and reportable in accordance with 10CFR 50.73(a)(2)(i)(B).

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## 17. NARRATIVE (continued)

## EVENT DESCRIPTION

On 4/13/2012, Oconee Unit 3 was in Mode 1 and preparing to shut down for the scheduled 3EOC26 refueling outage. Scheduled MSR/V testing to satisfy SR 3.7.1.1 was being performed. Oconee has Crosby, Model HA/HC-65W valves and tests all 16 valves each refueling outage. This practice is conservative since the minimum testing required by the SR allows as few as 20% of the MSR/Vs to be tested every 24 months. Also, after the MSR/V as-found test is complete, the test procedure requires that the lift pressure be adjusted to an optimized setting relative to the acceptance criteria.

As the 16 MSR/Vs were tested one at a time, valves 3MS-1, 3MS-3, and 3MS-4 failed their "as found" set pressure due to exceeding the +1% tolerance. The remaining 13 valves were all found within the allowable range. Upon completion of each test that yielded unacceptable results, the individual valve was declared inoperable and TS 3.7.1, Condition A was entered. The valve was then adjusted, retested, and declared operable within the time constraints (typically within 30 to 90 minutes) permitted by TS 3.7.1. The results of the valves that exceeded the allowable range are listed below:

Valve	Nameplate	+1% value	As-Found	% over Nameplate
3MS-1	1104 psig	1115 psig	1122 psig	1.6%
3MS-3	1080 psig	1091 psig	1092 psig	1.1%
3MS-4	1090 psig	1101 psig	1114 psig	2.2%

Documentation of the MSR/V multiple test failures was entered into the Duke Energy corrective action process for evaluation.

## CAUSAL FACTORS

The causal analysis investigation into the test failure of valves 3MS-1, 3MS-3, and 3MS-4, included the following potential failure modes:

- 1) Aging,
- 2) Assembly,
- 3) Binding,
- 4) Bonding/Corrosion,
- 5) Foreign Material,
- 6) Nozzle Loading,
- 7) Procedural,
- 8) Test Conditions,
- 9) Difference In Test Method,
- 10) Lift-Assist Device,
- 11) Lift-Assist Device Inputs,
- 12) Setpoint Drift

The results of this evaluation concluded that the root cause of the test failures was random setpoint drift, in parallel with the current plant design restrictions which limit the upper setpoint tolerance to +1% of nameplate set pressure.

The internal inspection of the valves did not reveal signs of actual binding, however, the potential for binding was identified in two areas; 1) the clearance between spindle and guide bearing was less than current manufacturer recommendations, and 2) signs of upper spindle wear were detected in the area of the top spring washer on 3MS-4. Therefore, potential binding was identified as a contributing cause.

## CORRECTIVE ACTIONS

## Immediate:

TS 3.7.1 Condition A was entered when each valve was found outside of its acceptance range. Each valve responded to adjustments as expected, and was tested multiple times with acceptable results before Condition A was exited.

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**17. NARRATIVE** *(continued)*

**Subsequent:**

After performing inspections on five MSRVs as part of the causal analysis, the current manufacturer's recommendation to increase the inner diameter (ID) of the guide bearing was implemented on the five inspected valves. This action reduces the potential for spindle-to-bearing drag (a contributor to setpoint drift). Also, the spindle of 3MS-4 was replaced due to wear in the area of the upper spring washer.

**Planned:**

1. Plant/design engineering changes will be made to address the restrictive design margins such that the effects of MSRV setpoint drift will be encompassed.
2. Revise the appropriate procedures to incorporate the latest manufacturer's criteria for guide bearing ID into MSRV scheduled PMs.
3. Revise the appropriate procedures to require inspection of the spindle, top spring washer (ID) and adjusting bolt (ID) in their contact area and require observed indications in those areas to be evaluated by appropriate personnel.

These corrective actions above are not considered NRC Commitment items. There are no NRC Commitment items contained in this LER.

**SAFETY ANALYSIS**

This event did not include a Safety System Functional Failure.

The occurrence of the three MSRVs having as-found setpoints which exceeded the tolerance allowed by Technical Specifications (TS) was determined to be due to setpoint drift. Although testing found the lift pressure to be above the TS acceptance criteria of +1% of nameplate set pressure, [3MS-1 (1.6%), 3MS-3 (1.1%) and 3MS-4 (2.2%)], these lift pressures are bounded by safety analysis limits and assumptions.

The safety analysis assumes one valve (usually with the highest set pressure) on each line does not open at all, and the remaining valves all lift at 2% above their nameplate pressure. 3MS-1 and 3MS-3 both had set pressures less than the 2% assumed by the safety analysis, and since testing demonstrated that all other valves would actually open within values assumed in the safety analyses, having 3MS-4 open at this slightly higher pressure remains within the bounds of the analyses. As a group, the MSRVs were capable of performing all required safety functions.

Since the beginning of cycle 26, there were no operational events which challenged the functionality of the MSRVs as a group and because the as-found lift pressures were bounded by the safety analyses, there was no impact on analyzed accidents. Therefore, there were no actual, or analyzed, consequences associated with this event and thus this event had no significance with respect to the health and safety to the plant or the public.

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**17. NARRATIVE** *(continued)*

**ADDITIONAL INFORMATION**

Energy Industry Identification System (EIIIS) codes are identified in the Text within brackets [ ].

In 2008, similar events were reported in LER 270/2008-02-01. The MSRV setpoint issues were related to Unit 2 in 2008, Unit 3 in 2007, Unit 2 in 2007, and Unit 1 in 2006. The cause of these prior issues was attributed to setpoint drift within the range of +/-3%. While enhancements to maintenance and testing can influence setpoint drift, it is recognized by the NRC (IN2006-24) as a phenomenon and can't be totally prevented. Consequently, a review of the past LER did not reveal a corrective action(s) whose implementation should have prevented this event from occurring.

There were no releases of radioactive materials, radiation exposures or personnel injuries associated with this event.

This event is not considered reportable under the Equipment Performance and Information Exchange (EPIX) program.