



Scott L. Batson
Vice President
Oconee Nuclear Station

Duke Energy
ON01VP | 7800 Rochester Hwy
Seneca, SC 29672
o: 864.873.3274

f: 864.873.4208
Scott.Batson@duke-energy.com

10 CFR 50.73

ONS-2013-020

December 19, 2013

Attn: Document Control Desk
U. S. Nuclear Regulatory Commission
11555 Rockville Pike
Rockville, MD 20852-2746

Subject: Duke Energy Carolinas, LLC (Duke Energy)
Oconee Nuclear Station Unit 3
Docket No. 50-287
Licensee Event Report 287/2013-01, Revision 0
Problem Investigation Program No.: O-13-11963

Enclosed is License Event Report (LER) 287/2013-01, Revision 0 for Oconee Nuclear Station (ONS), Unit 3, describing an event in which Oconee Unit 3 was manually tripped on October 24, 2013, due to Main Feedwater flow oscillations.

This report is being submitted in accordance with 10 CFR 50.73(a)(2)(iv)(A) "System Actuation."

There are no regulatory commitments contained in this LER.

Any questions regarding the content of this report should be directed to Bob Meixell of the ONS Regulatory Affairs Group, at (864) 873-3279.

Sincerely,

Scott L. Batson
Vice President
Oconee Nuclear Site

Enclosure

IE22
NRR

NRC Document Control Desk
December 19, 2013
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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. Richard Guzman
Project Manager
(by electronic mail only)
U.S. Nuclear Regulatory Commission
One White Flint North, Mail Stop O-8C2
11555 Rockville Pike
Rockville, MD 20852-2738

Mr. Eddy Crowe
NRC Senior Resident Inspector
Oconee Nuclear Station

INPO (Word File via E-mail)

bxc: ONS Site:
ONS Document Management and Information Services (Master File)*
PIP FILE*
Site PORC Members
RAG MGR/C.J. Wasik
RAG: Commitment Index/J.E. Smith# LER Book*#
Site Sections drive: \SA\ONS LERs\2013 (PDF copy)
WOE Mgr/B.J. Gatten
OPS-Procedures/D.B. Coyle#
Work Control: D.V. Deatherage#
Site Engineering/Doug Phelps#
EPIX Cord:
S.F. Hatley
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NRC FORM 366 U.S. NUCLEAR REGULATORY COMMISSION (10-2010)				APPROVED BY OMB: NO. 3150-0104 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.				EXPIRES: 10/31/2013																																																			
<h2 style="margin: 0;">LICENSEE EVENT REPORT (LER)</h2>																																																											
1. FACILITY NAME						2. DOCKET NUMBER				3. PAGE																																																	
Oconee Nuclear Station, Unit 3						05000-287				1 of 4																																																	
4. TITLE																																																											
Unit 3 Manual Reactor Trip Due to Main Feedwater Flow Oscillations																																																											
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																																															
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9. OPERATING MODE												11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)																																															
Mode 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)											
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12. LICENSEE CONTACT FOR THIS LER																																																											
NAME												TELEPHONE NUMBER (Include Area Code)																																															
Bob Meixell, Senior Nuclear Licensing Specialist												(864) 873-3279																																															
13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT																																																											
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14. SUPPLEMENTAL REPORT EXPECTED												15. EXPECTED SUBMISSION DATE																																															
<input type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE)												<input checked="" type="checkbox"/> NO																																															
16. ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)																																																											
<p>On October 24, 2013, Oconee Unit 3 was operating at 100% power in Mode 1 when Control Room operators observed that Main Feedwater flow indicators were oscillating outside of normal parameters. Control Room operators took manual control of the Integrated Control System (ICS) in an unsuccessful attempt to stabilize the Feedwater flow oscillations. With the recognition that Feedwater flow would not stabilize, the Control Room supervisor made the decision to manually trip Unit 3 at 0553 hours. During plant response monitoring after the reactor trip, four main steam relief valves (MSRV) were identified as not being completely reseated. Existing post-trip procedure guidance was used to reseat the MSRVs by reducing main steam pressure. All four MSRVs seated within allowed procedural limits. All other post trip conditions and system performance were normal and expected.</p> <p>An investigation of the event determined that the feedwater flow oscillations were caused by failure of a bushing seal (o-ring) in the actuator for Main Feedwater Control Valve (MFCV) 3FDW-32.</p> <p>This event was reported as a 4-hour notification to the NRC on October 24, 2013, in Event Notification (EN) number 49471 under 10 CFR 50.72(b)(2)(iv)(B) - RPS Actuation - Critical and 50.72(b)(3)(iv)(A) - Valid Specified System Actuation. This LER is reportable under 10 CFR 50.73(a)(2)(iv)(A) as a manual actuation of the Reactor Protection System (RPS).</p>																																																											

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17. NARRATIVE:

BACKGROUND

Main Feedwater Control Valve (MFCV) [EIS: FCV] 3FDW-32 is a fail-as-is, pneumatically operated valve, that regulates Feedwater flow to the 3A steam generator when reactor power is between approximately 15% and 100%. (3FDW-41 is the corresponding MFCV for the 3B steam generator.) The analog control signal for this valve is generated by the Integrated Control System (ICS) [EIS: JA] and transformed to a pneumatic signal via an electrical to pneumatic (E/P) converter [EIS: CNV]. Independent of the Main Feedwater control function, an Automatic Feedwater Isolation System (AFIS) circuit will automatically close the Feedwater control valves when a Main Steam Line Break (MSLB) is detected on the associated header.

When the reactor trip was initiated, Oconee Nuclear Station (ONS) Units 1 and 3 were operating in Mode 1 at approximately 100% power. Unit 2 was defueled for a scheduled refueling outage. No significant structures, systems or components were out of service such that they contributed to this event.

Technical Specification (Tech Spec) 3.7.3 "Main Feedwater Control Valves (MFCVs), and Startup Feedwater Control Valves (SFCVs)" LCO 3.7.3 requires "Two MFCVs and two SFCVs shall be OPERABLE." The Tech Spec Applicability is: "MODES 1, 2 and 3 except when all MFCVs and SFCVs are closed and deactivated or isolated by a closed manual valve." The safety function related to this Tech Spec is ability to isolate feedwater to the steam generators upon a steam line break inside containment. Following the reactor trip, 3FDW-32 closed fully and 3FDW-31 (Motor Operated Isolation Valve) also closed. Based on 3FDW-32 response and subsequent troubleshooting and repairs, Duke Energy concludes that the condition which affected the control function of 3FDW-32 did not challenge its Tech Spec function during this event.

Reportability Determination

The event was reported as a 4-hour notification to the NRC on October 24, 2013, in Event Notification (EN) number 49471 under 10 CFR 50.72(b)(2)(iv)(B) - RPS Actuation - Critical and 50.72(b)(3)(iv)(A) - Valid Specified System Actuation. This LER is reportable under 10 CFR 50.73(a)(2)(iv)(A) as a manual actuation of the Reactor Protection System (RPS).

EVENT DESCRIPTION

On October 24, 2013, Oconee Unit 3 was operating at 100% power in Mode 1 when Control Room operators noticed that Unit 3 Main Feedwater flow indicators were oscillating beyond normal parameters. Control Room operators attempted to stabilize the oscillations by taking manual control of the Integrated Control System (ICS). When these efforts were recognized to be ineffective, the Control Room supervisor made the decision to manually trip Unit 3 at 0553 hours. During plant response monitoring after the reactor trip, four main steam relief valves (MSRV) were identified as not being completely reseated. Procedural guidance was utilized to reseat the MSRVs by reducing main steam pressure. All other post trip conditions and system performance were normal and expected.

An investigation of the event determined that the feedwater flow oscillations were caused by failure of a bushing seal (o-ring) in the actuator for Main Feedwater Control Valve (MFCV) 3FDW-32 due to actuator piston rod and extension shaft linear misalignment.

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17. NARRATIVE:

The condition that caused the failure of 3FDW-32 was determined to potentially apply to the MFCVs and SFCVs on Oconee Units 1, 2 and 3. The extent of condition is being reviewed and evaluated further in the Root Cause Evaluation.

CAUSAL FACTORS

The preliminary root cause evaluation concluded that the causal factors for this event are as follows:

Root Causes:

1. The preventive maintenance activities in place were not sufficient with respect to checking for piston shaft misalignment.
2. 3FDW-32 actuator piston rod and extension shaft linear misalignment accelerated bushing seal (o-ring) degradation.

Contributing Cause:

- Based on operating experience, an actuator pressure test was used as a basis for the acceptable condition of the actuator, rather than performance of a periodic actuator rebuild. Also, the specified pressure test would not reliably identify bushing seal (o-ring) degradation.

Oconee's root cause evaluation for this event was not complete as of the date of submission of this LER. If the final root cause evaluation conclusions are significantly different than the preliminary results above, then Duke Energy will provide a supplement to this LER.

CORRECTIVE ACTIONS

Immediate:

- Performed a Trip/Transient Review per station procedures.
- Rebuilt actuators on MFCV 3FDW-32 and 3FDW-41.
- Initiated corrective actions to rebuild actuators on Unit 3 SFCVs 3FDW-35 and 3FDW-44.
- Rebuilt the actuators on MFCVs and SFCVs on Units 1 and 2 prior to restart of Units 1 and 2 from outages in November, 2013 (Unit 1), and December, 2013 (Unit 2).

Planned:

- Revise procedures to require an alignment check on the actuator piston rod and extension during valve tear-down whenever the piston rod and/or extension are replaced or disassembled.
- Modify Preventive Maintenance (PM) activities to rebuild the MFCVs and SFCVs actuators on a periodic basis.
- Modify actuator pressure testing to be more representative of valve operating position.

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17. NARRATIVE:

SAFETY ANALYSIS

The Oconee Unit 3 trip on October 24, 2013, is considered to be an uncomplicated reactor trip event with no significant impact on public health and safety. Although oscillations in Main Feedwater flow forced the unit offline, the Main Feedwater system continued to provide flow to the steam generators through the startup header and allowed operators to conduct an otherwise normal controlled shutdown. It was noted that four main steam relief valves failed to fully reseal at the normal expected pressures; however, the steam leakage was relatively small, no safety limits were challenged and no safety system actuations occurred. The valves were subsequently resealed by following procedural guidance to lower steam generator pressure incrementally. All four MSRVS seated within allowed procedural limits. A post-trip review found no procedural or human performance issues with the operator response to the event. There were no maintenance or other safety significant activities being conducted on any plant systems or equipment important to Unit 3 at the time of the trip. Therefore it is concluded that the conditional core damage probability for the Unit 3 reactor trip was very low and did not cause a significant increase in risk to the public.

ADDITIONAL INFORMATION

To determine if this event was recurring, a search of the Oconee Problem Investigation Program (PIP) database was conducted for a time period covering five years prior to the date of this event. A review of PIP and Industry OE databases was conducted with applicable words related to Feedwater oscillations to determine applicable events. Further review identified similar industry and Duke Energy events related to Feedwater oscillations. None of the identified events were similar or recurring to the event identified in this LER in relation to a misaligned shaft resulting in o-ring failure.

Energy Industry Identification System (EIS) codes are identified in the text as [XX]. This event is considered INPO Consolidated Events System (ICES) Reportable. There were no releases of radioactive materials, radiation exposures or personnel injuries associated with this event.