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ONS-2017-001

10 CFR 50.73

January 24, 2017

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

Duke Energy Carolinas, LLC (Duke Energy)
Oconee Nuclear Station (ONS), Unit 1
Docket No. 50-269
Renewed License Nos. DPR-38
Action Request No.: 02081523

Subject: Licensee Event Report 269/2016-003, Revision 0 - Engineered Safeguards Protection System Automatic Actuation Output Logic Bypassed

The enclosed Licensee Event Report (LER) describes the discovery of inoperable Engineered Safeguards Protective System (ESPS) Automatic Actuation Output Logic Channels. It was determined that the inoperable condition had existed longer than the time allowed by the Technical Specification (TS) applicable to the ESPS Automatic Actuation Output Logic Channels with no TS actions taken. Additionally, Unit 1 made MODE changes that were not allowed by TS. These conditions, which occurred during start-up from a refueling outage, constitute an "operation or condition prohibited by Technical Specifications" as described by 10 CFR 50.73(a)(2)(i)(B), thus requiring an LER to be submitted.

There are no regulatory commitments associated with this LER.

If you have any questions regarding this submittal, please contact Bob Meixell, Oconee Regulatory Affairs, at 864-873-3279.

Sincerely,

Thomas D. Ray
Vice President,
Oconee Nuclear Station

Enclosure:

LER 269/2016-003: Engineered Safeguards Protection System Automatic Actuation Output Logic Bypassed

IEZZ
NRR

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Enclosure:

**LER 269/2016-003: Engineered Safeguards Protection System
Automatic Actuation Output Logic Bypassed**



LICENSEE EVENT REPORT (LER)

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

(See NUREG-1022, R.3 for instruction and guidance for completing this form <http://www.nrc.gov/reading-rm/doc-collections/nureqs/staff/sr1022/r3/>)

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 Infocollections.Resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NE0B-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 Oconee Nuclear Station, Unit 1	2. DOCKET NUMBER 05000269	3. PAGE 1 of 4
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4. TITLE
Engineered Safeguards Protection System Automatic Actuation Output Logic Bypassed

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
11	25	2016	2016	003	0	1	24	2017	NA	05000
									FACILITY NAME	DOCKET NUMBER
									NA	05000

9. OPERATING MODE 3	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)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)
	<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)
	<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)
10. POWER LEVEL 0	<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(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)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(4)
	<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(5)
	<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> 73.77(a)(1)
	<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)(D)	<input type="checkbox"/> 73.77(a)(2)(i)
	<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)(vii)	<input type="checkbox"/> 73.77(a)(2)(ii)
		<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> OTHER Specify in Abstract below or in NRC Form 366A	

12. LICENSEE CONTACT FOR THIS LER

LICENSEE CONTACT Bob Meixell, Regulatory Affairs, Senior Nuclear Licensing Specialist	TELEPHONE NUMBER (Include Area Code) (864) 873-3279
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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
D				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:
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ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

On November 25, 2016, at 0645, with Unit 1 in MODE 3 during startup from a refueling outage, the Operations Control Room crew recognized that the Unit 1 Engineered Safeguards Protective System (ESPS) Voters 1 and 2 were bypassed, rendering both automatic actuation output logic subsystems inoperable. For Unit 1 plant conditions at the time, Oconee Technical Specification (TS) 3.3.7 Limiting Condition for Operation (LCO) required the automatic actuation output logic for Containment Isolation Valves, Reactor Building (RB) Cooling and RB Spray to be OPERABLE. Additionally, Unit 1 had made MODE changes from MODE 5 to MODE 4, and MODE 4 to MODE 3 that were not allowed by TS 3.0.4. At 0728, all ES Voters were placed in Operate and TS 3.3.7 was exited. The manual initiation functions required by TS 3.3.6 remained OPERABLE, therefore the condition did not constitute a loss of safety function. A recent procedure revision and inadequate procedural guidance for unit startup and MODE changes resulted in the unanticipated ESPS configuration. Corrective actions include revision of procedures for unit startup and MODE change verification. Due to Unit 1 operating in a configuration prohibited by TS, this event is reportable to the NRC and an LER is required per 10 CFR 50.73(a)(2)(i)(B) 'Any operation or condition which was prohibited by plant Technical Specifications.'

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NARRATIVE

BACKGROUND

The Engineered Safeguards Protective Systems (ESPS) [JE] for Oconee Units 1, 2 & 3 are Areva Teleperm XS (TXS)® digital processor based systems. The ESPS is designed to monitor selected plant parameters and initiate protective actions (start pumps, operate valves, etc.) when these parameters reach setpoint values.

The ESPS utilizes eight automatic actuation output logic channels grouped into an Odd Voter Train (Channels 1, 3, 5, and 7) and Even Voter Train (Channels 2, 4, 6, and 8). The ESPS Voters monitor for the required coincident logic (two-out-of-three) to initiate the system level protective actions (initiation of an output actuation channel).

The ODD/EVEN Voter designation is associated with redundant actuation devices. The ODD1 and ODD2 Voters provide output to ESPS actuation logic channels 1, 3, 5 and 7. The EVEN1 and EVEN2 Voters provide output to ESPS actuation logic channels 2, 4, 6 and 8. There is an ODD/EVEN subsystem 1 and an ODD/EVEN subsystem 2. The ESPS instrument input channels provide signals to subsystems 1 and 2. Either voter subsystem is capable of performing all required protective actions. ESPS actuated devices are actuated by two RO relays connected in series. To actuate a device, ESPS must send a signal from both binary output modules to energize the actuation relays. This prevents inadvertent actuation.

The ESPS Voter Manual Bypass key switches are administratively controlled (no hardware or software interlocks). In Manual Bypass, ESPS Automatic Actuation by the affected Voter is blocked. The Manual Trip is still functional with the Voter in Manual Bypass. Only one set of Voters (ODD1 and EVEN1 or ODD2 and EVEN2) are to be in the Manual Bypass position at a time during the MODE of applicability.

Oconee Technical Specifications (TS) governing ESPS are:

- 3.3.5 ESPS Input Instrumentation,
- 3.3.6 ESPS Manual Initiation,
- 3.3.7 ESPS Automatic Actuation Output Logic Channels.

TS 3.3.7 'Engineered Safeguards Protective System (ESPS) Automatic Actuation Output Logic Channels' requires eight ESPS Automatic Actuation Output Logic Channels to be OPERABLE in MODES 1 and 2, and in MODES 3 and 4 when the associated ES equipment is required to be OPERABLE. Automatically actuated features include High Pressure Injection (HPI) [BG], Low Pressure Injection (LPI) [BP], Reactor Building (RB) Cooling [BK], RB Spray [BE], and RB Isolation.

Of the TS 3.3.7 automatically actuated features, Containment Isolation Valves, RB Cooling and RB Spray were identified as being impacted for the event described in this LER. TS 3.6.3 'Containment Isolation Valves' requires each containment isolation valve to be OPERABLE in MODES 1, 2, 3, and 4. TS 3.6.5 'Reactor Building Spray and Cooling Systems' requires one train of RB Spray and two trains of RB Cooling to be OPERABLE during MODES 3 and 4. Therefore, based on TS 3.6.3 and TS 3.6.5 required MODES of applicability, TS 3.3.7 ES Automatic Actuation Output Logic Channels were required for Containment Isolation Valves, RB Cooling and RB Spray during the time the ES Voters were bypassed. TS 3.3.7 Condition A "One or more automatic actuation output logic channels inoperable," has a Completion Time of 1 hour. Oconee Unit 1 entered MODE 4 on November 24, 2016, at 2301. On November 25, 2016, at 0728, all ES Voters were placed in Operate and TS 3.3.7 was exited.

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NARRATIVE

Unit 1 was in a condition with both ESPS automatic actuation output logic subsystems inoperable for 8 hours and 27 minutes while in the Mode of Applicability without having taken the Required Action of TS 3.3.7, Condition A. Additionally, Unit 1 made MODE changes that were not allowed by TS 3.0.4, from MODE 5 to MODE 4, and MODE 4 to MODE 3 with inoperable automatic actuation output logic channels.

Due to Unit 1 operating in a configuration prohibited by TS 3.3.7, this event is reportable to the NRC and an LER is required per 10 CFR 50.73(a)(2)(i)(B) 'Any operation or condition which was prohibited by plant Technical Specifications.' The manual initiation functions required by TS 3.3.6 remained OPERABLE; therefore, the condition did not constitute a loss of safety function.

At the time this condition was identified, Oconee Unit 1 was in MODE 3, and Units 2 and 3 were operating in MODE 1 at approximately 100% power. There were no structures, systems or components out of service at the time of this event that contributed to this event. No change in plant MODE or reactor power occurred on any unit as a result of the conditions described within this report.

EVENT DESCRIPTION

Oconee Unit 1 entered MODE 4 on November 24, 2016, at 2301 during startup from a refueling outage. On November 25, 2016, at 0645, with Unit 1 in MODE 3, the Operations Control Room crew recognized that the Unit 1 Engineered Safeguards Protective System (ESPS) Voters (Odd and Even) 1 and 2 were bypassed, rendering both automatic actuation output logic subsystems inoperable. Oconee Technical Specification (TS) 3.3.7 requires the automatic actuation output logic for Containment Isolation Valves, Reactor Building (RB) Cooling and RB Spray to be OPERABLE for the Unit 1 plant conditions at the time (MODE 3). At 0728, all ES Voters were placed in Operate and TS 3.3.7 was exited.

Containment Isolation Valves, RB Cooling and RB Spray automatically actuated features were identified as being impacted for the event described in this LER. TS 3.6.3 'Containment Isolation Valves' requires each containment isolation valve to be OPERABLE in MODES 1, 2, 3, and 4. TS 3.6.5 'Reactor Building Spray and Cooling Systems' requires one train of reactor building spray and two trains of reactor building cooling to be OPERABLE during MODES 3 and 4. Therefore, based on TS 3.6.3 and TS 3.6.5 required MODES of applicability, TS 3.3.7 ES Automatic Actuation Output Logic Channels were required for Containment Isolation Valves, RB Cooling and RB Spray during the time the ES Voters were bypassed. TS 3.3.7 Condition A "One or more automatic actuation output logic channels inoperable," has a Completion Time of 1 hour. Oconee Unit 1 was in a condition with both ESPS automatic actuation output logic subsystems inoperable for 8 hours and 27 minutes while in the Mode of Applicability without having taken the Required Action of TS 3.3.7, Condition A. Additionally, Unit 1 made MODE changes that were not allowed by TS from MODE 5 to MODE 4, and MODE 4 to MODE 3 with inoperable automatic actuation output logic channels.

CAUSAL FACTORS

The apparent cause that resulted in the condition prohibited by TS was inadequate procedural guidance in MODE change verification procedures and unit startup procedures for ensuring the ESPS was properly aligned prior to being required by TS. Additionally, causal analysis determined that a recent testing procedure revision resulted in the specific conditions which led to the improper ESPS configuration for this Unit 1 startup, conditions which had not been present during startups from previous outages since the digital ESPS was installed.

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NARRATIVE

CORRECTIVE ACTIONS

Immediate/Completed Actions:

- Unit 1 ESPS Voter Manual Bypass key switches were placed in Operate and TS 3.3.7 was exited.
- Unit 1, 2 and 3 startup procedures were placed on hold and procedure revision requests generated to ensure ESPS Voter Manual Bypass key switches are in Operate prior to entering MODE 4.
- Procedure revision requests were generated to revise Unit 1, 2 and 3 MODE change verification procedures to ensure all systems required to be OPERABLE for the next MODE are configured to support OPERABILITY.

Planned Action:

- Revise Unit 1, 2 and 3 procedures for unit startup and MODE change verification to ensure systems required to be OPERABLE for the next MODE are configured to support OPERABILITY.

SAFETY ANALYSIS

The subject event is of very low safety significance based on the following considerations. First, although the Engineered Safeguards Protective System (ESPS) automatic actuation signals were bypassed and unavailable, the associated Emergency Core Cooling System (ECCS) functions were available with manual operator actions. Emergency procedures direct operators to verify ES actuation and to manually start ECCS equipment if required for accident conditions. Operators are trained for this scenario and the action is considered to be very reliable. Second, the period of inoperability of the ES signals was very short, approximately 8 hours, which on an annual basis represents an unavailability of less than 0.1%. Therefore, the likelihood of a LOCA or other accident requiring ES actuation during this 8 hour period is extremely small.

When these considerations are taken together, it is concluded that the conditional core damage probability for this ES inoperability event is very low and had no significant impact on public health and safety.

ADDITIONAL INFORMATION

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

In Block 13 on page 1, SYSTEM, COMPONENT and MANUFACTURER codes are not included because this event did not involve a component failure, and this event is reportable to ICES. (ICES replaced EPIX.)

SIMILAR EVENTS

A search for similar events revealed LER 269/2011-01, Rev. 1 (ML12055A336), "Reactor Protection System Overpower Flux/Flow/Imbalance Channels Inoperable." The event described in that LER involved operation prohibited by TS during implementation of Oconee Unit 1 digital Reactor Protection System/Engineered Safeguards (RPS/ES) due to a latent wiring error during installation of the digital RPS/ES modification. The 2011 event causes and corrective actions do not relate to the event described in this LER.