



April 15, 2019

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U.S. Nuclear Regulatory Commission
Washington, DC 20555

Serial No. 19-171
VCS-LIC/JRB R0
Docket No. 50-395
License No. NPF-12

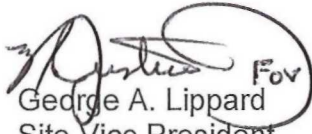
SOUTH CAROLINA ELECTRIC & GAS COMPANY
VIRGIL C. SUMMER NUCLEAR STATION (VCSNS) UNIT 1
LICENSEE EVENT REPORT 2019-001-00
CONDITION PROHIBITED BY TECHNICAL SPECIFICATION 3.4.6.1

Enclosed is Licensee Event Report (LER) 2019-001-00, for the Virgil C. Summer Nuclear Station. This report provides details concerning a past condition prohibited by Technical Specification 3.4.6.1. This report is submitted pursuant to 10 CFR 50.73(a)(2)(i)(B).

The event described in this LER occurred greater than sixty (60) days ago. The timeliness of this report is being addressed in the VCSNS Corrective Action Program by condition report CR-19-01287.

Should you have any questions, please call Mr. Michael Moore at (803) 345-4752.

Sincerely,



George A. Lippard
Site Vice President
V.C. Summer Nuclear Station

Enclosure

Commitments contained in this letter: None

cc: G. J. Lindamood – Santee Cooper
C. Haney – NRC Region II
S. A. Williams – NRC Project Mgr.
NRC Resident Inspector
J. N. Bassett – INPO
Marsh USA, Inc.



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
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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 Information Services Branch (T-2 F43), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to InfoCollects.Resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NE08-10202, (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 Number	3. Page
V.C. Summer Nuclear Station, Unit 1	05000 395	1 OF 4

4. Title
CONDITION PROHIBITED BY TECHNICAL SPECIFICATION 3.4.6.1

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
12	6	2018	2019	- 001 - 00		4	15	2019	Facility Name	Docket Number 05000

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)(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)
	<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)
10. Power Level	<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)
100	<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 Michael S. Moore	Telephone Number (Include Area Code) (803) 345-4752
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13. Complete One Line for each Component Failure Described in this Report

Cause D	System IJ	Component DRN	Manufacturer	Reportable to ICES Y	Cause	System	Component	Manufacturer	Reportable to ICES
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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 14 single-spaced typewritten lines)

On September 16, 2017, during the Reactor Building Cooling Unit (RBCU) Functional Test, STP-116.001, RBCU condensate drain flow switch 'A' (IFS01900A) came into alarm, would not clear, and was removed from service. Since one condensate flow switch is required for compliance with Virgil C. Summer Nuclear Station (VCSNS) Technical Specifications (TS) Limiting Condition for Operation (LCO) 3.4.6.1, RBCU condensate flow switch 'B' (IFS01900B) was credited for operability for the remainder of the cycle (CY24).

On October 29, 2018, during the Refuel 24 (RF24) inspection and cleaning of IFS01900B, it was discovered that the switch did not change states and the required alarm failed to initiate when flow was applied to the drain line with demineralized water. Inspection and cleaning identified that debris in the drain sensing line, including algae growth, had constricted flow. A past operability evaluation was performed and determined that the failure mechanism indicated that IFS01900B could not have been relied on as operable during the last cycle. Conservatively, it was determined inoperable for the entirety of the past cycle.

Review of TS 3.4.6.1 station work orders identified that for short periods of time during November 10-12, 2017, the TS-required compensatory actions were not completed. Therefore, the plant operated in a condition prohibited by TS, which is and reportable under 10 CFR 50.73(a)(2)(i)(B).

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

(See NUREG-1022, R.3 for instruction and guidance for completing this form
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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 Information Services Branch (T-2 F43), U. S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by 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 NUMBER	3. LER NUMBER									
V.C. Summer Nuclear Station, Unit 1	05000-	395	<table border="1"><tr><th>YEAR</th></tr><tr><td>2019</td></tr></table>	YEAR	2019	<table border="1"><tr><th>SEQUENTIAL NUMBER</th></tr><tr><td>001</td></tr></table>	SEQUENTIAL NUMBER	001	<table border="1"><tr><th>REV NO.</th></tr><tr><td>00</td></tr></table>	REV NO.	00
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NARRATIVE**1.0 EVENT DESCRIPTION**

VCSNS TS 3.4.6.1 provides the LCO for RCS leakage detection while in Modes 1 through 4. Leakage detection consists of one RB sump level, one RB atmosphere radioactivity monitor, and one RBCU condensate flow rate monitor. When one or more of these diverse detection methods is inoperable, TS 3.4.6.1 provides compensatory actions and timeframes for implementation.

During the period of September 16, 2017 to October 6, 2018, the plant was operating in Modes 1 through 4 without an operable RBCU condensate flow switch to meet TS 3.4.6.1. IFS01900A and IFS01900B provide an alarm in the control room if high condensate flow from the RBCUs is detected, which is indicative of potential primary or secondary leakage inside containment.

Other methods of leakage detection and associated actions in TS 3.4.6.1 were reviewed for compliance. Conditions discovered during RF24 and associated evaluations performed following RF24 have determined that the LCO and associated actions were not met for short periods of time during CY24. Specifically, on November 10 and 11, 2017, an RCS water inventory balance calculation could not be performed due to a plant transient. Channel checks of the RB atmospheric radiation monitor were performed every 12 hours, however this did not meet the TS 3.4.6.1 Action c requirement for channel checks every 8 hours.

Therefore, it was determined that VCSNS did not comply with TS 3.4.6.1 Action c for short periods of time.

2.0 EVENT ANALYSIS

During RF24, it was identified that biological growth in the RBCU condensate drain sensing lines was obstructing flow. Previous cleaning efforts did not include removal of RBCU condensate drain valves that collected debris and acted as flow choke points. The restricted flow of condensate created an environment that promoted algae growth. As a result, this algae and other debris within the drain sensing lines impacted flow to the RBCU condensate drain flow switches, causing inoperable flow switches (both IFS01900A and IFS01900B) during CY24, as described below. With the installation of the new RB chiller system in preparation for RF23, the industrial cooling water supplied to the RBCU coils is now colder than the original design, resulting in increased moisture removal by the RBCUs. This larger volume of condensate is thought to be a contributor to the increased amount of algae growth over the past run cycle.

VCSNS completed RF23 on June 1, 2017 and entered normal power operations. On September 16, 2017, RBCU condensate flow switch 'A' (IFS01900A) was declared inoperable and removed from service. IFS01900A had experienced a locked in HI alarm without condensate flow present due to algae and other debris in the RBCU drain sensing line, which could not be corrected during power operation. VCSNS credited IFS01900B to meet TS LCO 3.4.6.1 for the remainder of the cycle.

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NARRATIVE

RBCU condensate flow switch 'B' (IFS01900B) was discovered inoperable on October 29, 2018, during RF24. IFS01900B was found to not respond when flow was introduced to the switch using the demineralized water system, due to algae and other debris present in the RBCU drain sensing line. A past operability determination was performed and on December 6, 2018, it was concluded that the switch could not have been relied on to actuate during the previous cycle. Therefore, it was conservatively determined to consider IFS01900B inoperable during the past cycle (June 1, 2017 to October 6, 2018).

As a result of the past operability determination for IFS01900B and the concurrent inoperability of IFS01900A, VCSNS did not have an operable RBCU condensate flow rate monitor, as required by TS LCO 3.4.6.1, from September 16, 2017 to October 6, 2018.

Evaluation of station compliance with LCO 3.4.6.1 and associated TS Actions initially determined that the required actions were implemented by normal operations procedures, including Surveillance Test Procedure STP-114.002, Operational Leakage Calculation. However, further review determined that VCSNS did not comply with TS 3.4.6.1 Action c for short periods of time during power ascension following a reactor trip on November 7, 2017. STP-114.002 work orders for November 10 and 11, 2017 were closed without being performed due to the plant transient. Therefore, the plant operated in a condition prohibited by TS, which is reportable under 10 CFR 50.73(a)(2)(i)(B).

During RF24, VCSNS Unit 1 implemented new cleaning and maintenance practices, restored operability of both IFS01900A and IFS01900B, and has exited TS 3.4.6.1 Action c.

3.0 SAFETY SIGNIFICANCE

There was no quantified risk impact from this event. The Probabilistic Risk Assessment does not model the RBCU condensate drain flow switches or credit the function. Two diverse methods of leak detection were operable at the time of the missed action. Channel checks of the RB atmospheric radiation monitor were performed every 12 hours with satisfactory results. RB sump level instrumentation was available without interruption.

4.0 PREVIOUS OCCURRENCE

There have been no other instances of TS violations related to leak detection systems in containment during the past three (3) years.

It is noted that this event is similar to LER 2007-003-01, which documents a previous TS violation due to clogging of IFS01900A and IFS01900B. However, this event differed from the event described in LER 2007-003-01 due to the failure mechanism. LER 2007-003-01 captures failure of the RBCU condensate flow switches due to inorganic foreign material within the drain lines.

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NARRATIVE**5.0 CORRECTIVE ACTIONS**

Inspection and cleaning techniques were refined and utilized to restore both RBCU condensate flow switches during RF24. Station procedure MMP-460.038, Revision 1 "Inspection, Cleaning, and Lubrication of Reactor Building Cooling Units XAA0001A/B and XAA0002A/B" has been updated to include the added cleaning techniques of the flow switches. MMP-460.038, Revision 1 added a new section, Section 7.3 and Attachment II for cleaning RBCU drain lines. This technique includes ensuring the inside of all piping around IFS01900A and IFS01900B is scrubbed to remove the buildup, soaked with hydrogen peroxide, and flushed with demineralized water multiple times. The lines are then inspected to verify cleanliness and to ensure that there are no obstructions remaining.

In addition to the refined techniques used, the pipe cleaning boundary upstream of the flow switches has been expanded to areas that were not previously included in the inspection or cleaning. This includes physical and chemical cleaning of the drain line trap and sensing lines that direct flow to the RBCU condensate flow switches. Plant engineers developed the new expanded cleaning boundary and techniques, and concluded that implementation of the new methodology provides reasonable assurance of flow switch operability.

Implementation of the expanded and refined inspection and cleaning techniques cleared the drain sensing line obstruction. Testing performed confirmed flow switch operability for both IFS01900A and IFS01900B, indicating that both would have operated as expected if the line had not been obstructed.