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A SCANA COMPANY

May 12, 2015

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

Dear Sir / Madam:

Subject: VIRGIL C. SUMMER NUCLEAR STATION (VCSNS), UNIT 1
DOCKET NO. 50-395
OPERATING LICENSE NO. NPF-12
LICENSEE EVENT REPORT (LER 2015-001-00)
REACTOR BUILDING SPRAY ISOLATION VALVE FAILURE RENDERS TRAIN OF REACTOR BUILDING SPRAY INOPERABLE

Attached is Licensee Event Report (LER) 2015-001-00, for the Virgil C. Summer Nuclear Station (VCSNS). This report describes the failure of a normally closed valve to stroke full open and was therefore unable to perform its design function. This report is submitted in accordance with 10CFR50.73(a)(2)(i)(B) and 10CFR50.73(a)(2)(v).

Should you have any questions, please call Mr. Bruce Thompson at (803) 931-5042.

Very truly yours,

George A. Lippard for TDG

Thomas D. Gatlin

WLT/TDG/ts
Attachment

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RTS (CR-14-06439/CR-15-00541)
File (818.07)
PRSF (RC-15-0069)

IE22
NRR

NRC FORM 366 (02-2014) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 01/31/2017

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.

LICENSEE EVENT REPORT (LER)

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

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
V.C. Summer Nuclear Station, Unit 1	05000 395	1 OF 3

4. TITLE

REACTOR BUILDING SPRAY ISOLATION VALVE FAILURE RENDERS TRAIN OF REACTOR BUILDING SPRAY INOPERABLE

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
										05000
3	17	2015	2015	001	00	5	12	2015	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	☐ 20.2201(b)	☐ 20.2203(a)(3)(i)	☐ 50.73(a)(2)(i)(C)	☐ 50.73(a)(2)(vii)
	☐ 20.2201(d)	☐ 20.2203(a)(3)(ii)	☐ 50.73(a)(2)(ii)(A)	☐ 50.73(a)(2)(viii)(A)
	☐ 20.2203(a)(1)	☐ 20.2203(a)(4)	☐ 50.73(a)(2)(ii)(B)	☐ 50.73(a)(2)(viii)(B)
	☐ 20.2203(a)(2)(i)	☐ 50.36(c)(1)(i)(A)	☐ 50.73(a)(2)(iii)	☐ 50.73(a)(2)(ix)(A)
10. POWER LEVEL	☐ 20.2203(a)(2)(ii)	☐ 50.36(c)(1)(ii)(A)	☐ 50.73(a)(2)(iv)(A)	☐ 50.73(a)(2)(x)
	☐ 20.2203(a)(2)(iii)	☐ 50.36(c)(2)	☐ 50.73(a)(2)(v)(A)	☐ 73.71(a)(4)
100	☐ 20.2203(a)(2)(iv)	☐ 50.46(a)(3)(ii)	☐ 50.73(a)(2)(v)(B)	☐ 73.71(a)(5)
	☐ 20.2203(a)(2)(v)	☐ 50.73(a)(2)(i)(A)	☑ 50.73(a)(2)(v)(C)	☐ OTHER
	☐ 20.2203(a)(2)(vi)	☑ 50.73(a)(2)(i)(B)	☑ 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

LICENSEE CONTACT	TELEPHONE NUMBER *(Include Area Code)*
Bruce Thompson, Manager Nuclear Licensing	(803) 931-5042

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
X	BE	ISV	A391	Y					

14. SUPPLEMENTAL REPORT EXPECTED	15. EXPECTED SUBMISSION DATE	MONTH	DAY	YEAR
☐ YES *(If yes, complete 15. EXPECTED SUBMISSION DATE)* ☑ NO				

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

On March 17, 2015 a past operability review determined that XVG03005A-SP, Outside Reactor Containment (ORC) Reactor Building (RB) Spray Sump Isolation Valve A, was inoperable due to failure to fully stroke open during a surveillance test. XVG03004A-SP, Inside Reactor Containment RB Spray Sump Isolation Valve A, and XVG03005A-SP automatically open on receipt of RWST Lo-Lo Level coincident with a SI signal to transfer XPP0038A, Reactor Building Spray Pump A, suction from the RWST to the RB Sumps. XVG03004A-SP and XVG03005A-SP are also logically tied to XVG03001A-SP, RB Spray Pump A RWST Suction Header Valve. The full-open limit switches on XVG03004A-SP and XVG03005A-SP initiate automatic closure of XVG03001A-SP. Since XVG03005A-SP did not stroke fully open, the automatic swapover sequence could not have been completed, rendering the "A" train of RB Spray inoperable.

The cause of XVG03005A-SP to fully stroke open was due to spring pack relaxation and associated torque switch setting tolerances which resulted in the torque switch opening prior to the valve reaching the 100% open limit switch.

The torque switch setting was adjusted from 1 to 1.5 to allow higher developed torque before the switch opens to trip the motor. This adjustment will also reduce the effects from spring pack relaxation.

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
		YEAR	SEQUENTIAL NUMBER	REV NO.	
V.C. Summer Nuclear Station, Unit 1	05000 395	2015	- 001	- 00	2 OF 3

NARRATIVE

EVENT DESCRIPTION

On March 17, 2015 a past operability evaluation determined that XVG03005A-SP, Outside Reactor Containment (ORC) Reactor Building (RB) Spray Sump Isolation Valve A, was inoperable for failure to fully stroke open.

The failure to stroke open occurred on February 4, 2015 at approximately 0548 during performance of STP-105.016A, Train A Charging Pump & Diesel Generator Slave Relay Testing. When the valve was tested in the open direction, the valve position did not indicate full open on the Main Control Board (MCB). Upon local inspection, the valve appeared to be full open. An at-the-valve Motor Operated Valve Analysis and Test System (MOVATS) was performed. No anomalies were found in the MOVATS data. The MOVATS test data was within Design Bases requirements and XVG03005A-SP operated as required in the open and closed directions.

The plant was operating at 100% power at the time of failure.

EVENT ANALYSIS

XVG03005A-SP is a normally closed Limitorque actuated gate valve that performs an active safety function in the open position. XVG03005A-SP must open to provide a suction path from the Reactor Building sump to XPP0038A, Reactor Building Spray Pump A, on Lo-Lo Refueling Water Storage Tank (RWST) level. XVG03005A-SP receives an automatic open signal due to recirculation sump auto switchover logic.

XVG03004A-SP and XVG03005A-SP are also logically tied to XVG03001A-SP, RB Spray Pump A RWST Suction Header Valve. The full-open limit switches on XVG03004A-SP and XVG03005A-SP initiates an automatic closure of XVG03001A-SP. XVG03004A-SP and XVG03005A-SP automatically open on receipt of RWST Lo-Lo Level coincident with a SI signal. XVG03001A-SP automatically closes when both of the sump isolation valves are full open. This prevents further drain down of the RWST and completes the suction swap over for XPP0038A to its associated RB sump.

The failure of XVG03005A-SP to stroke open was attributed to spring pack relaxation and associated torque switch setting tolerances which resulted in the torque switch opening prior to the valve reaching the 100% open limit switch. This failure mode would allow XVG03005A-SP to open 90%, but stop before reaching the full open limit switch. Analysis has determined that Limitorque valves stroking open to greater than 90% are essentially fully open. XVG03005A-SP would pass sufficient flow at 90% open to the suction of XPP0038A. However, the closure interlock associated with XVG03001A-SP would not be satisfied.

With XVG03005A-SP not indicating full open on the MCB, Operations would have been procedurally directed to place XPP0038A in pull-to-lock during Cold Leg Recirculation swapover.

During the period of inoperability, the "B" train RB Spray System was removed from service for approximately 1 hour for surveillance testing. This condition could have prevented the fulfillment of a safety function and is being reported under 10CFR50.73(a)(2)(v).

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
		YEAR	SEQUENTIAL NUMBER	REV NO.	
V.C. Summer Nuclear Station, Unit 1	05000 395	2015	- 001	- 00	3 OF 3

NARRATIVE

SAFETY SIGNIFICANCE

Station procedure for swapover of RB Spray from injection to recirculation requires Operations to ensure that XVG03004A-SP and XVG03005A-SP are open. If the valves cannot be placed in their required positions, the procedure directs Operations to place XPP0038A in pull-to-lock. The procedure continues by ensuring Charging Pumps are aligned for Cold Leg Recirculation. The impact of the XVG03005A-SP failure to indicate full open would be the loss of the A train of Spray.

Valve XVG03005A-SP is not modeled in the internal events PRA model for CDF or LERF. XVG03005A-SP is modeled in the fire PRA model, for spuriously open, as a contributor to a possible RWST drain down path. The failure of XVG03005A-SP to fully stroke open was not a spurious open failure.

The XVG03001A-SP interlock is not modeled in the fire or internal events PRA. Risk associated with XVG03001A-SP being open during the swap to sump recirculation was not identified in the development of the PRA model.

Based on the above considerations there is no impact on core damage frequency (CDF) or large early release frequency (LERF) from the failure of XVG03005A-SP to stroke fully open.

PREVIOUS OCCURRENCE

XVG03005A-SP failed to stroke open on December 11, 2014 during performance of STP-112.003, RB Spray System Valve Operability Test. The valve position indicated mid-position and the Engineered Safety Feature (ESF) status light on the Main Control Board (MCB) remained DIM. Operations personnel manually stroked the valve full open and the ESF status light went bright. Local observation verified that the valve stroked open smoothly with no abnormal noise or binding. The torque switch contacts were cleaned and the limit switch contacts were inspected. Motor load data was obtained and found to be consistent with historical values. XVG03005A-SP was satisfactorily retested and declared operable.

The December 11, 2014 failure of XVG03005A-SP was the first failure of this valve to stroke open. The failure was considered to be a random, one time failure with no firm evidence that the failure would have occurred prior to the December 11, 2014 test. There have been no prior occurrences with XVG03005B-SP or XVG03004A/B-SP.

CORRECTIVE ACTIONS

The torque switch setting was adjusted from 1 to 1.5 to allow higher developed torque before the switch opens to trip the motor. XVG03005A-SP has a manufacturer supplied torque switch limit plate. The torque switch setting of 1.5 will not increase the developed torque beyond the maximum recommended torque values. Successive performances of STP-112.003 have resulted in satisfactory performance from XVG03005A-SP.

The station is considering an adjustment to the XVG03001A/B-SP interlock to 90% open limit switches instead of 100% open limit switches on XVG03004A/B-SP and XVG03005A/B-SP. This would ensure that XVG03001A/B-SP would automatically close if XVG03004A/B-SP and XVG03005A/B-SP reach 90% and stop due to over torque. The station is also considering changing the ESF lights for XVG03004A/B-SP and XVG03005A/B-SP to the 90% open limit switches to provide indication that XVG03004A/B-SP and XVG03005A/B-SP are open and capable of passing adequate flow.