



Thomas D. Gatlin
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June 24, 2014

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 2014-003-00)
COMPONENT COOLING SYSTEM EMERGENCY MAKEUP "A" VALVE
FAILED TO STROKE OPEN RENDERING TRAIN OF COMPONENT
COOLING INOPERABLE

Attached is Licensee Event Report (LER) 2014-003-00, for the Virgil C. Summer Nuclear Station (VCSNS). This report describes the surveillance test of a normally closed valve that failed to stroke open and was therefore unable to perform its design function. This report is submitted in accordance with 10CFR50.73(a)(2)(i)(B).

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

Very truly yours,

Thomas D. Gatlin

WLT/TDG/wm
Attachment

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File (818.07)
PRSF (RC-14-0104)

IE22
NRK



LICENSEE EVENT REPORT (LER)
(See Page 2 for required number of digits/characters for each block)

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.

1. FACILITY NAME

V. C. SUMMER NUCLEAR STATION, UNIT 1

2. DOCKET NUMBER

05000 395

3. PAGE

1 OF 3

4. TITLE

COMPONENT COOLING SYSTEM EMERGENCY MAKEUP "A" VALVE FAILED TO STROKE OPEN RENDERING TRAIN OF COMPONENT COOLING 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
04	26	2014	2014	003	00	06	24	2014	FACILITY NAME	05000
									FACILITY NAME	05000

9. OPERATING MODE

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)

6	<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 0%	<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
	<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)	Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

LICENSEE CONTACT

Bruce Thompson, Manager Nuclear Licensing

TELEPHONE NUMBER (Include Area Code)

(803) 931-5042

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	CC	V	A391	Y					

14. SUPPLEMENTAL REPORT EXPECTED

YES (If yes, complete 15. EXPECTED SUBMISSION DATE) NO

15. EXPECTED SUBMISSION DATE

MONTH	DAY	YEAR

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

1.0 ABSTRACT

On April 26, 2014, while performing a surveillance test, the normally closed Component Cooling (CC) System emergency makeup valve (XVG09627A-CC) failed to stroke open. During the second attempt XVG09627A-CC opened in 11.29 seconds, which exceeded the maximum allowed stroke time of ten (10) seconds. This surveillance test is performed each refueling outage and was last successfully tested during the fall 2012 refueling outage (RF20). The emergency makeup supply to the CC System is provided by the Service Water (SW) System. The SW System functions as a source of emergency makeup in the event of a complete loss of the normal makeup capability provided by the Demineralized Water System or if leakage exceeds the normal makeup capacity. The safety related function of XVG09627A-CC is to open to allow SW from the "A" Train to provide makeup to the "A" train CC system. By failing to open, this valve was unable to perform its design function without additional operator action. Since the valve did not stroke open on April 26, 2014, the station has concluded the valve may not have operated if required during the operating cycle. While XVG09627A-CC was unavailable, it was determined that XVG09627B-CC was also inoperable. A PRA risk evaluation determined the event of both valves being inoperable is of low safety significance. The cause of this event is believed to be low valve manipulation frequency, added frictional forces, and possible spring degradation. XVG09627A-CC has been rebuilt with new closure and trip springs and new packing that has a lower friction resistance. The pressure regulator closing force was also reduced. This report is submitted in accordance with 10CFR50.73(a)(2)(i)(B).



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

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1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
V. C. SUMMER NUCLEAR STATION, UNIT 1	05000 395	YEAR	SEQUENTIAL NUMBER	REV NO.	2 OF 3
		2014	- 003	- 00	

NARRATIVE

2.0 EVENT DESCRIPTION

On April 26, 2014, during VCS Refueling Outage (RF) 21, surveillance test procedure STP130.005L was performed to verify the Component Cooling (CC) System [CC] emergency makeup valve (XVG09627A-CC) [V] would stroke open on demand. The valve was actuated to the open position from the Main Control Board (MCB), but the valve remained closed as documented in surveillance test task sheet STTS 1301142-001. An immediate retest resulted in the valve opening outside of the maximum allowed stroke time of ten (10) seconds. The valve was declared inoperable and action taken per Technical Specifications 4.0.5, 3.7.3, and 3.7.4. In the event the valve did not open in an actual event, an Operator would be dispatched to manually adjust the valve off of its seat.

The valve is tested on a R01 (every refueling outage) frequency when the systems are shutdown to prevent cross-contaminating the systems.

3.0 EVENT ANALYSIS

In the event of a large CC system leak or a loss of the normal makeup capability of the Demineralized Water System, each CC System train has a service water (SW) emergency makeup supply valve. Excessive CC system leakage could be detected by pressure changes, flow rate changes, increase in the frequency and/or duration of surge tank water makeup cycles, or visual inspection of the system. The emergency makeup supply valves are designed to open automatically at one foot below the low-low surge tank level alarm setpoint to supply makeup water to the affected loop.

XVG09627A-CC is a normally closed, fail open, energize to open, four inch air operated valve (AOV) located between the SW supply lines and the CC system. The valve has an air accumulator to maintain the valve closed for approximately three hours on a loss of instrument air. The valve fails open on loss of accumulator air, but fails closed on loss of control signal, if sufficient accumulator air is available. Valve XVG09627A-CC must open in 10 seconds or less to maintain required CC Pump Net Positive Suction Head (NPSH), and to provide makeup flow for a system break or through-wall crack.

One side of the XVG09627A-CC valve is located in a raw water (SW) environment. The operator uses air to close which allows the gate to be firmly thrust into the seat so there is no cross contamination between the SW and CC systems. The valve is only cycled during refueling outages to maintain the isolation of the SW system from the CC system to ensure there is no cross-contamination.

In the 18 months between refueling outages, corrosion products and sediment could build-up on the seat and disc face. With this added layer of corrosion product and sediment, there is an increased amount of force required to remove the disc from the seat. The packing used in the valve was an older style of graphite packing that can place a higher frictional force on the stem of the valve. Greater force is required to remove the disc from the seat due to this added frictional force.

Additionally, the valve is a spring open valve. It uses four springs to remove the valve from the seat. Since the valve's safety function is to fail open, the springs are normally in a compressed state. When springs are in a fully compressed state for long periods of time they begin to set due to the grain structure realignment. Spring set effectively reduces the overall energy (opening force) stored in the spring.

**LICENSEE EVENT REPORT (LER)
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NARRATIVE

4.0 SAFETY SIGNIFICANCE

When the plant is in Modes 1-4, the train of CC associated with XVG09627A-CC is rendered inoperable when XVG09627A-CC is inoperable. The function of XVG09627A-CC to supply makeup inventory to the CC system is not risk significant and is not monitored in Mitigating Systems Performance Index (MSPI) basis.

During the period of unavailability of XVG09627A-CC, it was discovered that XVG09627B-CC was also inoperable (LER 2014-001-00 documents this failure). The failed stroke test of both XVG09627A-CC and XVG09627B-CC implies that both valves were inoperable during this period of time. A PRA risk evaluation was performed to determine the change in risk with both valves being out of service simultaneously. With both valves out of service simultaneously, the resulting change in risk is as follows:

The delta CDF is: 3.16E-08/yr
The delta LERF is: 2.70E-10/yr

The values for increased risk are well below the thresholds for safety significance (1E-06/yr and 1E-07/yr, respectively). Therefore, the event of both valves being inoperable is of low safety significance.

Reporting requirement 10CFR50.73(a)(2)(v) was made in LER 2014-001-00 for both XVG09627A-CC and XVG09627B-CC being inoperable at the same time.

5.0 PREVIOUS OCCURRENCE

There have been no previous occurrences of XVG09627A-CC failing to stroke open in the last three years.

However, XVG09627B-CC failed to stroke open when surveillance testing was performed during the fall 2012 outage (RF20) and the spring 2014 outage (RF21). LER 2013-002-00 and LER 2014-001-00 were submitted for these events.

6.0 CORRECTIVE ACTIONS

The valve was disassembled, inspected and rebuilt using new closure and trip springs. The graphite packing was replaced with Teflon packing. The air piston actuator assembly was rebuilt. All points on the valve linkage were lubricated. The pressure regulator closing force was also reduced.

The valve was stroke tested satisfactorily after being rebuilt.