



Tennessee Valley Authority, Sequoyah Nuclear Plant, P.O. Box 2000, Soddy Daisy, Tennessee 37384

March 20, 2020

10 CFR 50.73

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

Sequoyah Nuclear Plant, Unit 1
Renewed Facility Operating License No. DPR-77
NRC Docket No. 50-327

**Subject: Licensee Event Report 50-327/2020-001-00, Containment Vacuum Relief
Lines Found Isolated**

The enclosed licensee event report provides details concerning containment vacuum relief lines found isolated during normal operation. These events are being reported in accordance with 10 CFR 50.73(a)(2)(i)(B), as an event that resulted in a condition prohibited by Technical Specifications and in accordance with 10 CFR 50.73(a)(2)(ii)(B), as a condition that resulted in the nuclear power plant being in an unanalyzed condition that significantly degraded plant safety.

There are no regulatory commitments contained in this letter. Should you have any questions concerning this submittal, please contact Mr. Jeffrey Sowa, Site Licensing Manager, at (423) 843-8129.

Respectfully,

A handwritten signature in black ink, appearing to be 'MR', followed by a long horizontal line extending to the right.

Matthew Rasmussen
Site Vice President
Sequoyah Nuclear Plant

Enclosure: Licensee Event Report 50-327/2020-001-00
cc: NRC Regional Administrator – Region II
NRC Senior Resident Inspector – Sequoyah Nuclear Plant



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/nuregs/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 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 Sequoyah Nuclear Plant, Unit 1	2. Docket Number 05000327	3. Page 1 OF 6
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4. Title
Containment Vacuum Relief Lines Found Isolated

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
01	21	2020	2020	001	00	03	20	2020	NA	05000
									Facility Name	Docket Number
									NA	05000

9. Operating Mode 1	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 checked="" 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 100	<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)(ii)	
	<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)(iii)	
			<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 Zachary Kitts								Telephone Number (Include Area Code) 423-843-7018	

13. Complete One Line for each Component Failure Described in this Report									
Cause	System	Component	Manufacturer	Reportable To ICES	Cause	System	Component	Manufacturer	Reportable To ICES

14. Supplemental Report Expected					15. Expected Submission Date			Month	Day	Year
<input type="checkbox"/> Yes (If yes, complete 15. Expected Submission Date) <input checked="" type="checkbox"/> No										

Abstract (Limit to 1400 spaces, i.e., approximately 14 single-spaced typewritten lines)

On January 21, 2020, at 2218 Eastern Standard Time (EST) Operations Personnel identified that 3-out-of-3 containment vessel vacuum relief isolation valves were isolated. Operations Personnel declared the containment vessel vacuum relief lines inoperable. Operations Personnel restored the vacuum relief lines to operable status at 2223 EST by opening the vacuum relief isolation valves. Investigation of the condition determined that while in a refueling outage on November 13, 2019, a Licensed Operator incorrectly closed the vacuum relief isolation valves during the performance of a surveillance instruction. The cause of the event was a failure to follow the surveillance instruction by the Licensed Operator. The Operator assumed that a process was in place to restore the valves to open position. It was also determined that Operations Leadership did not establish a rigorous outage oversight plan, which precluded the ability to identify degraded or declining operator fundamental behavior. Actions being taken to address this event include a formal oversight plan to reinforce use of Operator Fundamentals, monitoring for shortfalls, and coaching to standards. Also, a revision to the common operating procedure for unit startup will ensure the vacuum relief system is aligned for Mode 4 entry.



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

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1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
Sequoyah Nuclear Plant Unit 1	05000-327	YEAR 2020	SEQUENTIAL NUMBER - 001	REV NO. - 00

NARRATIVE

I. Plant Operating Conditions Before the Event

At the time of the condition, Sequoyah Nuclear Plant (SQN) Unit 1 was in Mode 1 at 100 percent rated thermal power.

II. Description of Event

A. Event Summary:

On January 21, 2020, at 2218 Eastern Standard Time (EST) Operations Personnel identified that 3-out-of-3 containment vessel vacuum relief isolation valves [EIS Code: ISV] were isolated. Operations Personnel declared the containment vessel vacuum relief lines inoperable. Limiting Condition for Operation (LCO) 3.0.3 was entered because LCO 3.6.9, Vacuum Relief Valves, does not provide an action for more than one vacuum relief line being inoperable. Operations Personnel restored the vacuum relief lines to operable status at 2223 EST by opening the vacuum relief isolation valves.

Investigation of the condition determined that on November 13, 2019, Operations Personnel were verifying containment isolation in preparation for fuel handling using surveillance instruction, 1-SI-OPS-088-006.0, Containment Building Ventilation Isolation. During performance of the surveillance instruction, a Licensed Operator incorrectly closed the vacuum relief isolation valves.

On November 24, 2019, Unit 1 entered into Mode 4. From this date until the vacuum relief lines were restored on January 21, 2020, the actions of LCO 3.6.9 and LCO 3.0.3 were not fulfilled. This resulted in a condition prohibited by Technical Specifications (TS) and is reportable in accordance with 10 CFR 50.73(a)(2)(i)(B).

B. Status of structures, components, or systems that were inoperable at the start of the event and contributed to the event:

No inoperable structures, components, or systems contributed to this event.

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C. Dates and approximate times of occurrences:

Date/Time (EST)	Description
November 13, 2019	Licensed Operator closed all 3 vacuum relief isolation valves.
November 24, 2019 at 1427	Unit 1 enters into Mode 4. LCO 3.6.9 lowest Mode of applicability.
January 21, 2020 at 2218	Operations Personnel determined the vacuum relief lines were inoperable and took action to correct the condition.
January 21, 2020 at 2223	Operations Personnel declared vacuum relief lines operable.

D. Manufacturer and model number of each component that failed during the event:

There was no component that failed during the event.

E. Other systems or secondary functions affected:

No other systems or secondary functions were affected by this event.

F. Method of discovery of each component or system failure or procedural error:

Operations Personnel while conducting a quarterly valve stroke surveillance instruction identified 3-out-of-3 of the vacuum relief isolation valves' indication showing closed.

G. Failure mode, mechanism, and effect of each failed component:

There was no component that failed during the event.

H. Operator actions:

Operations Personnel, upon determining the containment vacuum relief lines were isolated in a Mode of TS applicability, declared the lines inoperable, entered into appropriate TS actions, and took action to restore the vacuum relief lines to operable condition.

I. Automatically and manually initiated safety system responses:

There were no automatic or manually initiated safety system responses associated with this event.

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III. Cause of the Event**A. Cause of each component or system failure or personnel error:**

The Licensed Operator who closed each of the vacuum relief isolation valves understood the procedure requirement specified in the containment isolation surveillance instruction was verification only. The Operator did not follow the procedure, believing the intent of the procedure step was to isolate the valves to closed position instead of to verify the status of the valves. The Operator further assumed that a process was in place to restore the valves to open position.

B. Cause(s) and circumstances for each human performance related root cause:

As described above, a Licensed Operator, under no time pressure, did not comply with procedure requirements and assumed that a process was in place to restore the valves to open position. TVA also determined a contributing factor wherein Operations Leadership did not establish a rigorous outage oversight plan, which precluded the ability to identify degraded or declining operator fundamental behaviors.

IV. Analysis of the Event:

The primary containment vessel is fitted with a vacuum relief (VR) system [EIS Code: BF]. The purpose of the VR system is to protect the vessel from an excessive external force. It is a self-activated system that limits external pressure on the vessel in the event of maloperation or inadvertent operation of systems that result in additional external forces on the containment vessel. Those limiting external forces are created by design basis transients: inadvertent containment spray [EIS Code: BE] actuation, inadvertent containment air return system [EIS Code: BK] operation and simultaneous occurrence of both. The VR system consists of 3 containment relief pathways (i.e. vacuum relief lines,) each containing a normally closed self-actuated vacuum relief valve and position indication. In series with the vacuum relief valve is a normally open, fail open, pneumatically operated containment isolation valve with necessary instrumentation and controls. The containment vessel VR system assures that the external pressure differential on the containment vessel does not exceed the design external pressure of 0.5 pounds per square inch delta (psid) assuming one vacuum relief valve fails to open in keeping with single failure criteria. When an external pressure exceeds a relief valve actuation force it opens allowing air flow from the annulus space through the VR pathway into the containment vessel. Additional details may be found in Section 6.2.6, "Vacuum Relief System," of the Updated Final Safety Analysis Report (UFSAR).

The containment relief pathway's pneumatically operated containment isolation valve closes when containment pressure with respect to annulus pressure reaches a instrument set point of 1.5 psid. A high pressure signal is developed from either of two sets of instrument sensors and is completely independent of the other containment isolation signals. The containment relief pathway's isolation



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valves provide containment isolation and containment integrity to control the release of radioactive materials from the containment atmosphere during design basis accidents.

Closure of all 3 containment relief pathway isolation valves ensured pathway containment isolation and integrity in the unlikely event of a design basis accident that requires mitigation of consequences, which could result in potential offsite exposure.

Closure of all 3 containment relief pathway isolation valves defeated the vacuum relief lines single failure capability, challenging the integrity of a fission product barrier in the unlikely event of a design basis transients that results in limiting external pressure on the containment vessel. This is considered to be an event that resulted in the nuclear power plant being in an unanalyzed condition that significantly degraded plant safety in accordance with 10 CFR 50.73(a)(2)(ii)(B).

Nevertheless, during the time of the inoperable containment vacuum relief lines, there were no actual safety significant consequences as a result of this event. No event occurred that required the use of the vacuum relief lines.

V. Assessment of Safety Consequences

- A. Availability of systems or components that could have performed the same function as the components and systems that failed during the event:

Analysis for excessive external forces where the relief function of the containment vacuum relief is necessary, assumes one vacuum relief valve fails to open. During the time period of inoperability, no mitigation of these forces would have been available, because all 3 vacuum relief lines were isolated.

- B. For events that occurred when the reactor was shut down, availability of systems or components needed to shutdown the reactor and maintain safe shutdown conditions, remove residual heat, control the release of radioactive material, or mitigate the consequences of an accident:

For events requiring isolation, the containment vacuum pathway containment isolation valves were isolated performing their safety function.

- C. For failure that rendered a train of a safety system inoperable, an estimate of the elapsed time from discovery of the failure until the train was returned to service:

The vacuum relief lines are not train designated, yet form a single system. None-the-less, an estimated elapsed time of 58 days, 7 hours and 56 minutes passed from November 24, 2019 at 1427 EST until the vacuum relief lines were restored to operable status on January 21, 2020 at 2223.

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VI. Corrective Actions**A. Immediate Corrective Actions:**

Operations Personnel entered into the TS LCO actions and un-isolated the containment vacuum relief isolation valves.

B. Corrective Actions to Prevent Recurrence or to reduce probability of similar events occurring in the future:

Corrective Actions are being managed via the Tennessee Valley Authority's corrective action program under condition report number 1580587. The corrective actions to be taken to address the causes of this event include:

1. Developing a Unit 2 Cycle 23 Refueling Outage Safety-Human Performance Plan to reinforce use of Operator Fundamentals, monitor for shortfalls, and coaching to standards.
2. Revising the common operating procedure for unit startup from cold shutdown to hot standby with steps to ensure vacuum relief system is aligned for Mode 4 entry.

VII. Previous Similar Events at the Same Site:

There were no previous similar events at SQN occurring within the last three years.

VIII. Additional Information

There is no additional information.

IX. Commitments:

There are no commitments.