

Tennessee Valley Authority, Post Office Box 2000, Soddy Daisy, Tennessee 37384-2000

January 6, 2016

10 CFR 50.73

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

> Sequoyah Nuclear Plant, Unit 2 Renewed Facility Operating License No. DPR-79 NRC Docket No. 50-328

# Subject: Licensee Event Report 50-328/2015-002-00, "Unanalyzed Condition due to Inoperable Containment Recirculation Drains"

The enclosed Licensee Event Report (LER) provides details concerning an unanalyzed condition that resulted from a potential blockage of two refuel canal drains on Unit 2. This report is being submitted pursuant to 10 CFR 50.73 (a)(2)(ii)(B), 10 CFR 50.73 (a)(2)(v)(B) and (D). The LER reports the discovery of two dropped cold weather suits into the Unit 2 refuel canal that could have adversely affected the safety functions of the Containment Spray and Emergency Core Cooling Systems that are needed to mitigate the consequences of a design basis accident. The effect of this condition resulted in an unanalyzed condition that significantly degraded plant safety, and a condition that could have prevented the fulfillment of the safety function that is needed to remove residual heat and mitigate the consequences of an accident.

There are no new regulatory commitments contained in this letter. Should you have questions regarding this submittal, please contact Mr. Mike McBrearty, Sequoyah Site Licensing Manager at (423) 843-7088.

Respectfully,

Christopher J. Schwarz-Site Vice President Sequoyah Nuclear Plant

Enclosure: Licensee Event Report 50-328/2015-002-00 cc: NRC Regional Administrator – Region II NRC Senior Resident Inspector – Sequoyah Nuclear Plant

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NRC FORM 3	66		U.S. NUCL	EAR REGU	LATOR	Y COMMIS	SION	APPRO	OVE	D BY OMB: NO. 3	150-0104		E	XPIRE	S: 10	//31/2018
(11-2015)	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.						t: 80 hours. to industry. Collections 0001, or by ormation and Washington, currently valid t required to		
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ABSTRACT (L On Novem equipment being decla Recirculati At that time the equipm LCO times potential fo Containme basis accio The appare the pre-job containme	ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) On November 10, 2015, at 1502 Eastern Standard Time (EST), two cold weather suits were inadvertently dropped into the equipment pit portion of the Sequoyah Nuclear Plant Unit 2 reactor cavity, resulting in two containment recirculation drains being declared inoperable. Technical Specification (TS) Limiting Condition for Operation (LCO) 3.6.15, "Containment Recirculation Drains," and TS LCO 3.0.3 were entered. The first suit was removed from the equipment pit at 1553 EST. At that time, only one of the drains remained inoperable and LCO 3.0.3 was exited. The remaining suit was removed from the equipment pit at 1556 EST, and LCO 3.6.15 was exited. Plant conditions were restored to normal within the allowed LCO times and no plant shutdown was required. The two cold weather suits in the Unit 2 reactor cavity area created the potential for obstructing the flow path for containment recirculation adversely affecting the safety function of the Containment Spray and Emergency Core Cooling Systems that are needed to mitigate the consequences of a design basis accident. The effect of this condition resulted in an unanalyzed condition that significantly degraded plant safety. The apparent cause was failure of the Maintenance personnel to identify and mitigate potential hazards and risks during the pre-job briefs, 2-minute rule, and walk downs. Corrective action includes addition of risk mitigation strategies to the containment access control procedure. Unit 1 was unaffected by this event.															

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NRC FORM 366A	U.S. NUCLEAR REGULAT	ORY COMMISSION	APPROVED BY OMB: NO. 315	0-0104		EXPIR	ES: 10/31/2018
(11-2015)	LICENSEE EVENT REP CONTINUATION S	ORT (LER) HEET	Estimated burden per response to com lessons learned are incorporated into comments regarding burden estimate 1 F53), U.S. Nuclear Regulatory Commi Infocollects.Resource@nrc.gov, and to NEOB-10202, (3150-0104), Office of M used to impose an information collectio NRC may not conduct or sponsor, a collection.	ply with this m o the licensin to the FOIA, F ission, Washir the Desk Offic lanagement a in does not dia nd a person	nandatory collection g process and fea- rivacy and informan- ngton, DC 20555-00 cer, Office of Inform and Budget, Washin splay a currently va- is not required to	request: back tion Coll 001, or b ation and gton, DC lid OMB respond	80 hours. Reported to industry. Send ections Branch (T-5 yo internet e-mail to d Regulatory Affairs, 2 20503. If a means control number, the to, the information
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Sequoyan Nucle		0000020		2015	- 002	-	00
NARRATIVE							
I. Plant O	perating Conditions Before	the Event					
At the time of the event, Sequoyah Nuclear Plant (SQN) Unit 1 reactor was operating at 100 percent rated thermal power (RTP) and SQN Unit 2 reactor was operating at 81 percent RTP. The condition described in this LER did not impact SQN Unit 1.							
II. Descript	tion of Events						

- - A. Event:

On November 10, 2015, at 1502 Eastern Standard Time (EST), the SQN Unit 2 main control room was notified by workers in containment that two cold weather suits had been dropped into the equipment pit portion of the reactor cavity. Operators declared the two containment recirculation drains to be inoperable and entered Technical Specification (TS) Limiting Condition for Operation (LCO) 3.6.15, "Containment Recirculation Drains," and TS LCO 3.0.3. The first suit was removed from the equipment pit at 1553. At that time, only one of the drains remained inoperable and LCO 3.0.3 was exited. The remaining suit was removed from the equipment pit at 1556, and LCO 3.6.15 was exited. Plant conditions were restored to normal within the allowed LCO times and no plant shutdown was required. The two cold weather suits in the Unit 2 reactor cavity area created the potential for obstructing the flow path for containment recirculation. Obstruction of the drains could adversely affect the safety function of the Containment Spray and Emergency Core Cooling Systems that are needed to mitigate the consequences of a design basis accident. The effect of this condition resulted in an unanalyzed condition that significantly degraded plant safety, and a condition that could have prevented the fulfillment of the safety function that is needed to remove residual heat and mitigate the consequences of an accident.

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

There were no structures, components or systems that were inoperable at the start of the event.

C. Dates and approximate times of occurrences:

The event occurred at 1502 on November 10, 2015. Maintenance Services personnel had completed removal of the Unit 2 upper ice vent curtain in preparation for the Unit 2 refueling outage. Five cold weather suits were tied together by rope and were being lowered by hand from the ice deck to the refueling floor. When the spotter signaled to stop the load, the rope jerked and the five suits slid out from the rope. Two of the cold weather suits fell under the hand rail and into the equipment pit portion of the reactor cavity.

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U.S. NUCLEAR REGULATORY COMMISSION

NRC FORM 366A (11-2015)

## LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

1. FACILITY NAME	2. DOCKET		6. LER NUMBE	R
Conversion Nuclear Diget Light 2	05000229	YEAR	SEQUENTIAL NUMBER	REV NO.
Sequoyan Nuclear Plant Unit 2	05000328	2015	- 002 -	00

NARRATIVE

C. Dates and approximate times of occurrences (continued):

Dates and Times	Description
November 10, 2015, 1502 EST	Five cold weather suits were dropped onto refuel floor; two of the suits fell into equipment pit portion of the reactor cavity.
November 10, 2015, 1502 EST	Main control room was notified.
November 10, 2015, 1502 EST	TS LCO 3.6.15 and LCO 3.0.3 were entered.
November 10, 2015, 1553 EST	First suit retrieved from Unit 2 equipment pit.
November 10, 2015, 1553 EST	LCO 3.0.3 exited.
November 10, 2015, 1556 EST	Second suit retrieved from Unit 2 equipment pit.
November 10, 2015, 1556 EST	LCO 3.6.15 exited.

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

There were no components that failed during the event. The cold weather suits are full body suits manufactured by "Iron-Tuff."

E. Other systems or secondary functions affected:

There were no other systems or functions affected by this event.

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

The event was observed by the maintenance services personnel.

G. The failure mode, mechanism, and effect of each failed component, if known:

There were no failed components for this event. The event was due to human error.

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#### U.S. NUCLEAR REGULATORY COMMISSION LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

1. FACILITY NAME	2. DOCKET		6. LER NUMBER	र
Conveyeb Nuclear Blant Unit 2	05000208	YEAR	SEQUENTIAL NUMBER	REV NO.
Sequoyan Nuclear Plant Unit 2	03000328	2015	- 002 -	00

NARRATIVE

H. Operator actions:

Following notification that two suits had fallen into the Unit 2 equipment pit, operators in the main control room declared the two containment recirculation drains inoperable and entered TS LCO 3.6.15, "Containment Recirculation Drains." There are no LCO actions in 3.6.15 that address the loss of both drains, therefore the operators also entered LCO 3.0.3. Operators exited LCO 3.0.3 after the first suit had been retrieved, and exited LCO 3.6.15 after the second suit was retrieved.

I. Automatically and manually initiated safety system responses:

There were no automatic or manually initiated safety systems in response to this event.

- III. Cause of the event
  - A. The cause of each component or system failure or personnel error, if known:

The cause of the condition is personnel error. It was determined that the Maintenance Services personnel failed to identify and mitigate potential hazards and risks during the pre-job briefs, 2-minute rule and walk downs.

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

The causes and circumstances for the human performance deficiencies include the following:

- Organization and Programmatic Weaknesses including omission of information/actions that resulted in inadequate preparation and review. Maintenance Services personnel failed to identify and mitigate risks prior to starting work. Removing the upper ice vent curtain on-line is an outage time/duration saving opportunity that should have been risk evaluated in depth prior to execution.
- 2) Overconfidence of the Maintenance Services personnel who underestimated the task complexity, scope, or depth resulting in a lack of adequate contingency planning.
- 3) Habit intrusion of the Maintenance Services personnel who were performing a task that was based on past experience without fully understanding the current situation.

Each of the above causes are fully documented in condition report (CR) 1103003

IV. Analysis of the event:

SQN Unit 2 was coasting down in power to begin a scheduled refueling outage. Outage preparations were in progress and included work activities inside upper containment. The maintenance services personnel had completed removal of the Unit 2 upper ice vent curtain and were lowering cold weather suits by rope from the ice condenser deck (elevation 802)

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U.S. NUCLEAR REGULATORY COMMISSION LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

1. FACILITY NAME	2. DOCKET		6. LER NUMBER				
	05000228	YEAR	SEQUENTIAL NUMBER	REV NO.			
	05000328	2015	- 002 -	00			

#### NARRATIVE

to the refuel floor (elevation 734). Five cold weather suits that were tied together were being lowered by hand to the refueling floor. The spotter signaled to stop the load when it reached elevation 738. As the rope reached elevation 738, the rope was stopped quickly that caused five suits to slide out from the rope. Two of the cold weather suits fell under the hand rail and into the reactor cavity area. The maintenance services personnel notified the main control room operators immediately following the event.

The cold weather suits are full body suits and are capable of blocking the refueling canal drains which are 14-inches in diameter. The safety functions of the drains are to return any containment spray water from upper containment to the active sump in lower containment during a design basis accident. The drains are a feature addressed by TS 3.6.15, "Containment Recirculation Drains," and require the refuel canal drains to be OPERABLE in MODES 1, 2, 3 and 4. The TS ACTION condition only addresses one inoperable drain with a required action to restore the drain to operable status within one hour or be in MODE 3 in 6 hours and MODE 5 in 36 hours. The condition of having two drains inoperable places the plant into TS LCO 3.0.3. Operators in the main control room entered TS LCO 3.6.15 and TS LCO 3.0.3.

Maintenance services personnel removed the first suit from the equipment pit which allowed the plant to exit TS LCO 3.0.3. The remaining suit was removed from the equipment pit and TS LCO 3.6.15 was exited. Plant conditions were restored to normal within the allowed LCO times and no plant shutdown was required.

## V. Assessment of Safety Consequences

There were no actual safety consequences as a result of the event. Plant safety systems were not required to function and no complications were experienced. No TS LCO limits were exceeded and the UFSAR analyses of the event remained bounding.

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

There were no other components that could have performed the same function as the refueling canal drains.

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:

This event did not occur while the reactor was shut down. The recovery time for restoring the plant from the unanalyzed condition was accomplished in less than an hour (within the TS LCO action time). The safety-related systems that were needed to remove residual heat or mitigate the consequences of an accident potentially were not available during this event.

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NRC F( (11-2015)	<b>ORM 3</b> )	i66A LICEN! C	SEE EVENT REPORT (LER)	.S. NUCLEA	RREGULATORY CO	MMISSION		
		1. FACILITY NAME	2. DOCKET	<b>T</b>	6. LER NUMBER			
		Nuclear Black   Init 2	05000228	YEAR	SEQUENTIAL NUMBER	REV NO.		
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NARR/	ATIVE							
	C.	For failure that rendered a train of time from discovery of the failure	i a safety system inoperable, ar until the train was returned to s	1 estimate ervice:	e of the elapsed			
		The elapsed time from discovery	until the drains were returned to	o service	was 54 minutes.			
VI.	Co	rrective Actions						
		Corrective Actions are being man	aged by TVA's corrective action	n progran	n under CR 1103	3003		
	Α.	Immediate Corrective Actions:						
		The condition was corrected imme equipment pit. No other issues w	ediately by removing the cold w rere identified.	/eather si	uits from the			
	В.	Corrective Actions to Prevent Recurrence or to reduce probability of similar events occurring in the future:						
		The corrective actions include the access control procedure, 0-PI-O' Modes 1-4."	addition of risk mitigation strate PS-000-011.0, "Containment A PS-000-011.0, "Containment A	egies to t ccess Co	he containment Introl During			
VII.	Ado	ditional Information						
	Α.	Previous similar events at the sar	ne plant:					
		A review of the previous reportab similar events caused by human	le events for the past 3 years a error.	t SQN foi	und the following	ı two		
<ol> <li>LER 1-2013-001, Latent Design Input Inconsistencies Adversely Affect Proba Flood Analysis, identified two human performance related causes: organization rooted in over-confidence resulted in the input errors (latent computer modeling inconsistencies), and management failure to provide oversight and conservation making involving the impact of changes to the river system on the calculated</li> </ol>						able Maximum ional behavior ling ative decision- I PMF.		
		<ol> <li>LER 2-2014-001, Misalignmer Condition Prohibited by Techr cause: Operations staff involv and responsibility for procedu</li> </ol>	nt of Containment Purge Radiat nical Specifications, identified or ved in the event demonstrated I are use and adherence.	tion Monit ne humar less than	tors Results in n performance re adequate standa	elated ards		
	В.	Additional Information:						
		None						
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### U.S. NUCLEAR REGULATORY COMMISSION LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

1. FACILITY NAME	2. DOCKET		6. LER NUMBER	र
Sequence Nuclear Blant Unit 2	05000239	YEAR	SEQUENTIAL NUMBER	REV NO.
	05000328		- 002 -	00

NARRATIVE

C. Safety System Functional Failure Consideration:

This event resulted in a safety system functional failure in accordance with 10 CFR 50.73(a)(2)(v)(B) and (D).

D. Scrams with Complications Consideration:

This event did not result in an unplanned scram with complications.

VIII. Commitments:

None.