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

July 26, 2019

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 50-327/2019-002-00, Steam Generator Pressure Transmitter Degraded Sensing Line Causes Condition Prohibited by Technical Specifications**

The enclosed licensee event report provides details concerning an inoperable steam generator pressure transmitter affecting the Engineered Safety Features Actuation System. This event is 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. Additionally, this event is being reported, in accordance with 10 CFR 50.73(a)(2)(v)(D), as an event that resulted in a condition which could have prevented the fulfillment of a safety function necessary to mitigate the consequences of an accident.

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

Respectfully,

for Matthew Rasmussen
Site Vice President
Sequoyah Nuclear Plant

Enclosure: Licensee Event Report 50-327/2019-002-00
cc: NRC Regional Administrator – Region II
NRC Senior Resident Inspector – Sequoyah Nuclear Plant

NRC FORM 366 (04-2018) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 03/31/2020

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.

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/)

1. Facility Name	2. Docket Number	3. Page
Sequoyah Nuclear Plant Unit 1	05000327	1 OF 6

4. Title

Steam Generator Pressure Transmitter Degraded Sensing Line Causes Condition Prohibited by Technical Specifications

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
									NA	**05000**
05	29	2019	2019	- 002	- 00	07	26	2019	Facility Name	Docket Number
									NA	**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)(ii)(A)	☐ 50.73(a)(2)(viii)(A)
	☐ 20.2201(d)	☐ 20.2203(a)(3)(ii)	☐ 50.73(a)(2)(ii)(B)	☐ 50.73(a)(2)(viii)(B)
	☐ 20.2203(a)(1)	☐ 20.2203(a)(4)	☐ 50.73(a)(2)(iii)	☐ 50.73(a)(2)(ix)(A)
	☐ 20.2203(a)(2)(i)	☐ 50.36(c)(1)(i)(A)	☐ 50.73(a)(2)(iv)(A)	☐ 50.73(a)(2)(x)
10. Power Level	☐ 20.2203(a)(2)(ii)	☐ 50.36(c)(1)(ii)(A)	☐ 50.73(a)(2)(v)(A)	☐ 73.71(a)(4)
	☐ 20.2203(a)(2)(iii)	☐ 50.36(c)(2)	☐ 50.73(a)(2)(v)(B)	☐ 73.71(a)(5)
100	☐ 20.2203(a)(2)(iv)	☐ 50.46(a)(3)(ii)	☐ 50.73(a)(2)(v)(C)	☐ 73.77(a)(1)
	☐ 20.2203(a)(2)(v)	☐ 50.73(a)(2)(i)(A)	☒ 50.73(a)(2)(v)(D)	☐ 73.77(a)(2)(ii)
	☐ 20.2203(a)(2)(vi)	☒ 50.73(a)(2)(i)(B)	☐ 50.73(a)(2)(vii)	☐ 73.77(a)(2)(iii)
		☐ 50.73(a)(2)(i)(C)	☐ Other (Specify in Abstract below or in NRC Form 366A)	

12. Licensee Contact for this LER

Licensee Contact	Telephone Number (Include Area Code)
Andrew McNeil	423-843-8098

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
X	SB	PT	F180	Y	N/A	N/A	N/A	N/A	N/A

14. Supplemental Report Expected	15. Expected Submission Date	Month	Day	Year
☐ **Yes** (If yes, complete 15. Expected Submission Date) ☒ No		N/A	N/A	N/A

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

On April 15, 2019, during a post trip review, it was identified that Steam Generator #3 pressure transmitter, 1-PT-1-23, had demonstrated sluggish behavior during the transient. The pressure input is utilized by the Engineered Safety Features Actuation System for several postulated events. Operations declared the instrument inoperable, and entered the appropriate Technical Specifications (TS) Limiting Condition for Operation (LCO) until maintenance activities restored operability. Investigation revealed that the instrument response exceeded the TS channel check acceptance criteria. Historical search and past operability evaluation completed May 29, 2019, determined that previous identification was not effectively resolved, and that there were multiple periods where other transmitters were removed from service at the same time as the affected transmitter. This led to a condition prohibited by TS, and a condition that could have prevented the fulfillment of a safety function. The cause of the component failure was debris found in the pressure transmitter sensing line due to a lack of regularly scheduled preventative maintenance. The corrective action is to ensure preventative maintenance instructions are created to clear sensing lines for Main Steam transmitters.

1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
Sequoyah Nuclear Plant Unit 1	05000-327	2019	- 002	- 00

NARRATIVE

I. Plant Operating Conditions Before the Event

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

II. Description of Event

A. Event Summary:

Following a unit trip on April 14, 2019, it was noted, during a post trip review, that Steam Generator (SG) [EIIS: SB] #3 Steam Pressure Transmitter, 1-PT-1-23 [EIIS: PT], exhibited a sluggish response. This sluggish response could have challenged the Engineered Safety Features Actuation System (ESFAS) [EIIS: JE] input function associated with SG pressure. It was determined on April 15, 2019, at 1229 eastern daylight time (EDT), that the pressure transmitter sensing line was partially blocked. Technical Specifications (TS) Limiting Condition for Operation (LCO) 3.3.2.D for ESFAS Instrumentation was entered at that time. Maintenance was performed to blow down the sensing line, and 1-PT-1-23 was restored to operable status on April 17, 2019 at 0332 EDT.

A past operability evaluation (POE) completed on May 29, 2019, determined that 1-PT-1-23 was outside of its acceptance criteria during the transient conditions. The POE also revealed that this condition had been identified during a previous transient in 2015, but was not adequately dispositioned, which made 1-PT-1-23 inoperable since 2015 (not recognized at the time). With 1-PT-1-23 inoperable, TS LCO 3.3.2.D for ESFAS Instrumentation required the channel be placed in trip within 72 hours, or perform a plant shutdown within 78 hours and exit the mode of applicability. Failing to complete the Required Actions led to a condition prohibited by TS, and is reportable under 10 CFR 50.73(a)(2)(i)(B). Additionally, the POE determined other channels in addition to 1-PT-1-23 were removed from service for testing since 2015. With 1-PT-1-23 and an additional instrument for that channel inoperable, ESFAS instrumentation would not have provided sufficient logic for actuation. This condition could have prevented the fulfillment of a safety function necessary to mitigate the consequences of an accident, which is reportable under 10 CFR 50.73(a)(2)(v)(D).

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

There were no inoperable structures, systems, or components that contributed to this event.

C. Dates and approximate times of occurrences:

Date/Time (EDT)	Event
November 2015	Trace analysis of plant computer data indicated that 1-PT-1-23 pressure response was lagging. A condition report (CR) was initiated but 1-PT-1-23 was not repaired. 1-PT-1-23 was not recognized as inoperable.
November 2015 – April 2019	Various maintenance and testing activities were performed (cumulative time 28 hours 10 minutes) with additional channels removed from service.
April 14, 2019, 0320	Unit 1 tripped following a loss of an operating Main Feedwater Pump
April 15, 2019, 1229	Post trip review identified that 1-PT-1-23 pressure response was lagging. A CR was initiated, TS LCO 3.3.2.D was entered.
April 17, 2019 0332	Maintenance was completed with sensing line blown down. 1-PT-1-23 was restored to operable status and TS LCO 3.3.2.D was exited

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

The subject transmitter is a safety-related, 10-50 milliAmp Foxboro Model E11GM, with a process range of 0-1200 pounds per square inch gage. The component identification at SQN is SQN-1-PT-001-0023-F.

E. Other systems or secondary functions affected:

1-PT-1-23 provides input to ESFAS.

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

The described condition was identified during a review of key parameters as part of a post trip review.

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

The sensing line was discovered partially blocked due to long-term build-up of solids. The identified blockage did not affect indicated pressure during steady state operations, but did provide sluggish indication and response when a significant load rejection occurred.

1-PT-1-23 is one of three pressure transmitters used to monitor SG #3 steam pressure. These three transmitters are used, with their instrument loops, to provide two-out-of-three logic (per SG) required by TS for ESFAS. The affected portion of ESFAS included actuation signals for Safety Injection [EIIS: BQ] and Steam Line Isolation (SLI). With the instrument line partially clogged, the pressure transmitter was inoperable and not able to respond in the time as required by Technical Specifications and the Final Safety Analysis Report (FSAR).

H. Operator actions:

Operators completed review of key plant parameters, and submitted a CR for the identified pressure response anomaly.

I. Automatically and manually initiated safety system responses:

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

III. Cause of the Event

A. Cause of each component or system failure or personnel error:

The cause of the component failure was debris found in the pressure transmitter sensing line due to a lack of regularly scheduled preventative maintenance.

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

There was no identified human performance related root cause.

IV. Analysis of the Event:

The degraded response of 1-PT-1-23 did not cause abnormal degradation of, or stress upon, the principle safety barriers (cladding, reactor coolant system, or containment). Therefore, this event did not adversely affect the health and safety of plant personnel or the general public.

V. Assessment of Safety Consequences

The discovery of the condition and subsequent repair encompassed a period of approximately 39 hours. Investigation of instrument behavior revealed a questionable behavioral response extending back several years (back to 2015). Transmitter operation at steady state power met channel checks as required by TS Surveillance Requirement 3.3.2.1, but only exhibited degradation during plant transients. A period of three years was selected to

assess the probabilistic risk assessment (PRA) evaluation based on NUREG-1022 to provide a bounding analysis period. Considering 1-PT-1-23 inoperable for three years in conjunction with not maintaining a two-out-of-three logic for ESFAS instrumentation (SI signal on low SG pressure; SLI signal on low SG pressure; SLI Isolation signal on a High Negative Rate) for a duration of 28 hours and 10 minutes over the specified three year span, the safety significance was determined to be low.

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

When the degraded condition was recognized on April 15, 2019, the appropriate LCO was entered, and the affected transmitter was returned to service within the required Completion Time. For past operability evaluation, 1-PT-1-23 was inoperable, and that condition placed the ESFAS function from two-out-of-three logic to two-out-of-two logic configuration. The ESFAS channel associated with the 1-PT-1-23 should have been tripped, which would have satisfied redundancy requirements, or the unit placed in a lower mode. With the exception of the times noted in the POE totaling 28 hours 10 minutes, the remaining SG pressure transmitters remained functional. The SI ESFAS signal is also initiated by high containment pressure or low pressurizer pressure, and the SLI signal is also initiated by high-high containment pressure. These utilize instrumentation different than 1-PT-1-23.

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

The event did not occur when the reactor was shut down.

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:

1-PT-1-23 was declared inoperable and returned to service in approximately 39 hours.

VI. Corrective Actions

Corrective Actions are being managed by Tennessee Valley Authority's corrective action program under CRs 1507948 and 1516260.

A. Immediate Corrective Actions:

The pressure transmitter was declared inoperable. Maintenance was initiated to blow down the transmitter sensing line, which was completed and subsequently returned to service.

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

The corrective action is to ensure preventative maintenance instructions are created to clear sensing lines for Main Steam transmitters.

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.