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

August 17, 2016

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 Nos. DPR-77
NRC Docket No. 50-327

Subject: **Licensee Event Report 50-327/2016-005-00, Hydrogen Mitigation System Train A Inoperable Longer Than Allowed by Technical Specifications**

The enclosed Licensee Event Report provides details concerning the inoperability of one train of the Hydrogen Mitigation System for longer than allowed by Technical Specifications. This report is being submitted in accordance with 10 CFR 50.73(a)(2)(i)(B), as any operation or condition which was prohibited by the plant's Technical Specifications.

There are no regulatory commitments contained in this letter. Should you have any questions concerning this submittal, please contact Michael McBrearty, Site Licensing Manager, at (423) 843-7170.

Respectfully,

Christopher J. Schwarz
Site Vice President
Sequoyah Nuclear Plant

Enclosure: Licensee Event Report 50-327/2016-005-00
cc: NRC Regional Administrator – Region II
NRC Senior Resident Inspector – Sequoyah Nuclear Plant

NRC FORM 366 (11-2015) U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER)

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 10/31/2018

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4. TITLE

Hydrogen Mitigation System Train A Inoperable Longer Than Allowed 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	
06	07	2016	2016	- 005	- 00	08	17	2016	FACILITY NAME: NA	DOCKET NUMBER

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)
	☐ 20.2203(a)(2)(iv)	☐ 50.46(a)(3)(ii)	☐ 50.73(a)(2)(v)(C)	☐ 73.77(a)(1)
100	☐ 20.2203(a)(2)(v)	☐ 50.73(a)(2)(i)(A)	☐ 50.73(a)(2)(v)(D)	☐ 73.77(a)(2)(i)
	☐ 20.2203(a)(2)(vi)	☒ **50.73(a)(2)(i)(B)**	☐ 50.73(a)(2)(vii)	☐ 73.77(a)(2)(ii)
		☐ 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)*
Scott T Bowman	423-843-6910

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

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 June 7, 2016, at 0914 Eastern Daylight Time (EDT), main control room operators were notified by workers, in the field, that a breaker associated with two A train hydrogen ignitors was discovered in the open position. Surveillance Requirement 3.6.8.1 requires greater than or equal to 33 ignitors energized in each train. With the breaker open, there were less than 33 ignitors operable. Technical Specification (TS) 3.6.8, Hydrogen Mitigation System (HMS), Condition A was entered. At 0916 EDT, June 7, 2016, the breaker was closed restoring operability to the two hydrogen ignitors and TS 3.6.8 Condition A was exited. A past operability evaluation, determined that the breaker panel associated with the two ignitors was last accessed on March 11, 2016, as part of the performance of a work order. It is assumed that the breaker became aligned to the open position during this work. Therefore, one train of the HMS was inoperable for longer than allowed by TSs. However, Train B HMS remained operable during this event.

The cause for the breaker being in the open position is indeterminate. Corrective actions include issuing information to Operations and Maintenance personnel regarding the learnings from this event and the need for a questioning attitude while supporting troubleshooting and maintenance activities.

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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) CONTINUATION SHEET

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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 EVENTS

A. Event:

On June 7, 2016, at 0914 Eastern Daylight Time (EDT), main control room (MCR) operators were notified by workers, in the field, that a breaker [EIIS: BKR] associated with two A train hydrogen ignitors was discovered in the open position. Surveillance Requirement (SR) 3.6.8.1 requires greater than or equal to 33 ignitors energized in each train. With the breaker open, there were less than 33 of 34 ignitors operable. Technical Specification (TS) 3.6.8, Hydrogen Mitigation System (HMS) [EIIS: BB], Condition A was entered.

MCR operators verified that no configuration checklists or clearances configured the breaker to the open position and directed a worker to close the breaker. At 0916 EDT, June 7, 2016, the breaker was closed restoring operability to the two hydrogen ignitors and TS 3.6.8 Condition A was exited.

A past operability evaluation completed on June 20, 2016, determined that on March 8, 2016, Unit 1 entered TS 3.6.8, Condition A for a failure associated with the A train HMS. On March 11, 2016, Unit 1 exited TS 3.6.8, Condition A by crediting post maintenance testing following work on the A train HMS. The work performed on March 11, 2016, was the last record of personnel accessing the A train HMS distribution panel. March 11, 2016, is assumed to be the time of breaker misalignment. Therefore, there is no time when 33 or more A train hydrogen ignitors were known to be operable between March 8, 2016 and June 7, 2016.

TS 3.6.8, Condition A, Required Action A.1 allows seven days to restore an inoperable HMS train to operable status or Required Action A.2 allows SR 3.6.8.1 to be performed once per 7 days on the operable train. TS 3.6.8, Condition C requires the unit to be in MODE 3 within 6 hours if Required Action and associated Completion Time are not met. Because one train of the HMS was inoperable for 91 days without completing Required Action A.1, A.2, or C.1, this is a condition prohibited by TS and is therefore being reported in accordance with 10 CFR 50.73(a)(2)(i)(B), as any operation or condition which was prohibited by the plant's Technical Specifications.

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 (EDT)	Description
03/08/16, 1027	Unit 1 entered TS 3.6.8 Condition A for failure of the A train hydrogen ignitors.
03/11/16	Work was performed on the A train HMS distribution panel and this is assumed to be when the breaker became misaligned to the open position.
06/07/16, 0914	Workers notified MCR operators that a breaker associated with two A train hydrogen ignitors was discovered to be open. MCR operators determined that less than 33 required hydrogen ignitors were operable and Unit 1 entered Condition A of TS 3.6.8.
06/07/16, 0916	MCR operators verified that no configuration checklists or clearances configured the breaker to the open position and directed a worker to close the breaker to restore operability to the two A train hydrogen ignitors. Unit 1 exits Condition A of TS 3.6.8.

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

There was no component that failed.

E. Other systems or secondary functions affected:

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

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

MCR operators were notified by workers, in the field, that a breaker associated with two A train hydrogen ignitors was discovered in the open position.

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

There was no component that failed.

H. Operator actions:

Following notification of the issue to the MCR operators, it was determined that less than 33 ignitors were operable, and Unit 1 entered TS 3.6.8, Condition A. MCR operators verified that no configuration checklists or clearances configured the breaker to the open position and directed a worker to close the breaker and restore operability to the two A train hydrogen ignitors.

I. Automatically and manually initiated safety system responses:

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There were no automatic or manual system responses associated with 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 breaker being in the open position was indeterminate. The most likely cause was inadvertent bumping or jarring by workers in the area following post maintenance testing on March 11, 2016.

B. The 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 Hydrogen Mitigation System causes hydrogen in containment to burn in a controlled manner as it accumulates following a degraded core accident. Burning occurs at the lower flammability concentration, where the resulting temperatures and pressures are relatively benign. Without the system, hydrogen could build up to higher concentrations that could result in a violent reaction if ignited by random ignition source after such a buildup.

The hydrogen ignitors are not included for mitigation of a Design Basis Accident (DBA). However, the HMS is included in the Technical Specifications because it has been shown by probabilistic risk analysis to be a significant contributor to limiting the severity of accident sequences that are commonly found to dominate risk for units with ice condenser containments.

Operation with at least one HMS train ensures that the hydrogen in containment can be burned in a controlled manner. All B train hydrogen ignitors were operable for the duration in which the A train was inoperable.

V. ASSESSMENT OF SAFETY CONSEQUENCES

Based on the above Analysis of Event, the health and safety of the public were not adversely affected by this event.

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 components that failed during this event. During this event, the B train of the HMS was operable.

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

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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:

The elapsed time from discovery of the A train HMS being inoperable until the train was restored to operable status was approximately one minute.

VI. CORRECTIVE ACTIONS

This event was entered into the Tennessee Valley Authority Corrective Action Program under Condition Report (CR) 1179126.

A. Immediate Corrective Actions:

MCR operators verified that no configuration checklists or clearances configured the breaker to the open position and directed a worker to close the breaker and restore operability to the two A train hydrogen ignitors.

B. Corrective actions to reduce probability of similar events occurring in the future:

Corrective actions include re-verifying breakers associated with the HMS are in the correct alignment and issuing information to Operations and Maintenance personnel regarding the learnings from this event and the need for a questioning attitude while supporting troubleshooting and maintenance activities.

VII. ADDITIONAL INFORMATION

A. Previous similar events at the same plant:

There have been no previous similar events at SQN in the past three years.

B. Additional Information:

None.

C. Safety System Functional Failure Consideration:

This condition did not result in a safety system functional failure.

D. Scrams with Complications Consideration:

There was no scram associated with this event.

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VIII. COMMITMENTS

None.