



Tennessee Valley Authority, 1101 Market Street, Chattanooga, Tennessee 37402

CNL-16-111

December 23, 2016

10 CFR 50.4  
10 CFR 50, Appendix H

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: **SEQUOYAH NUCLEAR PLANT - REQUEST TO REVISE THE  
REACTOR PRESSURE VESSEL SURVEILLANCE CAPSULE  
WITHDRAWAL SCHEDULE FOR UNIT 2**

- References:
1. NRC letter to TVA, Sequoyah Nuclear Plant, Units 1 and 2 - Revise the Reactor Pressure Vessel Material Surveillance Capsule Withdrawal Schedule due to License Renewal Amendment (TAC Nos. MF0631 and MF0632), dated September 27, 2013
  2. TVA letter to NRC, Sequoyah Reactor Pressure Vessel Surveillance Capsule Withdrawal Schedule Revision Due to License Renewal Amendment, dated January 10, 2013

The purpose of this letter is to request approval to replace the Sequoyah Nuclear Plant (SQN) Unit 2 "S" capsule with the SQN Unit 2 "W" capsule in the approved SQN Unit 2 reactor vessel surveillance capsule withdrawal schedule.

By the Reference 1 letter, NRC provided acceptance of the Tennessee Valley Authority (TVA) revised reactor pressure vessel (RPV) material surveillance specimen withdrawal schedule for SQN, Units 1 and 2. The revised withdrawal schedule was submitted by TVA's Reference 2 letter and supported renewal of SQN, Units 1 and 2 operating licenses for an additional 20 years. The revised schedule was based on relocation of the "S" and "W" surveillance capsules for Unit 2.

The capsule relocations were completed during the Unit 2 end of cycle (EOC) R19. The objective of these relocations was to place surveillance capsules in a leading fluence location

so that the revised surveillance specimen withdrawal schedule would comply with the expectations of American Society for Testing and Materials (ASTM) E 185-82, NUREG-1801, Revision 2, "Generic Aging Lessons Learned (GALL) Report," and the requirements of 10 CFR 50, Appendix H.

As discussed with NRC staff on November 27, 2015, inspection of the Unit 2 relocated "S" and "W" reactor vessel surveillance capsules identified that the cap of the "S" capsule was damaged and not seated as designed. The "W" capsule was found to be installed as designed with no observable damage. As a result of this inspection, the Unit 2 "S" capsule was removed and stored in the spent fuel pool for potential later re-insertion in the reactor vessel pending examination and repair of the capsule, if needed. TVA proposes that the Unit 2 "W" capsule replace the Unit 2 "S" capsule in the Unit 2 reactor vessel surveillance capsule withdrawal schedule. Technical justification for this change is provided in the Enclosure.

The withdrawal schedule approved by the NRC staff in Reference 1 is unchanged and continues to meet the provisions of the specific regulatory requirements for the License Renewal Rule, 10 CFR Part 54, (i.e., ASTM E 185-82, NUREG-1801, Revision 2, "Generic Aging Lessons Learned (GALL) Report," and the requirements of 10 CFR 50, Appendix H).

TVA requests approval of this revised schedule by January 31, 2018. If you have any questions regarding this submittal, please contact Mr. Mike McBrearty, Sequoyah Site Licensing Manager at (423) 843-7170.

I declare under penalty of perjury that the foregoing is true and correct. Executed on this 23th day of December 2016.

Respectfully,



J. W. Shea  
Vice President, Nuclear Licensing

Enclosure: Revision of the Reactor Vessel Material Surveillance Capsule Identified in the Sequoyah Unit 2 Withdrawal Schedule

cc: NRC Regional Administrator - Region II  
NRC Senior Resident Inspector - Sequoyah Nuclear Plant  
NRR Project Manager - Sequoyah Nuclear Plant

## **Enclosure**

### **Tennessee Valley Authority Sequoyah Nuclear Plant Unit 2**

#### **Revision of the Reactor Vessel Material Surveillance Capsule Identified in the Sequoyah Unit 2 Withdrawal Schedule**

##### **1. Background**

In Reference 1, Tennessee Valley Authority (TVA) proposed a revision to the Sequoyah Nuclear Plant (SQN) Unit 2 Reactor Vessel Surveillance Capsule withdrawal schedule to support renewal of the SQN Unit 2 operating license for an additional 20 years. In Reference 2, TVA responded to an NRC Request for Additional Information (RAI) regarding the Reference 1 proposed schedule change. In Reference 3, the NRC approved the proposed revised reactor vessel material surveillance capsule withdrawal schedule. The NRC review concluded, given that the relocation of the Capsule "S" and "W" occurs during the 19<sup>th</sup> or 20<sup>th</sup> refueling outage, the revised withdrawal schedule date of the end of cycle (EOC) 27 for the Unit 2 surveillance capsule "S" is acceptable.

At EOC 19 on Unit 2, Sequoyah relocated Capsules "S" and "W" to higher fluence locations. Capsule "S" was repositioned in accordance with the relocation plan established in Reference 1. The Reference 1 Capsule "W" relocation plan proposed repositioning the capsule to the location formerly occupied by Capsule "X" (220-degree location). At EOC 19, Capsule "W" was repositioned to the location formerly occupied by Capsule "U" (140-degree location), which is radiologically equivalent to the proposed 220-degree location formerly occupied by the "X" capsule. Inspection of the Unit 2 reactor vessel at EOC 20 revealed that the cap of the "S" capsule was damaged. Consequently, the "S" capsule was removed from the Unit 2 reactor vessel and stored in the spent fuel pool for potential re-insertion at a later date.

##### **2. Proposed Revision To The SQN Unit 2 Reactor Vessel Specimen Withdrawal Plan**

In Reference 1, TVA proposed that the relocated Unit 2 Capsule "S" would be withdrawn in the EOC 27 outage with the relocated Unit 2 Capsule "W" remaining unchanged (Standby). As a result of the damage to the Unit 2 Capsule "S", TVA proposes to withdraw Unit 2 Capsule "W" in the EOC 27 outage as a substitute for the Unit 2 Capsule "S" proposed in Reference 1. The revised Updated Final Safety Analysis Report (UFSAR) Reactor Vessel Capsule Removal Schedule for SQN Unit 2 is provided in Table 1.

## **Enclosure**

### **3. Technical Justification**

The Unit 2 Capsule "S" (4-degree location) and "W" (184-degree location) were relocated to the locations formerly occupied by Capsules "T" (40-degree location) and "U" (140-degree location) respectively in Unit 2 EOC 19 (see SQN UFSAR Figure 5.4.3-3 for capsule location orientation). The 40-degree location and the 140-degree location are considered to be radiologically equivalent for future plant operational fluence projections. Tables 2 and 3 presented in the Reference 2 Enclosure are unchanged and are applicable to Capsule "W" in the relocated position "U" (140-degree). Removal of Capsule "W" at EOC 27 would produce a neutron fluence for Capsule "W" of  $2.78 \times 10^{19}$  n/cm<sup>2</sup> (E>1 MeV) as provided in Reference 2 Table 3. The maximum fluence at the reactor pressure vessel inside diameter for the end of the license renewal period at SQN Unit 2 (52 EFPY) is estimated as  $2.57 \times 10^{19}$  n/cm<sup>2</sup> (E>1 MeV) as provided in Reference 2 Table 2. Removal of Unit 2 Capsule "W" at EOC 27 will result in the fluence on Capsule "W" exceeding the peak reactor vessel neutron fluence at 60 years of operation, but will not be greater than twice the peak. This withdrawal schedule continues to meet the provisions of the specific regulatory requirements for the License Renewal Rule, 10 CFR Part 54, (i.e., ASTM E 185-82, NUREG-1801, Revision 2, "Generic Aging Lessons Learned (GALL) Report," and the requirements of 10 CFR 50, Appendix H). Therefore, substituting Capsule "W" for Capsule "S" in the reactor vessel material surveillance withdrawal plan for SQN Unit 2 is acceptable.

### **4. References**

1. TVA letter to NRC, Sequoyah Reactor Pressure Vessel Surveillance Capsule Withdrawal Schedule Revision due to License Renewal Amendment, dated January 10, 2013
2. TVA letter to NRC, Response to NRC Request for Additional Information Regarding Reactor Pressure Vessel Surveillance Capsule Withdrawal Schedule Revision (TAC Nos. MF0631 and MF0632), dated July 3, 2013
3. NRC Letter to TVA, Sequoyah Nuclear Plant, Units 1 and 2 – Revise the Reactor Pressure Vessel Material Surveillance Capsule Withdrawal Schedule due to License Renewal Amendment (TAC Nos. MF0631 and MF0632), dated September 27, 2013
4. Westinghouse Report WCAP-17539-NP, Revision 0, "Sequoyah Nuclear Plant Units 1 and 2 Time-Limited Aging Analysis on Reactor Vessel Integrity," March 2012
5. Westinghouse Report WCAP-17539-NP, Revision 1, "Sequoyah Nuclear Plant Units 1 and 2 Time-Limited Aging Analysis on Reactor Vessel Integrity," May 2015

## Enclosure

Table 1

### Proposed FSAR Reactor Vessel Capsule Removal Schedule for Unit 2

Capsule Number	Vessel Location	Lead Factor Note (d)	Withdrawal Time (EFPY)	Neutron Fluence ( $\times 10^{19}$ n/cm <sup>2</sup> , E>1.0 MeV)
T	40°	3.11	1.07 (removed)	0.244
U	140°	3.17	2.91 (removed)	0.654
X	220°	3.18	5.36 (removed)	1.16
Y	320°	3.15	10.55 (removed)	2.02
S	4° Note (a)	3.11	Note (a)	N/A
V	176°	0.94	Standby	N/A
W	184° Note (c)	3.18	EOC 27	2.78 Note (b)
Z	356°	0.94	Standby	N/A

Notes:

- Capsule "S" was relocated from the 4-degree location to the 40-degree location in the Unit 2 EOC 19. It was removed from the Unit 2 reactor vessel at EOC 20 and placed in the spent fuel pool.
- Value taken from Reference 2, Enclosure Table 3 for Unit 2 EOC 19 relocation (The 40-degree location and the 140-degree locations (with Capsule "W") are considered to be radiologically equivalent).
- Capsule "W" has been relocated from the 184-degree location to the 140-degree location at Unit 2 EOC 19.
- Values taken from Reference 2, Table 4, except as noted.