



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**  
REGION II  
245 PEACHTREE CENTER AVENUE NE, SUITE 1200  
ATLANTA, GEORGIA 30303-1257

April 18, 2017

Mr. Joseph W. Shea  
Vice President, Nuclear Licensing  
Tennessee Valley Authority  
1101 Market Street, LP 3R-C  
Chattanooga, TN 37402-2801

**SUBJECT: SEQUOYAH NUCLEAR PLANT – NRC TEAM INSPECTION REPORT  
05000327/2017010 AND 05000328/2017010**

Dear Mr. Shea:

On March 9, 2017, the U. S. Nuclear Regulatory Commission (NRC) completed an inspection at your Sequoyah Nuclear Power Plant Units 1 and 2. The enclosed report documents the inspection results, which were discussed on March 9, 2017, with Mr. G. Boerschig and other members of your staff. A re-exit was conducted with Mr. Z. Kitts via telephone on April 12, 2017, to discuss the final results of the inspection. The results of this inspection are documented in the enclosed report.

The inspection examined activities conducted under your license as they relate to the implementation of mitigation strategies and spent fuel pool instrumentation orders (EA-12-049 and EA-12-051) and Emergency Preparedness Communication/Staffing/Multi-Unit Dose Assessment Plans, your compliance with the Commission's rules and regulations, and with the conditions of your operating license. Within these areas, the inspection involved examination of selected procedures and records, observation of activities, and interviews with station personnel.

No NRC-identified or self-revealing findings were identified during this inspection.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC's Public Document Room or from the Publicly Available Records (PARS) component of the NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

*/RA/*

Philip J. McKenna, Acting Chief  
Reactor Projects Branch 7  
Division of Reactor Projects

Docket Nos. 05000327, 05000328  
License Nos. DPR-77, DPR-79

Enclosure:  
IR 05000327/2017010 and 05000328/2017010  
w/Attachment: Supplemental Information

cc Distribution via ListServ

SUBJECT: SEQUOYAH NUCLEAR PLANT – NRC TEAM INSPECTION REPORT  
05000327/2017010 AND 05000328/2017010 April 18, 2017

**DISTRIBUTION:**

M. Kowal, RII  
S. Price, RII  
L. Sloan, RII  
OE Mail  
RIDSNNRRDIRS  
PUBLIC  
RidsNrrPMSequoyah Resource

**ADAMS Accession No. ML17108A583**

OFFICE	RII:DRP	RII:DRP	RII:DRP	RII:DRP	RII:DRP
NAME	RRodriguez	RTaylor	WDeschaine	ABlamey	PMcKenna
DATE	4/14/2017	4/14/2017	4/13/2017	4/17/2017	4/17/2017

OFFICIAL RECORD COPY

**U.S. NUCLEAR REGULATORY COMMISSION**

**REGION II**

Docket No.: 50-327, 50-328

License No.: DPR-77, DPR-79

Report No.: 05000327/2017010, 05000328/2017010

Licensee: Tennessee Valley Authority (TVA)

Facility: Sequoyah Nuclear Plant, Units 1 and 2

Location: Sequoyah Access Road  
Soddy-Daisy, TN 37379

Dates: March 6 – 9, 2017

Inspectors: R. Rodriguez, Senior Project Engineer (Team Leader)  
W. Deschaine, Resident Inspector, Sequoyah  
R. Taylor, Senior Project Inspector

Approved by: Philip McKenna, Acting Chief  
Reactor Projects Branch 7  
Division of Reactor Projects

Enclosure

## SUMMARY

IR 05000327/2017010, 05000328/2017010; 3/6/2017 – 3/9/2017; Sequoyah Nuclear Power Plant Units 1 and 2; Temporary Instruction 2515/191, Inspection of the Implementation of Mitigation Strategies and Spent Fuel Pool Instrumentation Orders and Emergency Preparedness Communication/Staffing/Multi-Unit Dose Assessment Plans issued December 23, 2015.

The inspection covered a one-week inspection by one senior project engineer, one senior project inspector, and one resident inspector. No NRC-identified or self-revealing findings were identified. The Nuclear Regulatory Commission's (NRC's) program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 5.

A. NRC-Identified and Self-Revealing Findings

None

B. Licensee-Identified Violations

None

## REPORT DETAILS

### 4. Other Activities

#### 4OA5 Other Activities (TI 2515/191)

The objective of Temporary Instruction (TI) 2015/191, "Inspection of the Implementation of Mitigation Strategies and Spent Fuel Pool Instrumentation Orders and Emergency Preparedness Communication/Staffing/Multi-Unit Dose Assessment Plans," is to verify that licensees have adequately implemented the mitigation strategies as described in the licensee's Final Integrated Plan, dated August 8, 2016, and the Nuclear Regulatory Commission's (NRC's) plant safety evaluation (ADAMS Accession No. ML16270A517) and to verify that the licensees installed reliable water-level measurement instrumentation in their spent fuel pools. The purpose of this TI is also to verify the licensees have implemented Emergency Preparedness (EP) enhancements as described in their site-specific submittals and NRC safety assessments, including multi-unit dose assessment capability and enhancements to ensure that staffing is sufficient and communications can be maintained during such an event.

The inspection verifies that plans for complying with NRC Orders EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (ADAMS Accession No. ML12054A736) and EA-12-051, Order Modifying Licenses With Regard to Reliable Spent Fuel Pool Instrumentation (ADAMS Accession No. ML12054A679) are in place and are being implemented by the licensee. Additionally, the inspection verifies implementation of staffing and communications information provided in response to the March 12, 2012, request for information letter and multiunit dose assessment information provided per COMSECY-13-0010, Schedule and Plans for Tier 2 Order on Emergency Preparedness for Japan Lessons Learned, dated March 27, 2013, (ADAMS Accession No. ML12339A262).

The team discussed the plans and strategies with plant staff, reviewed documentation, and where appropriate, performed plant walkdowns to verify that the strategies could be implemented as stated in the licensee's submittals and the NRC staff prepared safety evaluation. For most strategies, this included verification that the strategy was feasible, procedures and/or guidance had been developed, training had been provided to plant staff, and required equipment had been identified and staged. Specific details of the team's inspection activities are described in the following sections.

#### 1. Mitigation Strategies for Beyond-Design Basis External Events

##### a. Inspection Scope

The team examined the licensee's established guidelines and implementing procedures for the beyond-design basis mitigation strategies. The team assessed how the licensee coordinated and documented the interface/transition between existing off-normal and emergency operating procedures with the newly developed mitigation strategies. The team selected a number of mitigation strategies and conducted plant walk downs with licensed operators and responsible plant staff to assess: The adequacy and

completeness of the procedures; familiarity of operators with the procedure objectives and specific guidance; staging and compatibility of equipment; and the practicality of the operator actions prescribed by the procedures, consistent with the postulated scenarios.

The team verified that a preventive maintenance program had been established for the Diverse and Flexible Coping Strategies (FLEX) portable equipment and that periodic equipment inventories were in place and being conducted. Additionally, the team examined the introductory and planned periodic/refresher training provided to the Operations and Security staff most likely to be tasked with implementation of the FLEX mitigation strategies. The team also reviewed the introductory and planned periodic training provided to the Emergency Response Organization personnel. Documents reviewed are listed in the attachment.

b. Assessment

Based on samples selected for review, the inspectors verified that the licensee satisfactorily implemented appropriate elements of the FLEX strategy as described in the plant-specific submittals and the associated safety evaluation and determined that the licensee was generally in compliance with NRC Order EA-12-049. The inspectors verified that the licensee satisfactorily:

- developed and issued FLEX Support Guidelines (FSG) to implement the FLEX strategies for postulated external events.
- integrated the FSGs into existing plant procedures such that entry into and departure from the FSGs were clear when using existing plant procedures.
- protected FLEX equipment from site-specific hazards.
- developed and implemented adequate testing and maintenance of FLEX equipment to ensure its availability and capability.
- trained the staff to ensure personnel proficiency in the mitigation of beyond-design-basis events.
- developed means to ensure that the necessary off-site FLEX equipment would be available from off-site locations.

The inspectors verified that noncompliance with the current licensing requirements, and other issues identified during the inspection, were entered into the licensee's corrective action program.

c. Findings

No findings identified.

2. Spent Fuel Pool Instrumentation

a. Inspection Scope

The team examined the licensee's newly installed spent fuel pool instrumentation. Specifically, the inspectors verified the sensors were installed as described in the plant-specific submittals and the associated safety evaluation and that the cabling for the power supplies and the indications for each channel are physically and electrically separated. Additionally, environmental conditions and accessibility of the instruments were evaluated. Documents reviewed are listed in the attachment.

b. Assessment

Based on samples selected for review, the inspectors determined that the licensee satisfactorily installed and established control of the spent fuel pool (SFP) instrumentation as described in the plant-specific submittals and the associated safety evaluation and determined that the licensee is generally in compliance with NRC Order EA-12-051. The inspectors verified that the licensee satisfactorily:

- installed the SFP instrumentation sensors, cabling and power supplies to provide physical and electrical separation as described in the plant-specific submittals and safety evaluation.
- installed the SFP instrumentation display in the location, environmental conditions and accessibility as described in the plant-specific submittals.
- trained their staff to assure personnel proficiency with the maintenance, testing, and use of the SFP instrumentation.
- developed and issued procedures for maintenance, testing, and use of the reliable SFP instrumentation.

The inspectors verified that noncompliance with the current licensing requirements, and other issues identified during the inspection, were entered into the licensee's corrective action program.

c. Findings

No findings identified.

3. Staffing and Communication Request for Information

a. Inspection Scope

Through discussions with plant staff, review of documentation and plant walkdowns, the team verified that the licensee had implemented required changes to staffing, communications equipment and facilities to support a multi-unit extended loss of offsite power scenario as described in the licensee's staffing assessment and the NRC safety assessment. The team also verified that the licensee had implemented dose assessment (including releases from spent fuel pools) capability using the licensee's site-specific dose assessment software and approach as described in the licensee's multi-unit dose assessment submittal. Documents reviewed are listed in the attachment.

b. Assessment

The inspectors reviewed information provided in the licensee's multi-unit dose submittal and in response to the NRC's March 12, 2012, request for information letter and verified that the licensee satisfactorily implemented enhancements pertaining to Near-Term Task Force Recommendation 9.3 response to a large scale natural emergency event that results in an extended loss of all alternating current power (ELAP) to the site and impedes access to the site. The inspectors verified the following:

- Licensee satisfactorily implemented required staffing change(s) to support an ELAP scenario.

- EP communications equipment and facilities were sufficient for dealing with an ELAP scenario.
- Implemented dose assessment capabilities (including releases from spent fuel pools) using the licensee's site-specific dose assessment software and approach.

The inspectors verified that noncompliance with the current licensing requirements, and other issues identified during the inspection, were entered into the licensee's corrective action program.

c. Findings

No findings identified.

4OA6 Exit

Exit Meeting Summary

On March 9, 2017, the inspectors presented the inspection results to Mr. G. Boerschig and other members of the site staff. A re-exit was conducted with Mr. Z. Kitts via telephone on April 12, 2017, to discuss the final results of the inspection. The inspectors confirmed that proprietary information was not provided or examined during the inspection.

ATTACHMENT: SUPPLEMENTAL INFORMATION

## **SUPPLEMENTAL INFORMATION**

### **KEY POINTS OF CONTACT**

#### Licensee personnel:

G. Boerschig, Site Vice President  
B. Lacey, Corporate Engineering Programs  
R. Thompson, Corporate Licensing  
P. Pareshask, Operations  
W. Lee, Corporate Emergency Preparedness Director  
M. Hayes, Engineering Programs  
Z. Kitts, Licensing

#### NRC personnel:

None

### **LIST OF REPORT ITEMS**

#### Opened and Closed

None

#### Discussed

None

## LIST OF DOCUMENTS REVIEWED

### Procedures

ECA-0.0, Loss of All AC Power, Rev. 29  
EA-250-1, Load Shed of Vital Loads after Station Blackout, Rev. 18  
EA-201-1, 480V Board Room Breaker Alignments, Rev. 2  
0-TI-DXX-000-922.3, Diverse and Flexible Coping Strategies (FLEX) Program Basis, Rev. 1  
EPM-7-1, EOI Administrative Controls - FLEX strategies time validation study, Rev. 16  
EA-78-1, Refilling the Spent Fuel Pit, Rev. 6  
FSI-5.05, FLEX ERCW Alignment, Rev. 0  
FSI-5.04, 6900V FLEX DG Plant Equipment Loading, Rev. 0  
FSI-5.03, 6.9KV & 480V Shutdown Board Initial FLEX Alignment, Rev. 0  
FSI-5.02, 6900V FLEX DG Startup and Alignment, Rev. 0  
FSI-5.01, Initial Assessment and FLEX Equipment Deployment, Rev. 1  
FSI-11, Alternate SFP Makeup and Cooling, Rev. 0  
NPG-SPP-07.2.11, Shutdown Risk Management, Rev. 11  
AOP-P.10, Loss of All AC Power While on RHR Cooling Rev. 0  
EPIP-13, Dose Assessment Rev. 17  
CECC EPIP-8, Dose Assessment Staff Activities during Nuclear Plant Radiological Emergencies, Rev. 44  
0-MI-FMI-360-001.0, Align Submersible High Pressure, Rev. 1  
0-MI-FMI-360-003.0, Align Submersible Spare High Pressure FLEX Pump, Rev. 1  
0-MI-FMI-360-005.0, Align Submersible High Pressure Pump from Boric Acid Tanks Wye Connection to RCS, Rev. 1  
0-MI-FMI-360-017.0, FLEX - Spent Fuel Pool Makeup from Elev. 734 ERCW, Rev. 2  
0-MI-FMI-360-018.0, FLEX - Spent Fuel Pool Makeup from Elev. 714 ERCW, Rev. 1  
0-MI-FMI-360-020.0, FLEX - Water Transfer Pump Makeup to Condensate Storage Tanks, Rev. 0  
0-MI-FMI-360-022.1, Staging of Low Pressure Diesel Driven Triton Pump (Floating Booster Pump) and 5000 GPM Dominator Pump (FLEX ERCW Pump), Rev. 1  
0-MI-FMI-360-022.2, FLEX - Transporting and Staging of Water Transfer Pumps, Rev. 1  
0-MI-FMI-360-023.0, FLEX - Portable Diesel Equipment Refueling, Rev. 2  
0-MI-FMI-360-024.0, FLEX - 480V FLEX DG Refueling Strategy, Rev. 4  
0-MI-FMI-360-025.0, FLEX - Align Diesel Driven IPP from CST to SG Makeup, Rev. 2  
0-MI-FMI-360-026.0, FLEX - Align Elevation 714 Intermediate Pressure Pumps from ERCW to SG Makeup, Rev. 1  
0-MI-FMI-360-027.0, FLEX - Align Elevation 669 Intermediate Pressure Pump from ERCW to SG Makeup, Rev. 1  
0-MI-FMI-360-029.0, FLEX - Hose Deployment for Essential Raw Cooling Water System, Rev. 3  
0-MI-FMI-360-030.0, FLEX- 6900V FLEX DG Fuel Line Connection, Rev. 0

### Drawings

2-45n2418-2, Lightning Floor EL 734.0 Plan and Details Sheet 2, Rev. 1  
1,2-55w300-8, Communications Harris Cabinet #6 Connection Diagram, Rev. 0  
1,2-45N749-3, Wiring Diagrams 480V Shutdown Board 1B1-B Single Line, Rev. 53  
1,2-45N706-3, Wiring Diagram 120AC Vital Instrument Power Boards 1-III and 2-III Connection Diagram Sheet 3, Rev. 52  
1,2-45N706-1, Wiring Diagram 120AC Vital Instrument Power Boards 1-I and 2-I Connection Diagram Sheet 1, Rev. 53  
0-55w300-1, Communications Harris Cabinet #5 Connection Diagram, Rev. 0  
55W2792, Communications VHF Radios In-Plant Repeaters Arrangement and Details,

Modifications

CDN 23096-A, SQN Nextel Replacement Project  
DCN 23376, CST Missile Barrier Modification, Rev. A

Calculations

B87140924001, FLEX Analysis for 125V DC Vital Batteries, Rev. 3

Condition Reports Reviewed

1164886, 1164895, 1164898, 1164902, 1164886, 1164903, 1164904, 1263523

Condition Reports Generated as part of the Inspection

1270809, PMs and tests of FLEX Tritons and Dominators do not contain acceptance criteria for flow and pressure  
1270790, FLEX Hose Deployment for Essential Raw Cooling Water System procedure providing misleading instructions  
1269775, FLEX- Remove lockable door knobs and replace with unlockable door knobs  
1270155, Drawing discrepancy on 45N706-2  
1269879, NRC FLEX Inspection hose bend radius at IPS  
1270304, NRC FLEX Inspection - Key Cabinet in FESB  
1270328, NRC TI 191- NRC identified equipment discrepancy during Maintenance Procedure walkdown  
1270322, NRC FLEX Inspection- Observation on inventory  
1269731, NRC FLEX Inspection FLEX job box missing lock  
1269728, NRC FLEX Inspection vendor tag on 480V FLEX DG  
1269711, NRC FLEX inspection housekeeping in A 480V DG

Surveillances

EPIP-12, Emergency Equipment and Supplies, Appendix C, Dated 11/18/16  
EPIP-12, Emergency Equipment and Supplies, Appendix A, Dated 11/17/16  
EPIP-12, Emergency Equipment and Supplies, Appendix I, Dated 2/8/17  
EPIP-12, Emergency Equipment and Supplies, Appendix C, Dated 2/8/17  
EPIP-12, Emergency Equipment and Supplies, Appendix A, Dated 2/8/17  
EPIP-12, Emergency Equipment and Supplies, Appendix I, Dated 1/3/17  
0-PI-REM-244-002.Q, Quarterly Testing of Emergency Response Facility Communications Equipment Rev. 1, Dated 11/2/16  
0-PI-REM-244-002.Q, Quarterly Testing of Emergency Response Facility Communications Equipment Rev. 1, Dated 2/1/17

Other

Sequoyah Nuclear Plant, Units 1 and 2 - Safety Evaluation Regarding Implementation of Mitigating Strategies and Reliable Spent Fuel Pool Instrumentation Related to Orders EA-12-049 and EA-12-051  
0-TI-DXX-000-922.3, Diverse and Flexible Coping Strategies (FLEX) Program Basis. Rev. 1  
B85161215005, FLEX Final Integrated Plan, Rev. 1  
EPM-7-1, EOI Administrative Controls, Validation Scenario Sheet, Rev. 16  
SQN NEI 12-01 Phase 2 ELAP ERO Staffing Analysis Report  
PR SL-E-0389, Elect Cable 8000g Diesel Fuel Tank D22929, Rev. 0  
SQN-ENG-SSA-17-014, Self-Assessment for Flex Inspection  
SQN-ENG-FSA-16-001, Self-Assessment for Flex Inspection  
SQN SER for EA-12-049 and EA-12-051 (ML16270A517), October 12, 2016  
CNL-15-067 - SQN SFPI Order 051 Compliance, July 15, 2015

B85161215005 - FLEX Final Integrated Plan, Rev. 1

SQL-DC-V-48.0, Flex Response System, Rev. 8

NPG-SQN-200103, Licensed Operator Cycle 15-2 Continuing Training Curriculum

NPG-SQN-200105, Non Licensed Operator Cycle 15-2 Continuing Training Curriculum

Fire Ops Flex Training

B85161215005, Flex Final Integrated Plan, Rev. 1

CDQ0003602014000172, Qualification of FLEX Equipment Storage Building, Rev. 1