Discussion of License Amendment Request for Sequoyah Nuclear Plant Units 1 & 2 – Fuel Transition

Pre-Submittal Follow-up Meeting

February 20, 2020

Introductions

- Kim Hulvey and Gordon Williams – TVA Licensing
- David Brown– TVA General Manager, Reactor Engineering and Fuels
- Chris Carey and Kasey Decker – TVA Nuclear Safety Analysis
- Jim Smith – Westinghouse Licensing
- Westinghouse (on the Phone) –Individuals will introduce themselves when answering questions

Objectives

- Nov. 2018 meeting and approach changes
- Summarize TS changes
- Summarize LAR approach
- Discuss planned submittal and need date
- Answer NRC questions

Background

- TVA proposed an approach for the transition from Framatome **HTP™** fuel to Westinghouse RFA-2 fuel to the NRC in November 2018 (Reference ML18312A350)
- Feedback from the NRC on the November 2018 approach - *To independently verify that proposed TS changes meet applicable requirements and design criteria, and that proposed analysis methods are applicable and properly implemented, analytic results for the proposed fuel design need to be included in the fuel transition LAR (Reference ML19031A150)*
- Scope has been expanded to incorporate feedback

Revised Content of LAR

- Safety Analyses have been performed for the RFA-2 fuel using approved WEC methods and will be summarized
  - Impacted UFSAR Chapter 15 events updated to WEC methods and guidance
- Representative designs for the transition core (mixed core of HTP & RFA-2) and equilibrium core (RFA-2 only)
- Compatibility of the HTP and RFA-2 in a mixed core will be discussed
- The approach for setting safety limits on the HTP and RFA-2 fuel in the transition cores will be presented

Requested Technical Specification Changes

- Add **Optimized ZIRLO™** cladding to the approved fuel clad materials (TS 4.2.1)
- Move the Core Safety Limits Figure, OTDT/OPDT and time delay constants, and RCS DNB Limits to the Core Operating Limits Report (COLR) – (consistent with TSTF-339, R2)
- Revise the DNB limit to reflect WRB-2M correlation application
- Revise the fuel centerline temperature limit consistent with the approved PAD5 methodology

Requested Technical Specification Changes (continued)

- Revise the Power Distribution Limits (TSs 3.2) to be consistent with WEC methodology and NRC-approved WCAP-17661-P-A, Revision 1
- Applied changes to reflect the installation and use of **BEACON™**-TSM
- Replace Framatome methods with WEC methods in the Core Operating Limits Report Methodologies list (TS 5.6.3)
- Permanent removal of RCCA H-08 and associated drive shaft for Unit 1 (TS 4.2.2)

Additional Documents to be Included in LAR

- TS Bases – Unit 1 – for information
- Representative COLR – Unit 1 – for information
- TRM changes to reflect BEACON application
- **FULL SPECTRUM™** LOCA (**FSLOCA™**) Evaluation Model (EM) application to Sequoyah
- 10 CFR 50.46 Exemption Request for Optimized ZIRLO

Analysis Approach for the HTP Fuel

- Framatome provided WEC with data regarding the HTP fuel and core designs
- WEC nuclear design methods have been used to model prior HTP cycles
  - The power distribution information has been used to establish peaking limits for the HTP fuel
  - Because previous HTP peaking limits were developed using approved Framatome methods, maintaining HTP peaking limits to that seen in previous HTP cores offers conformance with those methods

Analysis Approach for the HTP™ Fuel (continued)

- The COLR limit for $F_Q(Z)$ will be unchanged from the current limit for the HTP fuel
- The $F^N_{\Delta H}$ COLR limit will be set separately for RFA-2 and HTP fuel
- The HTP fuel will be monitored to a lower limit using BEACON-TSM
- HTP fuel rod mechanical design and fuel performance will be confirmed by ensuring operation within the previously established acceptable operating envelopes

Analysis Approach for the HTP Fuel (continued)

- Sufficient information has been obtained from Framatome to assess the HTP fuel for the following analyses:
  - Thermal-Hydraulic behavior and compatibility
  - Non-LOCA safety analyses will use PAD5 generated fuel temperatures to assess HTP
  - LOCA analysis with a transition core PCT penalty assessment for HTP fuel
  - Seismic/LOCA grid crush
- Transition core DNBR penalty for the HTP fuel is determined by approved WEC transition core methodology and conservative assumptions on the HTP

Proposed Schedule for Submittal and Requested Approval

- SQN plans to load WEC RFA-2 fuel in the fall of 2022
- Pre-submittal meeting at NRC in February 2020
- TVA will submit the LAR by June 2020
- In order to proceed with confidence with the transition to RFA-2, TVA requests LAR approval by June 2021

Closing and Questions