Watts Bar Nuclear Plant
Unit 1

TPBAR Loading Increase License Amendment Request Alignment Meeting

Agenda

- Introduction and Purpose
- WBN Unit 1 TPBAR Loading Plans
- Licensing Activities Schedule
- Timeline for WBN Unit 1 TPBAR Program
- Proposed Technical Specification Changes
- Post-LOCA Subcriticality Analysis
- Radiological Analysis
- NRC Review with TVA and DOE Support
- Summary

Introduction

- TVA requested a change to the Watts Bar Nuclear Plant (WBN) Unit 1 Technical Specifications to increase the number of Tritium Producing Burnable Absorber Rods (TPBARs) that can be irradiated from 704 to 1792
- TVA requested NRC approval by August 31, 2016, to support an increased TPBAR loading in Cycle 15 (spring of 2017) for DOE National Nuclear Security Administration (NNSA) needs

Purpose

- Provide a high level overview of the License Amendment Request (LAR)
- Discuss the schedule of the LAR review to meet the NNSA need date
- Offer TVA and DOE support of NRC technical reviews

WBN Unit 1 TPBAR Loading Plans

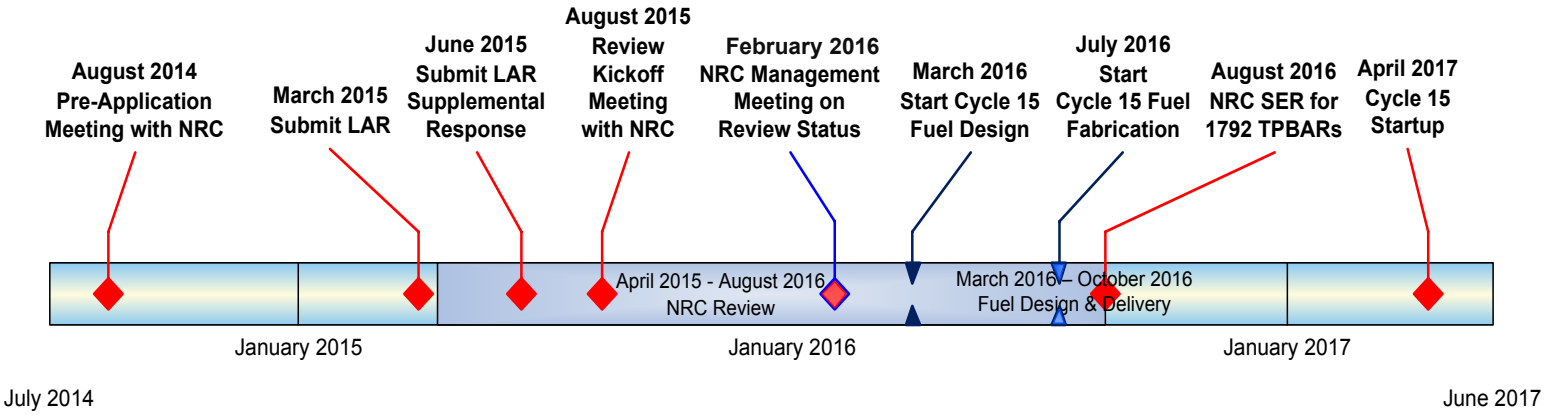
Cycle	Date	TPBAR Loading	Tech Spec Limit
C13	April 2014	704	704
C14	October 2015	704	704
C15	March 2017	1104	1792*
C16	October 2018	1504	1792*
C17	April 2020	1792	1792*

* Proposed LAR

Licensing Activities Schedule

1792 TPBAR License Amendment

Key Milestones



Timeline for WBN Unit 1 TPBAR Program

- May 1996 – DOE/NRC Memorandum of Understanding (MOU) formed the basis for NRC review and consultation on possible use of Commercial Light Water Reactors (CLWRs) for producing tritium
- Oct 1996 – TVA agreed to irradiate 32 TPBARs in four Lead Test Assemblies (LTAs) at WBN Unit 1
- May 1997 – NUREG-1607 (LTAs) issued
- Sept 1997 – WBN Unit 1 Amendment 8 (LTAs) issued
- Oct 1997 – 32 TPBARs loaded in Cycle 2

Timeline for WBN Unit 1 TPBAR Program (cont.)

- Sept 2002 – WBN Unit 1 Amendment 40 approved up to 2304 TPBARs
- Oct 2003 – WBN Unit 1 Amendment 48 reduced loading to 240 TPBARs to address post-LOCA subcriticality margin issue
- Oct 2003 – 240 TPBARs loaded in Cycle 6
- Mar 2005 – TVA notified NRC of interim cumulative TPBAR tritium release limits
  - While higher than projected permeation rates were investigated
- Apr 2005 – 240 TPBARs loaded in Cycle 7

Timeline for WBN Unit 1 TPBAR Program (cont.)

- Nov 2006 – 240 TPBARs loaded in Cycle 8
- Jan 2008 – WBN Unit 1 Amendment 67 approved up to 400 TPBARs
- Mar 2008 – 368 TPBARs loaded in Cycle 9
- May 2009 – WBN Unit 1 Amendment 77 approved up to 704 TPBARs
- Oct 2009 – 240 TPBARs loaded in Cycle 10
- May 2011 – 544 TPBARs loaded in Cycle 11

Timeline for WBN Unit 1 TPBAR Program (cont.)

- Oct 2012 – 544 TPBARs loaded in Cycle 12
- May 2014 – 704 TPBARs loaded in Cycle 13
- Jan 2015 – TVA notified NRC of updated program controls to remove interim measures for permeation while maintaining doses and release concentrations within regulatory requirements
- Oct 2015 – 704 TPBARs planned for loading in Cycle 14

Current License Amendment Request

- Pre-application meeting with NRC on August 14, 2014
- LAR submitted to NRC on March 31, 2015
- Correction letter submitted to NRC on April 28, 2015
- Provided supplemental information in letters dated May 27, 2015, and June 15, 2015, in response to NRC requests
- NRC accepted LAR for review on June 26, 2015

Proposed Technical Specification Changes

- Revise Technical Specification 4.2.1 to reflect new upper limit of 1792 TPBARs
- Revise Surveillance Requirement 3.5.1.4 to remove dependence of accumulator boron concentration on number of TPBARs
- Revise Surveillance Requirement 3.5.4.3 to remove dependence of RWST boron concentration on number of TPBARs

Number of TPBARs	Boron Concentration Ranges
0 - xxxx	≥ yyyy ppm and ≤ zzzz ppm

Post-LOCA Subcriticality Analysis

- Post-LOCA subcriticality analysis method consistent with method previously used in WBN Unit 1 Amendment 77 with the following key changes:
  - Eliminated 40 gpm dilution source in containment sump (requires plant modifications)
  - Updated time-dependent lithium leaching rate based on testing
- RCS boron concentration reduced by increased Integral Fuel Burnable Absorber (IFBA) loading
- Results demonstrate sufficient margin for 1792 TPBARs

Radiological Analysis

- Radiological analysis in WBN Unit 1 Amendment 40 assumed 2304 TPBARs and permeation rate of 1 Ci/TPBAR/year
- Current LAR supported by new radiological analysis for:
  - Realistic scenario of up to 1900 TPBARs at 5 Ci/TPBAR/year
  - Bounding (Design Basis) scenario of up to 2500 TPBARs at 10 Ci/TPBAR/year
- Regulatory criteria in 10 CFR Part 20, Part 50.67, Part 50 Appendix I, and Part 100 are all satisfied

NRC Review with TVA and DOE Support

- Due to the importance of meeting the NNSA need for increased TPBAR irradiation in WBN Unit 1 Cycle 15, TVA requests essential completion of NRC technical reviews prior to initiation of fuel and core design activities on March 2, 2016
- TVA and DOE will provide any support needed for expeditious technical reviews
  - TVA and DOE are willing to send technical experts to meet with NRC reviewers to provide any needed background information or discussion of the various LAR sections
- TVA requests at least monthly updates from the NRC Project Manager regarding the progress of the technical reviews

Summary

- LAR requests increased TPBAR loadings beginning with WBN Unit 1 Cycle 15 to meet NNSA needs
- LAR addresses post-LOCA subcriticality margin, required plant modifications, lithium leaching rates, and radiological analysis
- TVA and DOE offer technical support for NRC reviewers
- TVA requests monthly progress updates from NRC Project Manager
- TVA requests NRC technical reviews near completion by March 2, 2016
- TVA requests NRC approval by August 31, 2016