WCNOC-NRC Pre-application Meeting

Core Design and Safety Analysis Methodology Transition License Amendment Request

September 20, 2012

Wolf Creek Nuclear Operating Corporation

Meeting Agenda

- Meeting Purpose / Objectives
- Introductions
- Transition to Westinghouse Analysis Methodologies
  - Analysis Methodologies
  - Alternative Source Term
  - Setpoint Uncertainty Analyses
- License Amendment Request (LAR) Content and Schedule
- Questions/Discussion

Introductions

- NRC
- WCNOC Team
- Westinghouse Support
- Teleconference Attendees

Transition to Westinghouse Analysis Methodologies

- Current State
  - WCNOC's Core Design & Safety Analysis organizations performed the USAR Chapter 4 and 15 analyses in-house
    - The USAR Chapter 4 Core Design and Thermal-Hydraulic (T-H) analyses are performed by WCNOC using standard Westinghouse methods through a Technology Transfer agreement
    - The USAR Chapter 15 non-LOCA transient analysis are performed by WCNOC using vendor-independent methods

Transition to Westinghouse Analysis Methodologies

- Current State (cont.)
  - The USAR Chapter 15 LOCA analyses are performed by Westinghouse
  - Reactor Trip System (RTS) and Engineered Safety Features Actuation System (ESFAS) instrumentation setpoints performed by WCNOC

Transition to Westinghouse Analysis Methodologies

- Future State
  - The bulk of the safety analyses will be standard Westinghouse analysis methodologies
    - Containment response to be addressed when changes are required to support plant modifications
  - All Westinghouse methods previously approved by the NRC for application at plants like WCGS
  - All analyses to be performed by Westinghouse in accordance with Westinghouse QA processes

Transition to Westinghouse Analysis Methodologies

- Future State (cont.)
  - Core design and fuel rod design
    - No change for Core Design or Fuel Rod design tools/methods
  - Non-LOCA Transient Analyses
    - W-RETRAN-02 and VIPRE-W
  - Apply Alternative Source Term in radiological dose consequences analyses
    - Provide additional margin for control room/control building envelope in-leakage requirements
  - RTS and ESFAS instrumentation setpoints and supporting uncertainty analyses being performed using current Westinghouse setpoint methodology

Transition to Westinghouse Analysis Methodologies

- Teaming Agreement with Westinghouse
  - Westinghouse is responsible for all Core Design and Safety Analysis (CDSA) activities at WCGS
    - Westinghouse maintains an office at the site
      - Currently 3 Westinghouse CDSA employees are on site
      - Supplemented by Safety Analysis and Licensing staff at HQ and Dallas
    - Activities include:
      - Methodology transition support
      - Full scope core design (including upcoming Cycle 20)
      - Plant support in the CDSA function area

Transition to Westinghouse Analysis Methodologies

- Summary of Important Changes
  - Safety analyses will be performed to support a future measurement uncertainty recapture (MUR) power uprate application
    - No current plans to pursue the MUR uprate
  - DNB Correlations used with VIPRE-W
    - WRB-2 will continue to be used as the primary DNB correlation to be used for T/H analyses
    - ABB-NV and WLOP DNB correlations will be used for low-pressure conditions or below the first mixing vane grid

Transition to Westinghouse Analysis Methodologies

- Summary of Important Changes (cont.)
  - Non-LOCA transients and accidents
    - W- RETRAN-02 used in most non-LOCA analyses
    - Continued use of LOFTRAN code in selected analyses
    - Continued use of TWINKLE and FACTRAN 1-D kinetics codes for reactivity insertion transient analyses

Transition to Westinghouse Analysis Methodologies

- Summary of Important Changes (cont.)
  - Steam Generator Tube Rupture
    - Current WCNOC methodology shows SG overfill
    - Westinghouse methodology is margin to overfill
    - The revised SGTR analysis using Westinghouse methodology shows margin to overfill
      - Supporting reactor operator response time evaluations in progress
      - Dose consequences are calculated assuming overfill does not occur

Transition to Westinghouse Analysis Methodologies

- Summary of Important Changes (cont.)
  - Instrumentation Setpoints
    - Calculations being performed on RTS Instrumentation, ESFAS Instrumentation, and Loss of Power Diesel Generator (LOP DG) Start Instrumentation Functions using current Westinghouse setpoint methodology
    - Adopt TSTF-493 Rev. 4, Option B

Transition to Westinghouse Analysis Methodologies

- Summary of Important Changes (cont.)
  - Alternative Source Term (per Reg Guide 1.183) will be used in radiological dose consequences calculations
    - Offsite and Control Room Dose calculations only
    - No changes to the EQ dose analyses

Transition to Westinghouse Analysis Methodologies

- Alternative Source Term (AST) Implementation
  - Consistent with Reg Guide 1.183, “Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Plants”
  - Any exceptions to the Reg Guide will be identified
  - Full Scope Implementation
    - Reg Guide 1.183 C. 1.2.1- Full implementation addesses all characteristics of the AST, i.e., the composition and magnitude of the radioactive material, its chemical and physical form, and the timing of its release

Transition to Westinghouse Analysis Methodologies

- AST Implementation (cont.)
  - No changes to the EQ dose analyses
    - Reg Guide 1.183 C. 1.3.5- Licensees may use either the TID 14844 or AST assumptions for performing the EQ analyses
  - New atmospheric dispersion (X/Q) values are being calculated
    - EAB and LPZ (X/Q) values are being calculated in accordance with Reg Guide 1.145
    - Control Room (X/Q) values were calculated in accordance with Reg Guide 1.194

Transition to Westinghouse Analysis Methodologies

- AST Implementation (cont.)
  - Current licensing basis changes associated with the reanalysis
    - TEDE acceptance criterion
    - Revised analysis assumptions
    - Revised analysis results

Transition to Westinghouse Analysis Methodologies

- AST Implementation (cont.)
  - Dose consequence analyses reanalyzed with AST
    - Main Steamline Break (USAR Section 15.1.5.3)
    - Loss of Non-Emergency AC Power (USAR Section 15.2.6.3)
    - Locked Rotor (USAR Section 15.3.3.3)
    - Rod Ejection (USAR Section 15.4.8.3)
    - Letdown Line Break (USAR Section 15.6.2.1)
    - Steam Generator Tube Rupture (USAR Section 15.6.3.3)
    - Loss of Coolant Accident (USAR Section 15.6.5.4)
    - Waste Gas Decay Tank Failure (USAR Section 15.7.1)
    - Liquid Waste Tank Failure (USAR Section 15.7.2)
    - Fuel Handling Accident (USAR Section 15.7.4)

Transition to Westinghouse Analysis Methodologies

- TSTF-493 Rev. 4, Option B
  - Scope:
    - RTS Instrumentation
    - ESFAS Instrumentation
    - LOP DG Start Instrumentation
  - Updated uncertainty analyses and setpoints will be performed using the current Westinghouse setpoint methodology

Transition to Westinghouse Analysis Methodologies

- TSTF-493 Rev. 4, Option B (cont.)
  - The Setpoint Control Program (SCP) to be addressed in Section 5.5.19 of TSs
  - The Allowable Values will be removed from TS Table 3.3.1-1, Table 3.3.2-1, and SR 3.3.5.3
  - SR 3.3.5.3 Trip Setpoint will be relocated to SCP
  - The Nominal Trip Setpoints, As Left Tolerance values, As Found Tolerance values and operability determination criteria will be included in the SCP

Transition to Westinghouse Analysis Methodologies

- TSTF-493 Rev. 4, Option B (cont.)
  - The WCGS SCP will be based on the Westinghouse SCP Process Flow Diagram (recently discussed in the 6/28/12 NRC-DCPP meeting)

Transition to Westinghouse Analysis Methodologies

- License Amendment Request
  - Content
    - Attachments – Evaluation, Proposed TS Changes (Markups), Revised TS pages, Proposed TS Bases Changes (for information only), Proposed COLR Changes (for information only)
    - Enclosures
      - Plant specific WCAP Licensing Report
        - » Description of safety analyses assumptions
        - » Description of safety analyses results

Transition to Westinghouse Analysis Methodologies

- License Amendment Request (cont.)
  - Content (cont.)
    - Enclosures
      - Plant specific WCAP containing the setpoint methodology for the uncertainty analyses and setpoints
      - Plant specific WCAP containing the WCGS setpoint calculations
      - WCGS proposed SCP

Transition to Westinghouse Analysis Methodologies

- License Amendment Request (cont.)
  - Content – Enclosures (cont.)
    - Report for full scope implementation of Alternative Source Term
      - Description of the analysis assumptions
      - Description of the analysis results
      - Tables containing the CLB assumptions and results and reanalysis assumptions and results
      - A table identifying the conformance to Reg Guide 1.183 and any exceptions
      - A table that address the issues identified in RIS 2006-04

Transition to Westinghouse Analysis Methodologies

- License Amendment Request (cont.)
  - Potential Technical Specification Changes
    - TS 3.3.1, RTS Instrumentation
    - TS 3.3.2, ESFAS Instrumentation
    - TS 3.3.5, LOP DG Start Instrumentation
    - New TS 5.5.19, Setpoint Control Program
    - TS 5.6.5, CORE OPERATING LIMITS REPORT (COLR)

Schedule

• Submit LAR to NRC	August 2013
• NRC Acceptance Review	
• RAI Process	
• Start of Refueling Outage 20	January 5, 2015
• Cycle 21 Startup	February 9, 2015

Questions/Discussion