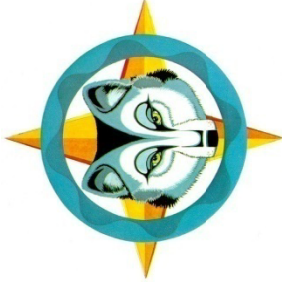


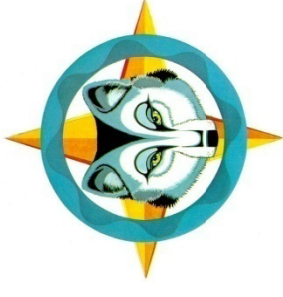
# WCNOC-NRC Pre-submittal Meeting



## Core Design and Safety Analysis Methodology Transition License Amendment Request

July 30, 2013

Wolf Creek Nuclear Operating Corporation



## Meeting Agenda

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- Meeting Purpose / Objectives
- Introductions
- License Amendment Request (LAR) Content
- Transition to Westinghouse Analysis Methodologies
- RTS/ESFAS/LOP DG Start Instrumentation Setpoint Uncertainty Analysis
- Alternative Source Term (AST)
- LAR Schedule
- Summary



# Introductions

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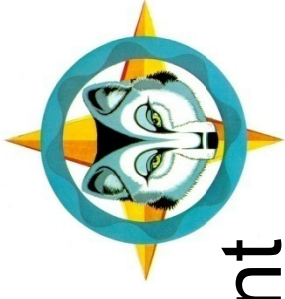
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- NRC
- WCNOC Team
- Westinghouse Support
- Teleconference Attendees



# WCNOC Ownership of Safety Analysis

- WCNOC Ownership of the Safety Analysis is demonstrated through the strength and application of the Quality Assurance (QA) Program
  - WCNOC technical oversight is provided by the QA processes and participation in NUPIC
  - WCNOC QA
    - Transmittal of Design Information – referenced to the source calculation, design basis document, or identified as a direct input
    - Owner’s Acceptance Review
    - Configuration Management updates, regulatory reviews, etc.
- WCNOC/Westinghouse (WEC) Interface
  - On-site WEC staff responsible for core design and safety analysis
  - On-site WEC staff maintains qualifications in both the WCNOC and WEC QA programs. Proper independence is always maintained between the QA programs.

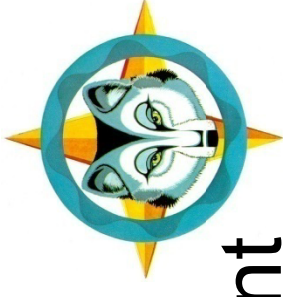


## License Amendment Request Content

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- License Amendment Request (LAR) to revise the WCGS Technical Specifications (TSs) based on:
  - Transition to Westinghouse core design and safety analysis methodologies
  - Transition to Westinghouse Setpoint Methodology
  - Full Scope Implementation of Alternative Source Term (AST)



## License Amendment Request Content

- LAR is consistent with NEI 06-02, “License Amendment Request (LAR) Guidelines” template

### Attachments:

- I - Evaluation
- II - Proposed TS Changes (Mark-up)
- III - Revised TS pages
- IV - Proposed TS Bases Changes (info only)
- V - Proposed COLR Changes (info only)



## License Amendment Request Content

- LAR content (cont.)

### Enclosures:

- I - WCAP-17658-NP – Transition Licensing Report
- II - WCAP-17746-P – Setpoint Methodology for WCGS
- III - WCAP-17746-NP
- IV - WCAP-17602-P – Setpoint Calculations for WCGS
- V - WCAP-17602-NP
- VI - Full Scope Implementation of Alternative Source Term
- VII - CD-ROM containing Meteorological Data
- VIII - Proprietary Information Affidavit for WCAP-17746-P
- IX - Proprietary Information Affidavit for WCAP-17602-P



# Transition to Westinghouse Analysis Methodologies

- Core Design and Safety Analysis Methodology
  - The Non-LOCA safety analyses were analyzed with Westinghouse, NRC approved methods
  - All of the Westinghouse Non-LOCA methods are applicable to the WCGS
  - The Containment response analyses of record are not impacted
  - The SBLOCA and LBLOCA analyses of record are not impacted
  - The Core Design and Fuel Rod Design will be evaluated for each reload cycle





# Transition to Westinghouse Analysis Methodologies

- Overview of Analysis Methodology Scope
  - Non-LOCA Safety Analyses
    - RETRAN-02 for Westinghouse PWRs (WCAP-14882-P-A) was used for majority of the analyses
    - LOFTRAN (WCAP-7907-P-A) was used for some analyses
    - Other Codes that were used:
      - TWINKLE (WCAP-7979-P-A)
      - FACTRAN (WCAP-7908-A)
  - Non-LOCA Thermal-Hydraulics (T&H) Safety Analyses
    - VIPRE-01 (WCAP-14565-P-A) was used for the T&H analyses
  - RETRAN-02 (WCAP-14882-P-A) and WCAP-10698-P-A were used for the Steam Generator Tube Rupture Margin to Overfill and Input to the Dose analyses



# Transition to Westinghouse Analysis Methodologies

- Overview of Analysis Methodology Scope (cont.)
  - DNB Correlations used in the VIPRE-01 DNBR calculations
    - The WRB-2 DNB correlation will continue to be used as the primary DNB correlation for the T&H analyses of fuel regions above the first mixing vane grid
    - The ABB-NV DNB correlation was used for the T&H analyses of fuel regions below the first mixing vane grid
    - The WLOP DNB correlation was used for the T&H analyses that are outside the range of applicability of the WRB-2 and ABB-NV DNB correlations



# Transition to Westinghouse Analysis Methodologies

- Implementation of the Westinghouse Non-LOCA Safety Analysis Methodology resulted in five changes to the current WCGS TSs
  - SLs 2.1.1, Added the ABB-NV and WLOB DNB Correlations
  - TS 3.3.1, RTS Function 10, Reactor Coolant Flow- Low
  - TS 3.4.1, RCS Pressure, Temperature and Flow DNB Limits
    - The Minimum Measured Flow (MMF) was relocated to the COLR and revised from 371,000 gpm to 376,000 gpm
    - The Thermal Design Flow – 361,200 gpm, replaces the MMF



# Transition to Westinghouse Analysis Methodologies

- Implementation of the Westinghouse Non-LOCA Safety Analysis Methodology results in five changes to the current WCGS TSs (cont.)
  - TS Table 3.7.1-1, OPERABLE MSSVs versus Maximum Allowable Power, the maximum allowable power for 4, 3, and 2 OPERABLE MSSVs was revised
  - TS 5.6.5, COLR
    - Added WCAP-9272-P-A, the Westinghouse Reload Methodology to Specification 5.6.5 b.
    - Deleted the WCNOC methodologies from Specification 5.6.5 b.
    - WCAP-9272-P-A is the only methodology associated with a Tech Spec COLR parameter



# Transition to Westinghouse Analysis Methodologies

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- Followup from the 9/20/12 Pre-Submittal Meeting
  - Provide a roadmap of which code was used to analyze each postulated accident – Attachment I of the LAR includes a roadmap
  - The Limitations, Restrictions and Conditions for the Westinghouse codes used in the Non-LOCA safety analyses are addressed in detail, including justifications in the LAR (Enclosure I, Appendix A)



# Instrumentation Setpoint Uncertainty Analysis

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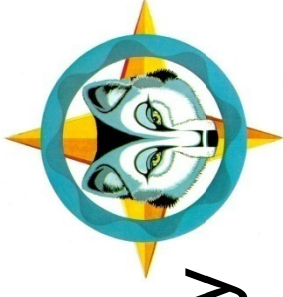
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- Uncertainty Analysis
  - Transition from the existing WCNOG Setpoint Methodology to the current Westinghouse Setpoint Methodology as applied to WCGS for RTS, ESFAS and LOP DG Start Instrumentation (WCAP-17746-P, Enclosure II of LAR)
  - Technical Specification Changes
    - TS 3.3.1, TS 3.3.2, and TS 3.3.5 Allowable Values were replaced with a Nominal Trip Setpoint
    - TS Table 3.3.1-1, Overtemperature  $\Delta T$ , Note 1 and Overpower  $\Delta T$ , Note 2



# Instrumentation Setpoint Uncertainty Analysis

- **Uncertainty Analysis (cont.)**
  - Calculations were performed for the RTS, ESFAS, and LOP DG Start instrumentation Functions using the current Westinghouse setpoint methodology (WCAP-17602-P, Enclosure IV of LAR)
  - Implementation of the Westinghouse Setpoint Methodology resulted in two changes to the existing WCGS Trip Setpoints
    - TS 3.3.1, RTS Function 10, Reactor Coolant Flow- Low
    - TS 3.3.5, Degraded Voltage Function



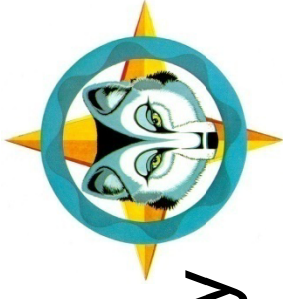
# Instrumentation Setpoint Uncertainty Analysis

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- TSTF-493-A, Revision 4, Option A – Technical Specification Changes
  - Variation from Option A - Nominal Trip Setpoint specified in the single column format based on the Westinghouse Setpoint Methodology
  - TS changes include the addition of individual Surveillance Requirement footnotes to the applicable instrumentation Functions in accordance with Option A of TSTF-493, Revision 4



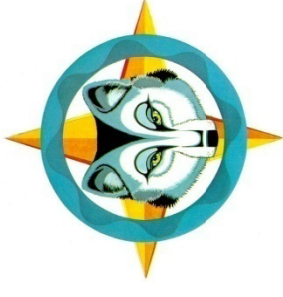


# Instrumentation Setpoint Uncertainty Analysis

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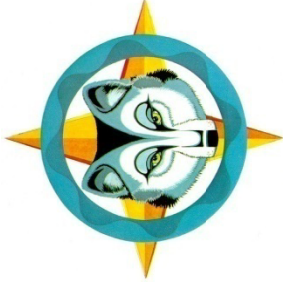
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- Followup from the 9/20/12 Pre-Submittal Meeting
  - The level of detail of the setpoint methodology and setpoint calculations for WCGS is consistent with that in the Diablo Canyon Power Plant (DCPP) submittal of March 7, 2013 (DCL-13-016)
  - WCNOC specific setpoint calculations are provided in WCAP-17602-P (Enclosure IV of LAR)



## Alternative Source Term

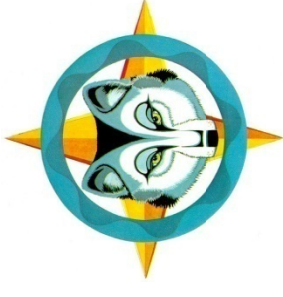
- Full Scope Implementation of the AST
  - Radiological dose consequences analyses were performed for the accidents specified in Regulatory Guide (RG) 1.183 include:
    - Main Steamline Break (USAR Section 15.1.5.3)
    - Locked Rotor (USAR Section 15.3.3.3)
    - Rod Ejection (USAR Section 15.4.8.3)
    - Steam Generator Tube Rupture (USAR Section 15.6.3.3)
    - Loss of Coolant Accident (USAR Section 15.6.5.4)
    - Fuel Handling Accident (USAR Section 15.7.4)



## Alternative Source Term

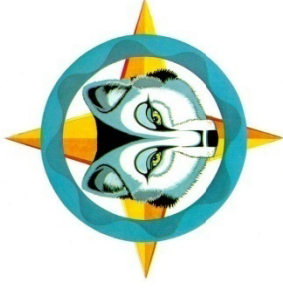
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- Full Scope Implementation of the AST (cont.)
  - Radiological dose consequences analyses performed for additional accidents not specified in RG 1.183 include:
    - Loss of Non-Emergency AC Power (USAR Section 15.2.6.3)
    - Letdown Line Break (USAR Section 15.6.2.1)
    - Waste Gas Decay Tank Failure (USAR Section 15.7.1)
    - Liquid Waste Tank Failure (USAR Section 15.7.2)
  - Dose consequences analyses were performed using version 3.03 of the RADTRAD computer code



## Alternative Source Term

- Full Scope Implementation of AST (cont.)
  - No changes to the licensing basis EQ dose analyses – maintaining the TID-14844 accident source term
  - No changes to the licensing basis NUREG-0737 evaluations other than the Control Room Habitability Envelope (CHRE) doses (III.D.3.4) and Technical Support Center doses (III.A.1.2)

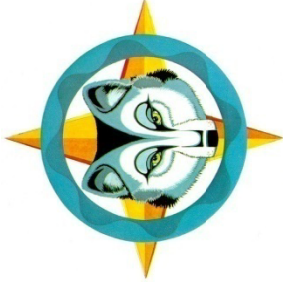


## Alternative Source Term

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- **Atmospheric Dispersion Factors (X/Q)**
  - New X/Q values were calculated
    - Offsite (EAB and LPZ) X/Q values were calculated using the PAVAN code consistent with RG 1.145
    - Control Room and TSC X/Q values were calculated using the ARCON96 code consistent with RG 1.194
  - **Meteorological Data**
    - Five years of WCGS site-specific meteorological data from 1/1/2006 through 12/31/2010 was collected
    - Data recovery for the 5-year period met the 90% recovery criterion of RG 1.23



## Alternative Source Term

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- **Current licensing basis changes**
  - Revises USAR Chapter 15 dose analysis for 10 accidents (includes the 6 DBAs in RG 1.183)
  - New Offsite, Control Room, and TSC atmospheric dispersion factors based on site-specific meteorological data from 2006 through 2010
  - Revises the CRHE unfiltered inleakage from 20 scfm to 50 scfm
  - Revises the Control Building unfiltered inleakage from 300 scfm to 400 scfm
  - TS changes to address the update of the accident source term and associated DBAs
  - TS changes to address the adoption of TSTF-51-A, Revision 2



## Alternative Source Term

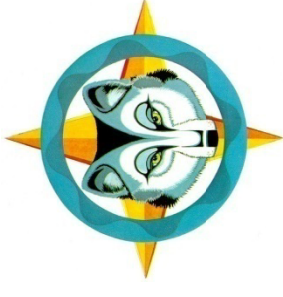
- Technical Specification Changes
  - Definition of DOSE EQUIVALENT I-131
    - Revised to only allow the use of the dose conversion factors from EPA Federal Guidance Report No. 11
  - Definition of DOSE EQUIVALENT XE-133
    - Revised to only allow the use of the dose conversion factors from EPA Federal Guidance Report No. 12
  - Specification 5.5.12, “Explosive Gas and Storage Tank Radioactivity Monitoring Program”
    - Revises the quantity of radioactivity contained in each gas storage tank to be less than the amount that would result in a whole body exposure limit to  $\geq 0.1$  rem (current limit is  $\geq 0.5$  rem)



## Alternative Source Term

- Technical Specification Changes (cont.)
  - Adoption of TSTF-51-A, Revision 2, “Revise Containment Requirements during Handling Irradiated Fuel and Core Alterations”
    - Allows the elimination of the TS requirements for certain Engineered Safety Feature (ESF) systems to be OPERABLE, after a sufficient radioactive decay has occurred
    - Changes were not applied to the TS Section 3.8 Electrical TSs (conservative)





## Alternative Source Term

- **Enclosure VI of LAR – Sections**

- 1 - DESCRIPTION
- 2 - PROPOSED CHANGES
- 3 - BACKGROUND
- 4 - TECHNICAL ANALYSIS
- 5 - RG 1.183 CONFORMANCE TABLE
- 6 - RG 1.145 CONFORMANCE TABLE
- 7 - RG 1.194 CONFORMANCE TABLE
- 8 - RIS 2006-04 TABLE
- 9 - PROPOSED TS MARKUPS
- 10 - RETYPED TS PAGES
- 11 - PROPOSED BASES MARKUPS (information only)
- 12 - PROPOSED TRM and BASES MARKUP (information only)
- 13 - PROPOSED USAR CHANGES (information only)

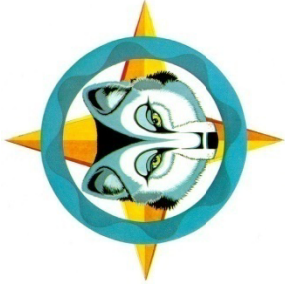


## Alternative Source Term

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- Followup from the 9/20/12 Pre-Submittal Meeting
  - Meteorological Data - One gap in the recorded data was due to the data logger failure (5/30/2007 through 6/7/2007)
  - Provide a detailed plant drawing that shows the potential release paths – site plan provided consistent with the guidance in RIS 2006-04 (Enclosure VI of the LAR)



# Alternative Source Term

- Followup from the 9/20/12 Pre-Submittal Meeting (cont)

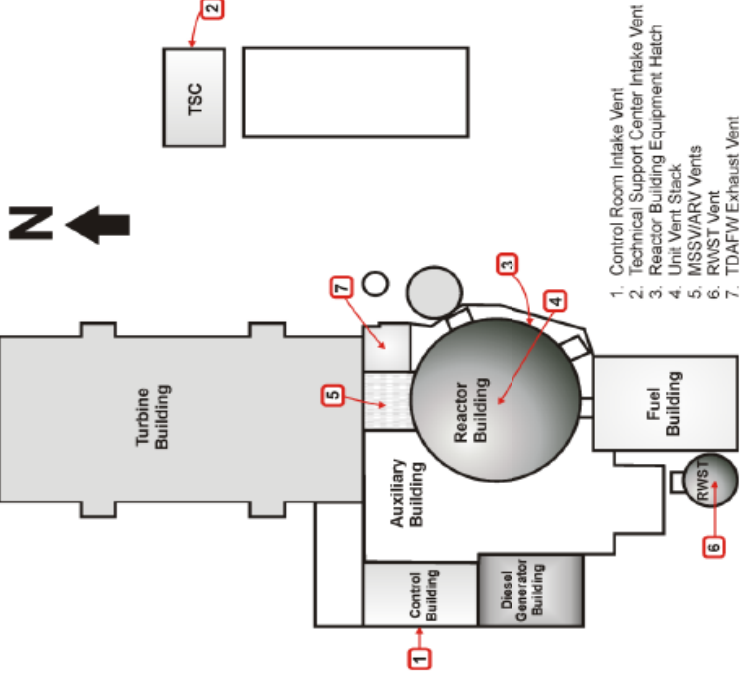


Figure 8-1 Site Plan



## Schedule

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- Submit LAR to NRC August 13, 2013
- NRC Acceptance Review (30 days per LIC-109)
- Requested Approval Date December 15, 2014
- Start of Refueling Outage 20 January 5, 2015
- Cycle 21 Startup February 9, 2015



## Summary

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- WCNOC intends to submit a LAR on 8/13/13 to revise the WCGS TSs based on:
  - Transition to the Westinghouse core design and safety analysis methodologies
  - Transition to the Westinghouse Setpoint Methodology
  - Full Scope Implementation of the Alternative Source Term (AST)
- Request NRC approval by 12/15/14 to support Cycle 21 operation (Feb. 2015)
- Questions/Comments