Enclosure 3 contains information not for public disclosure. Withhold under 10 CFR 2.390

Southern Nuclear

Regulatory Affairs

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NOV 0 8 2018

Docket Nos.: 50-348
50-364

NL-18-1412

U. S. Nuclear Regulatory Commission
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Washington, D. C. 20555-0001

Joseph M. Farley Nuclear Plant
Presentation Material for the Measurement Uncertainty Recovery and
Spent Fuel Pool Criticality Analysis Pre-Submittal Meeting

Ladies and Gentlemen:

Southern Nuclear Operating Company (SNC) submits the enclosed presentation material for the November 13, 2018 Pre-Submittal meeting to discuss the planned Measurement Uncertainty Recovery (MUR) and Spent Fuel Pool Criticality Analysis license amendment requests.

- Enclosure 1 – MUR Pre Submittal Meeting Presentation (Nonproprietary)
- Enclosure 2 – Westinghouse Proprietary Information Affidavit
- Enclosure 3 – Spent Fuel Pool Criticality Analysis Pre-Submittal Meeting Presentation (Proprietary)
- Enclosure 4 – Spent Fuel Pool Criticality Analysis Pre-Submittal Meeting Presentation (Nonproprietary)

SNC requests that Enclosure 3 be withheld from public disclosure in accordance with the requirement contained in 10 CFR 2.390.

This letter contains no NRC commitments. If you have any questions, please contact Nicole Jackson at 205.992.7683.

Respectfully submitted,

Jamie Coleman

Jamie Coleman
Licensing Manager

JC/NDJ/SM

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cc: Regional Administrator, Region II
NRR Project Manager – Farley Nuclear Plant
Senior Resident Inspector – Farley Nuclear Plant
RTYPE: CFA04.054

Joseph M. Farley Nuclear Plant Unit 1 and 2

Enclosure 1

Measurement Uncertainty Recovery
Pre-Submittal Meeting Presentation (Nonproprietary)

Farley 1 and 2 MUR Power Uprate

Jim Smith

November 13, 2018

Westinghouse

Agenda

- Purpose
- Scope
- Special Considerations
- Schedule
- Questions

Purpose

- Inform NRC of plans to submit a power uprate – Measurement Uncertainty Recovery
- Discuss Special Consideration and obtain NRC feedback
- Provide the important milestones for success

Westinghouse

Project Scope – NSSS Design Input

- Core/NSSS power increasing from current 2775/2785 MWt by ~1.6-1.7%.
  - Depends on calculated power uncertainty by Cameron with LEFM
- NSSS analyses will be performed at 2% increase (2831 core/2841 NSSS)
  - Bounds possible actual power levels
  - Consistent with previous MUR programs
- Assessment of NSSS components, systems, and accident analyses will require a combination of evaluations and more detailed analyses depending on whether a 2% power uncertainty was part of the current analysis basis
- BOP assessments will consist mostly of evaluations

Special Considerations

- PAD5 will be included in effort
  - Fuel rod temperatures/pressures generated with PAD5
  - Incorporated into affected "Not-LOCA" analysis areas (Chapter 15 transients, containment, fuel rod design criteria, fuel nuclear design and thermal/hydraulic design)

- Spent Fuel Pool Criticality
  - As discussed, the SFP criticality analysis is to be updated
  - The impact on the spent fuel for the MUR uprate will also be reflected in the analysis
  - As this SFP criticality analysis LAR review will be performed in parallel with the MUR LAR review, SNC is requesting feedback regarding this logistic

Schedule

- MUR LAR

✓ Pre-submittal meeting is planned for August 2019
✓ LAR is targeted for submittal in October 2019
✓ NRC approval is requested by July 2020 to support a Fall 2020 Unit 2 implementation

- SFP Criticality LAR

✓ Pre-submittal meeting is planned for July 2019
✓ LAR is targeted for submittal in September 2019
✓ NRC approval is requested by September 2020 (well before offloading a MUR impacted spent fuel assembly – Spring 2022)

Westinghouse

Questions?

Joseph M. Farley Nuclear Plant Unit 1 and 2

Enclosure 2

Westinghouse Proprietary Information Affidavit

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CAW-18-4833
November 7, 2018

APPLICATION FOR WITHHOLDING PROPRIETARY INFORMATION FROM PUBLIC DISCLOSURE

Subject: CAW-18-4833, Enclosure 3, "Farley Criticality Safety Analysis November 2018 NRC Presentation" (Proprietary)

The Application for Withholding Proprietary Information from Public Disclosure is submitted by Westinghouse Electric Company LLC ("Westinghouse"), pursuant to the provisions of paragraph (b)(1) of Section 2.390 of the Nuclear Regulatory Commission's ("Commission's") regulations. It contains commercial strategic information proprietary to Westinghouse and customarily held in confidence.

The proprietary information for which withholding is being requested in the above-referenced report is further identified in Affidavit CAW-18-4833 signed by the owner of the proprietary information, Westinghouse. The Affidavit, which accompanies this letter, sets forth the basis on which the information may be withheld from public disclosure by the Commission and addresses with specificity the considerations listed in paragraph (b)(4) of 10 CFR Section 2.390 of the Commission's regulations.

Accordingly, this letter authorizes the use of the accompanying affidavit by Southern Nuclear Company.

Correspondence with respect to the proprietary aspects of the Application for Withholding or the accompanying Affidavit should reference CAW-18-4833 and should be addressed to Camille T. Zozula, Manager, Facilities and Infrastructure Licensing, Westinghouse Electric Company, 1000 Westinghouse Drive, Building 2, Suite 259, Cranberry Township, PA 16066.

Paul A. Russ, Director
Licensing and Regulatory Affairs

Enclosures:
1. Affidavit CAW-18-4833
2. Proprietary Information Notice and Copyright Notice
3. "Farley Criticality Safety Analysis November 2018 NRC Presentation" (Proprietary)
4. "Farley Criticality Safety Analysis November 2018 NRC Presentation" (Non-Proprietary)

AFFIDAVIT

COMMONWEALTH OF PENNSYLVANIA:

SS

COUNTY OF BUTLER:

I, Paul A. Russ, am authorized to execute this Affidavit on behalf of Westinghouse Electric Company LLC ("Westinghouse") and declare that the averments of fact set forth in this Affidavit are true and correct to the best of my knowledge, information, and belief.

Executed on: 11/7/18

Paul A Russ

Paul A. Russ, Director
Licensing and Regulatory Affairs

(1) I am Director, Licensing and Regulatory Affairs, Westinghouse Electric Company LLC ("Westinghouse"), and as such, I have been specifically delegated the function of reviewing the proprietary information sought to be withheld from public disclosure in connection with nuclear power plant licensing and rule making proceedings, and am authorized to apply for its withholding on behalf of Westinghouse.

(2) I am making this Affidavit in conformance with the provisions of 10 CFR Section 2.390 of the Nuclear Regulatory Commission's ("Commission's") regulations and in conjunction with the Westinghouse Application for Withholding Proprietary Information from Public Disclosure accompanying this Affidavit.

(3) I have personal knowledge of the criteria and procedures utilized by Westinghouse in designating information as a trade secret, privileged or as confidential commercial or financial information.

(4) Pursuant to the provisions of paragraph (b)(4) of Section 2.390 of the Commission's regulations, the following is furnished for consideration by the Commission in determining whether the information sought to be withheld from public disclosure should be withheld.

(i) The information sought to be withheld from public disclosure is owned and has been held in confidence by Westinghouse.

(ii) The information is of a type customarily held in confidence by Westinghouse and not customarily disclosed to the public. Westinghouse has a rational basis for determining the types of information customarily held in confidence by it and, in that connection, utilizes a system to determine when and whether to hold certain types of information in confidence. The application of that system and the substance of that system constitute Westinghouse policy and provide the rational basis required.

Under that system, information is held in confidence if it falls in one or more of several types, the release of which might result in the loss of an existing or potential competitive advantage, as follows:

(a) The information reveals the distinguishing aspects of a process (or component, structure, tool, method, etc.) where prevention of its use by any of

Westinghouse's competitors without license from Westinghouse constitutes a competitive economic advantage over other companies.

(b) It consists of supporting data, including test data, relative to a process (or component, structure, tool, method, etc.), the application of which data secures a competitive economic advantage (e.g., by optimization or improved marketability).

(c) Its use by a competitor would reduce his expenditure of resources or improve his competitive position in the design, manufacture, shipment, installation, assurance of quality, or licensing a similar product.

(d) It reveals cost or price information, production capacities, budget levels, or commercial strategies of Westinghouse, its customers or suppliers.

(e) It reveals aspects of past, present, or future Westinghouse or customer funded development plans and programs of potential commercial value to Westinghouse.

(f) It contains patentable ideas, for which patent protection may be desirable.

(iii) There are sound policy reasons behind the Westinghouse system which include the following:

(a) The use of such information by Westinghouse gives Westinghouse a competitive advantage over its competitors. It is, therefore, withheld from disclosure to protect the Westinghouse competitive position.

(b) It is information that is marketable in many ways. The extent to which such information is available to competitors diminishes the Westinghouse ability to sell products and services involving the use of the information.

(c) Use by our competitor would put Westinghouse at a competitive disadvantage by reducing his expenditure of resources at our expense.

(d) Each component of proprietary information pertinent to a particular competitive advantage is potentially as valuable as the total competitive advantage. If competitors acquire components of proprietary information, any one component may be the key to the entire puzzle, thereby depriving Westinghouse of a competitive advantage.

(e) Unrestricted disclosure would jeopardize the position of prominence of Westinghouse in the world market, and thereby give a market advantage to the competition of those countries.

(f) The Westinghouse capacity to invest corporate assets in research and development depends upon the success in obtaining and maintaining a competitive advantage.

(iv) The information is being transmitted to the Commission in confidence and, under the provisions of 10 CFR Section 2.390, is to be received in confidence by the Commission.

(v) The information sought to be protected is not available in public sources or available information has not been previously employed in the same original manner or method to the best of our knowledge and belief.

(vi) The proprietary information sought to be withheld in this submittal is that which is appropriately marked in CAW-18-4833, Enclosure 3, "Farley Criticality Safety Analysis November 2018 NRC Presentation" (Proprietary). The proprietary information as submitted by Westinghouse is that associated with the November 13, 2018 pre-submittal meeting with the NRC for the J. M. Farley Unit 1 & 2 spent fuel pool criticality safety analysis, and may be used only for that purpose.

(a) This information is part of that which will enable Westinghouse to provide support for updating the J. M. Farley Unit 1 & 2 spent fuel pool criticality safety analysis.

(b) Further, this information has substantial commercial value as follows:

(i) Westinghouse plans to sell the use of similar information to its customers for the purpose of updating their spent fuel pool analysis of record.

(ii) Westinghouse can sell support and defense of industry guidelines and acceptance criteria for plant-specific applications.

(iii) The information requested to be withheld reveals the distinguishing aspects of a methodology which was developed by Westinghouse.

Public disclosure of this proprietary information is likely to cause substantial harm to the competitive position of Westinghouse because it would enhance the ability of competitors to provide similar technical evaluation justifications and licensing defense services for commercial power reactors without commensurate expenses. Also, public disclosure of the information would enable others to use the information to meet NRC requirements for licensing documentation without purchasing the right to use the information.

The development of the technology described in part by the information is the result of applying the results of many years of experience in an intensive Westinghouse effort and the expenditure of a considerable sum of money.

In order for competitors of Westinghouse to duplicate this information, similar technical programs would have to be performed and a significant manpower effort, having the requisite talent and experience, would have to be expended.

Further the deponent sayeth not.

PROPRIETARY INFORMATION NOTICE

Transmitted herewith are proprietary and non-proprietary versions of a document, furnished to the NRC in connection with requests for generic review and approval.

In order to conform to the requirements of 10 CFR 2.390 of the Commission's regulations concerning the protection of proprietary information so submitted to the NRC, the information which is proprietary in the proprietary versions is contained within brackets, and where the proprietary information has been deleted in the non-proprietary versions, only the brackets remain (the information that was contained within the brackets in the proprietary versions having been deleted). The justification for claiming the information so designated as proprietary is indicated in both versions by means of lower case letters (a) through (f) located as a superscript immediately following the brackets enclosing each item of information being identified as proprietary or in the margin opposite such information. These lower case letters refer to the types of information Westinghouse customarily holds in confidence identified in Sections (4)(ii)(a) through (4)(ii)(f) of the Affidavit accompanying this transmittal pursuant to 10 CFR 2.390(b)(1).

COPYRIGHT NOTICE

The reports transmitted herewith each bear a Westinghouse copyright notice. The NRC is permitted to make the number of copies of the information contained in these reports which are necessary for its internal use in connection with generic and plant-specific reviews and approvals as well as the issuance, denial, amendment, transfer, renewal, modification, suspension, revocation, or violation of a license, permit, order, or regulation subject to the requirements of 10 CFR 2.390 regarding restrictions on public disclosure to the extent such information has been identified as proprietary by Westinghouse, copyright protection notwithstanding. With respect to the non-proprietary versions of these reports, the NRC is permitted to make the number of copies beyond those necessary for its internal use which are necessary in order to have one copy available for public viewing in the appropriate docket files in the public document room in Washington, DC and in local public document rooms as may be required by NRC regulations if the number of copies submitted is insufficient for this purpose. Copies made by the NRC must include the copyright notice in all instances and the proprietary notice if the original was identified as proprietary.

Joseph M. Farley Nuclear Plant Unit 1 and 2

Enclosure 4

Spent Fuel Pool Criticality Analysis Pre-Submittal Meeting Presentation (Non-Proprietary)

Westinghouse

J. M. Farley Units 1 & 2
Spent Fuel Pool Criticality Analysis Methodology Overview

November 13, 2018

Westinghouse

Agenda

- Meeting Goals
- Analysis Purpose (NEI 12-16 Appendix C Checklist Section 1-2)
- Farley Plant Physical Description
  - Reactor Design & Operation Overview (Appendix C Section 3)
  - Fuel Design Overview (Appendix C Section 3)
  - Spent Fuel Pool & Storage Rack Design Overview (Appendix C Section 4)
- Method of Analysis (Appendix C Section 5)
  - Computer Codes (Appendix C Section 6)
  - Depletion Analysis (Appendix C Section 8)
  - Reactivity Analyses (Appendix C Section 9-12)
- Summary
- Questions

Westinghouse

Meeting Goals

- Provide NRC Staff familiarity with the in-process SFP criticality analysis for J. M. Farley Nuclear Plant, Units 1 & 2 (FNP)
  - Introduce reasons for new SFP Crit Analysis
  - Provide overview of FNP
    - Reactor & SFP design
    - Past, current, & perceived future operation
  - Outline the codes & methodology intended for use in the Farley Analysis
- The New Fuel Vault will not be reanalyzed

Westinghouse

Analysis Purpose

- Farley Analysis is being performed to support two goals
  - Support the Margin Uncertainty Recapture (MUR)
  - Update to a current analysis methodology
- MUR has minimal impact on discharge reactivity but is a good opportunity to update AoR
- The current analysis methodology is based on WCAP-14416-NP, approximately 20 years old
  - Current methodology is more robust and rigorous

Westinghouse

Analysis Background

- Analytical Scope
  - Reanalysis of the SFP, NFV will not be updated

- Technical Specifications will be updated to include graphics of each storage configuration allowed
  - Technical Specifications will contain separate storage requirements for STD & OFA fuel designs
  - Decay credit will be added

Analysis Background

- Requirements Documents:
  - 10 CFR Part 50.68
  - GDC 62
- Guidance Documents:
  - NEI 12-16, Rev. 3
  - DSS-ISG-2010-001
  - NUREGs-1475, 6698, 7109
- Methodology Precedence:
  - WCAPs-17400, 17400 Supplement 1, 17728, 18030

Farley Plant Physical Description

- This section provides a high level description of FNP physical features for both the reactor and SFP

Reactor Design & Operation Overview

Overview of FNP reactor and current, past, and planned future operating powers

- Reactor
  - Core: Westinghouse 3-loop 17x17 Core
  - # Units: 2 Units
    - Unit 1: 29 Cycles
    - Unit 2: 26 Cycles
  - Operating Power
    - Current: 2775 MWt
    - Historic: 2652-2775 MWt
    - Planned Future: 2831 MWt (MUR)
    - Peak Assembly Power: 1.635

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Fuel Design Overview

- Review of FNP Fuel Management shows FNP has used:
  - Fuel Assembly Designs:
    - Standard (STD) - 0.374 Fuel Rod OD
    - Optimized Fuel Assembly (OFA) - 0.360 Fuel Rod OD
    - Various permutations of both STD and OFA
  - Blanket Usage
    - FNP has not used reduced enrichment blankets
    - FNP uses annular pellets in IFBA Rods
  - Burnable Absorber Usage
    - Discrete Absorbers: Pyrex, WABA
    - Integral Absorbers: IFBA
    - Combinations: IFBA & WABA
  - No unique designs/fissile materials to cover (i.e., MOx)

Fuel Design Overview (cont'd)

- FNP has used:

Type	Fuel Design	Burnable Poison	Max. Loading Per Assembly	Blankets	Power (MWt)	Use
Fuel Design 1	STD	Pyrex	20	None	2652	Historic
Fuel Design 2	STD	WABA	24	None	2652	Historic
Fuel Design 3	OFA	IFBA (1x)/ WABA	156/8	None	2652	Historic
Fuel Design 4	OFA	IFBA (1x)/ WABA	104/12	None	2652	Historic
Fuel Design 5	OFA	IFBA (1.5x)	156	Annular IFBA	2652-2775	Current
Fuel Design 6	OFA	IFBA (1.5x)	200	Annular IFBA	2831	Potential Future
Fuel Design 7	STD	IFBA (1.5x)	200	Annular IFBA	2831	Potential Future

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Spent Fuel Pool & Storage Rack Design Overview

- FNP SFP Units 1 and 2 each have a SFP, the spent fuel pools are independent but identical in terms of the storage rack design
- Single rack design
  - no interfaces between different rack geometries
  - Rack design: Flux Trap
  - Neutron absorber: Boraflex® (Not credited)
- Current Configurations:
  - All-Cell
  - 2oo4
  - 3 Burned 1 Fresh (with IFBA Credit for Fresh > 4.4 wt.%)
  - Damage fuel configuration

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Spent Fuel Pool & Storage Rack Design Overview

- Damaged Fuel Configuration
  - Fuel assemblies are > 5 GWd/MTU and < 3.0 wt. %

Empty	Empty	Empty	Empty	Empty	Empty
Empty	2.70 w/o ^{235}U	Empty	2.70 w/o ^{235}U	2.70 w/o ^{235}U	Empty
Empty	2.70 w/o ^{235}U	2.70 w/o ^{235}U	2.70 w/o ^{235}U	2.70 w/o ^{235}U	Empty
Empty	2.70 w/o ^{235}U	2.70 w/o ^{235}U	2.70 w/o ^{235}U	2.70 w/o ^{235}U	Empty
Empty	Empty	Empty	Empty	Empty	Empty

Westinghouse

Method of Analysis

- The FNP analysis will use:
  - Burnup Credit
  - Soluble Boron Credit
  - Methodology based on recent NRC-approved analyses
    - Prairie Island, Palo Verde, Comanche Peak
- The FNP analysis will be divided into two main parts:
  - Depletion Analysis
  - Reactivity Analysis

Computer Codes

- Depletion Code
  - PARAGON v 1.2.0
    - Cross section library based on ENDF/B-VI.3
    - NRC approved depletion code (WCAP-16045-P-A)
    - Used on multiple NRC-approved SFP analyses
      - Prairie Island (2 analyses), Comanche Peak, Palo Verde

- Reactivity Calculations
  - Scale Version 6.2.3 csas5 Module (KENO)
    - ENDF/B-VII.0 238 group cross section library
    - First implementation of Scale 6.2.3 by Westinghouse
    - Validation methodology follows that used for recent NRC-approved analyses

Depletion Analysis

- The depletion analysis generates conservative spent fuel isotopic inventories that will be used to perform reactivity calculations and determine conservative burnup and soluble boron requirements.
- Depletion analysis divides burnup range into burnup bins to capture appropriate depletion parameters, typically 3-5 burnup bins
- Spent fuel isotopic inventories are defined in multiple axial zones (20+)
    - Distributed and uniform axial burnup profiles are considered

Generation of Fuel Isotopics

- Spent fuel isotopics are generated for:
  - For 3-5 enrichments (i.e., 3.0, 4.0, 5.0 wt.%)
  - For each enrichment, isotopics are generated in 2 GWd/MTU steps from 2 to 62 GWd/MTU
  - Residual boron removed (no residual IFBA credit)
  - 100 hrs of decay included to maximize discharge assembly reactivity (remove Xenon, etc.)

- Fresh fuel isotopics are used in each configuration for the maximum fresh enrichment

Depletion Analysis

- Review FNP operations and fuel management to determine depletion inputs
  - Axial burnup & temperature profiles
  - Maximum lifetime average soluble boron
  - Core Power
  - Assembly design & burnable absorbers
  - Fuel density
  - RCS flowrate
  - Fuel temperature

Axial Burnup and Moderator Temperature Profiles

- Axial Profiles based on actual fuel management and operating history from FNP Units 1 & 2
  - more than 20 cycles of actual Farley core designs
  - Profiles come from multiple times in life, not just End of Cycle
  - Profiles will be sorted into bins based on source assembly burnup

Axial Burnup Profile Selection

- [

]a,c

Axial Burnup Profile Selection

- [

]a,c

Axial Moderator Temperature Profile Selection

- [

]a,c

Depletion Input Selection

- Maximum lifetime average boron concentration:
  - Soluble boron concentration assumed throughout depletion
  - [ ]a,c
- Power:
  - [ ]a,c
- Fuel Temperature:
  - Calculated as part of depletion
    - based on power, moderator temperature, burnup, RCS flowrate, fuel density inputs

Depletion Input Selection (cont'd)

- Fuel design:
  - No changes planned for the current fuel design
  - Using limiting axial profiles, each unique fuel design will be depleted to determine the limiting design
  - OFA and STD fuel designs will be analyzed separately to determine a limiting design for each OFA and STD

- Fuel Density:
  - [ ]a,c

- RCS Flow Rate:
  - [ ]a,c

Reactivity Analysis

- In the reactivity analysis, burnup requirements, and normal and accident condition soluble boron requirements are determined.
- The reactivity analysis includes:
  - Modeling assumptions & simplifications
  - Calculation of biases & uncertainties (B&U)
  - Calculation of Target k_{eff}
  - Burnup requirement generation
  - Analysis of interfaces & normal conditions
  - Normal condition soluble boron requirements
  - Accident condition soluble boron requirements

Reactivity Analysis: Modeling Assumptions & Simplifications

- Reactivity models will:
  - [
    ]a,c
  - Fuel pellets will be assumed to be right circular cylinders
  - [
    ]a,c
  - x and y-axis boundary conditions will be periodic, z-axis boundary conditions will be reflective
  - The gap between rack modules will not be credited

Reactivity Analysis: Biases & Uncertainties

- To develop a 95% confidence with 95% probability that fuel will be less reactive than estimated, biases & uncertainties are accounted for. The analysis will account for:
  - Fuel & rack manufacturing tolerances
  - Analytical uncertainties
    - (Burnup uncertainty, depletion uncertainty, fission products & minor actinides, validation bias uncertainty)
  - Biases
    - (Validation bias, temperature bias, [ ]^{a,c}, eccentric positioning)

Westinghouse

Reactivity Analysis: Depletion Uncertainty

- Depletion uncertainty will be either:
  - standard 5% decrement method, or
  - the EPRI depletion benchmark allowed uncertainty

- Use of the EPRI depletion benchmark results is dependent on:
  - Need for additional margin at FNP
  - Whether the underlying EPRI reports are endorsed by the NRC in a time frame compatible with schedule for this analysis

Reactivity Analysis: [ ]a,c

- [

]a,c

Reactivity Analysis: Target k_{eff}

- Target k_{eff} is the maximum k_{eff} allowable to meet the regulatory requirement once biases & uncertainties and administrative margin are accounted for
  - Target keff = Regulatory Requirement – Biases & Uncertainties – Administrative Margin
  - Target keff = 1.0 – Biases & Uncertainties – 0.005

Reactivity Analysis: Target k_{eff} & Burnup Requirements

- Burnup Requirements are calculated in stages
  - [

    ]^{a,c}
  - Fit a curve that conservatively bounds each enrichment point
  - Graph the fit burnup requirements to ensure fit is well behaved and there is no non-conservative behavior at enrichments between the fit points

Reactivity Analysis: Interface & Normal Condition Analysis

- For FNP, only intra-region interfaces (interfaces between configurations) need to be addressed
  - All racks are the same geometry thus there are no inter-region interfaces to account for between different rack designs
- [

]a,c

- Normal conditions in the SFP besides static storage will be considered, including:
  - Fuel sipping, pedestal use, loose pellet & fuel rod storage baskets, ultrasonic cleaning, etc.

Reactivity Analysis: Normal Condition Soluble Boron Requirements

- Normal Condition Soluble Boron Requirement values will be based on assuming boron with 19.4 at% ^{10}B to conservatively account for any potential ^{10}B depletion.
- Simulations will be performed with fresh fuel and fuel of the highest burnup required for each configuration to account for spectral effects. Configurations will be analyzed using isotopics below the burnup requirement
  - This conservatively overestimates reactivity

Reactivity Analysis: Accident Condition Soluble Boron Requirements

- Only the multiple misload accident will be analyzed. The reactivity insertion from a multiple misload of fresh 5.0 wt. % unpoisoned assemblies is significantly greater than from any other postulated accident.
  - Single misload, misplacement outside the rack, and assembly drop across top of the rack are less severe accidents presuming only a single assembly being misplaced
  - The seismic case is covered by the base analysis by not crediting module gaps
  - Based on all recent NRC-approved analyses performed by Westinghouse, reactivity impact of bulk boiling in the SFP is significantly lower than the impact of even a single misload

Summary

- FNP is performing a new SFP criticality analysis due to the planned MUR
- Tech Specs will be updated to include separate limits for STD and OFA fuel designs
- Tech Specs will include decay credit
- Technical Analysis will align with NEI 12-16 Rev. 3
- Technical analysis will closely follow the methodology in recent Westinghouse SFP criticality analyses, in particular WCAP-17400-P, Supplement 1

Questions?