Presentation Slides

Crystal River Nuclear Plant Decommissioning

January 30, 2017

Enclosure 2

Crystal River Nuclear Plant Decommissioning

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DUKE ENERGY®

January 30, 2017 Meeting

- Purpose of Meeting
  - Discuss the Dry Shielded Canister design changes associated with the CR3 ISFSI project
- Duke Energy Participants
  - Terry Hobbs, General Manager Decommissioning
  - Alan Fata, ISFSI Project Director
  - Phyllis Dixon, Manager Technical Support- SAFSTOR
  - Steve Edwards, Manager Nuclear Engineering, Spent Fuel Mgmt
  - Chris Nolan, Director Fleet Regulatory Affairs
  - Ryan Stephens, Senior Nuclear Engineer, Spent Fuel Mgmt
- TN Participants
  - Prakash Narayanan
  - Jibu Abraham (tentative)
  - Don Shaw
  - Girish Patel
  - Raheel Haroon
  - Venkata Venigalla
  - Kamran Tavassoli
  - Joe Faldowski
  - Jayant Bondre
  - Phillipe Pham

Decommissioning Strategy, Timeline and Cost

- PSDAR: Submitted December 2013
- SAFSTOR: Reached SAFSTOR on July 1, 2015
- Timeline: Uses the 60 years allowed by NRC regulation
- Cost estimate: $1.18 billion in 2013 dollars
  - The nuclear decommissioning trust fund is currently sufficient to decommission the plant
  - No additional charges from Florida customers anticipated
  - Does not include ISFSI construction costs

Where are we headed?

- 2018 – Complete loading campaign
  - This milestone gates the transition to a much smaller security organization
- First Quarter 2019
    - Complete systems, structures and components abandonment
    - Complete modifications to systems, structures and components that will remain in service
    - Complete program and process changes to support SAFSTOR II
- Second Quarter 2019
  - Transition to SAFSTOR II organization

ISFSI Project Scope

- Dry Cask Storage of 1,243 Spent Fuel Assemblies
- AREVA NUHOMS 32PTH1 Type 2-W System
- 39 DSC / HSM Modules
- 130 Ton Single Failure Proof Cask Handling Crane
- Construction of ISFSI Facility
    - Ground Stabilization
    - Structural Backfill to 20 ft.
    - Pad & Apron

ISFSI Project Status

- Replacement of the 130 ton cask handling crane and NRC inspection complete
- Construction of the ISFSI pad and NRC inspection complete
- Fabrication of dry cask storage system continues with scheduled delivery dates on track
    - DSC's = 18 of 39 received
    - HSM's = 30 of 39 received
- HSM installation scheduled to commence in February 2017
  First array anticipated completion in May 2017
- Dry Runs scheduled for May 2017
- Loading Campaign scheduled to commence in June 2017
- Loading Campaign anticipated completion in February 2018

ISFSI Project Status

ISFSI Project Status

Summary of Draft LR 721004-1586 (32PTH1 Type 2-W)

AREVA

forward-looking energy

Outline

- Overview of Draft LR 721004-1586
- Summary of Nuclear Discipline
- Summary of Structural Discipline
- Summary of Thermal Discipline

Overview

- **Draft LR 721004-1586 – Licensing Review of the proposed 32PTH1 Type 2-W basket configuration**
- **Proposed changes of 32PTH1 Type 2-W as follows:**
  - **Reduction in thickness of the paired aluminum and poison plates and reduction in the thickness of the center section basket plates**
  - **And increase of fuel compartment size**

Nuclear Discipline

- **Criticality performance is not adversely impacted**
  - **Fuel compartment size increase: Minimum fuel compartment width is the most reactive configuration**
  - **Reduction of paired poison/aluminum plates thickness: poison plates/aluminum plates thickness does not have impact on criticality since the poison loading (B-10) is maintained**
- **Criticality Sensitivity Evaluation is performed focusing the Most Reactive Configuration (MRC) using identical methodology and computer code version (SCALE 4.4)**
  - **Model and compare 32PTH1 Type 2-W MRC to UFSAR 32PTH1 MRC**
  - **Confirm UFSAR 32PTH1 MRC is bounding**

Nuclear Discipline

- **Shielding performance evaluation for adverse impact**
  - **Fuel compartment size increase**
  - **Reduction of paired poison/aluminum plates thickness**
- **A full evaluation is performed using identical methodology and computer code version (MCNP5 v1.4)**
  - **Shielding analysis performed for 32PTH1 Type 2-W loaded with design basis source at 32 kW**
  - **UFSAR 32PTH1 dose rates are bounding**

Nuclear Discipline

- **Criticality Safety, UFSAR U.6 criticality analysis and maximum assembly average initial enrichments determined for basket type and minimum soluble loading (intact fuel and damaged fuels) apply to 32PTH1 Type 2-W**
- **Shielding Safety, UFSAR U.5 shielding analysis for the normal, off-normal and accident conditions apply to 32PTH1 Type 2-W**
- **No adverse impact on criticality safety and shielding safety and still in compliance with UFSAR U.6 and U.5 analyses**

Structural Discipline

- **Structural performance is evaluated for adverse impact**
  - **Fuel compartment size increase**
  - **Temperature differences**
- **A full evaluation is performed**
  - **UFSAR analysis models modified with proposed design changes**
  - **Results using different versions of ANSYS and LS-DYNA determined to be “conservative or essentially the same”**
  - **Proposed design change results in minor changes to the basket stresses**
  - **SSCs are in compliance with the UFSAR requirements**
  - **UFSAR will be updated with bounding results**

Thermal Discipline

- **Thermal performance of 32PTH1 Type 2-W DSC is evaluated for adverse impact due to the reduction in the thickness of the paired poison/aluminum plates compared to 32PTH1 Type 2 DSC.**
- **To evaluate the impact, the 32PTH1 Type 2-W DSC is re-evaluated using the same methodology described in the UFSAR based on ANSYS models.**
- **Results using different versions of ANSYS determined to be "conservative or essentially the same".**
- **Maximum Fuel Cladding Temperature**

Loading Condition	Intact (°F) Type 2-W / Type 2	Damaged (°F) Type 2-W / Type 2
Bounding Storage	728 / 717	749 / 733
Bounding Transfer	737 / 727	747 / 731

- **Maximum temperatures for all components and Internal Pressure for DSC remain below applicable limits described in the UFSAR.**

CR-3 ISFSI Regulatory Path Forward

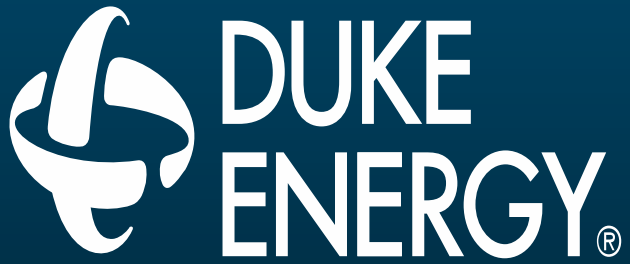
- CR-3 will proceed with current loading plans when the 72.48 evaluation based on original methods of evaluation is approved by TN and all inspection concerns resolved

- If the new 72.48 evaluation using original methods is not approved by TN or if new regulatory concerns are identified during inspection of the ISFSI project that cannot be resolved, CR-3 will submit an exemption request for approval to use the 32PTH1 Type 2-W canister design

- Exemption request would include a basis for expedited approval to minimize impact on the transition from wet to dry storage, currently scheduled to begin in June 2017

Proposed Exemption Request

- Request exemption from sections of 72.212 and 72.214 that require compliance with Certification of Compliance 1004 for the 32PTH1 canister design to permit use of the Type 2-W basket
- Include description and supporting analyses for design changes made to the 32PTH1 basket to create the Type 2-W
- Supporting analyses will be based on original methodologies used when 32PTH1 canister design was approved
  - Limitation of the maximum allowable heat load to approximately 28 KW as compared to 31.2 KW used in the analysis for the Type 2-W design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