



# **Fuel Transition License Amendment Request Pre-Application Meeting**



**Monticello Nuclear Generating Plant**

**February 28, 2013**

# Meeting Objectives

1. Present Xcel Energy's plans for a Simplified Fuel Transition review and approval in time to meet fuel delivery commitments
2. Obtain NRC feedback

## Importance of Fuel Transition

- Xcel Energy is committed to AREVA Fuel Transition
  - Significant cost savings to ratepayers
  - Fewer spent fuel assemblies
- Need fuel transition amendment approved prior to reload for Cycle 28 (January 2015)

# Background

- Fuel Transition to AREVA ATRIUM 10XM fuel
  - Fuel design approved per AREVA topical reports
  - ATRIUM 10XM operating at EPU conditions in another licensee's core
- Original Approach for AREVA Fuel Transition LAR
  - Add analysis methodology changes to TS
  - License a representative core design for MNGP Cycle 28
    - Illustrate the applicability, identify new TS values
  - Analysis would bound the EPU/MELLLA+ power-flow map (include AREVA EFW analysis)
  - Not an additional power uprate

## Background

- Pre-Application meeting – July 2012
  - Discussed need for approval in early 2015
  - Xcel Energy Planned to submit Fuel Transition LAR after EPU/MELLLA+ approval because of potential linkage questions
  - NRC: “difficult and challenging” for EFW review

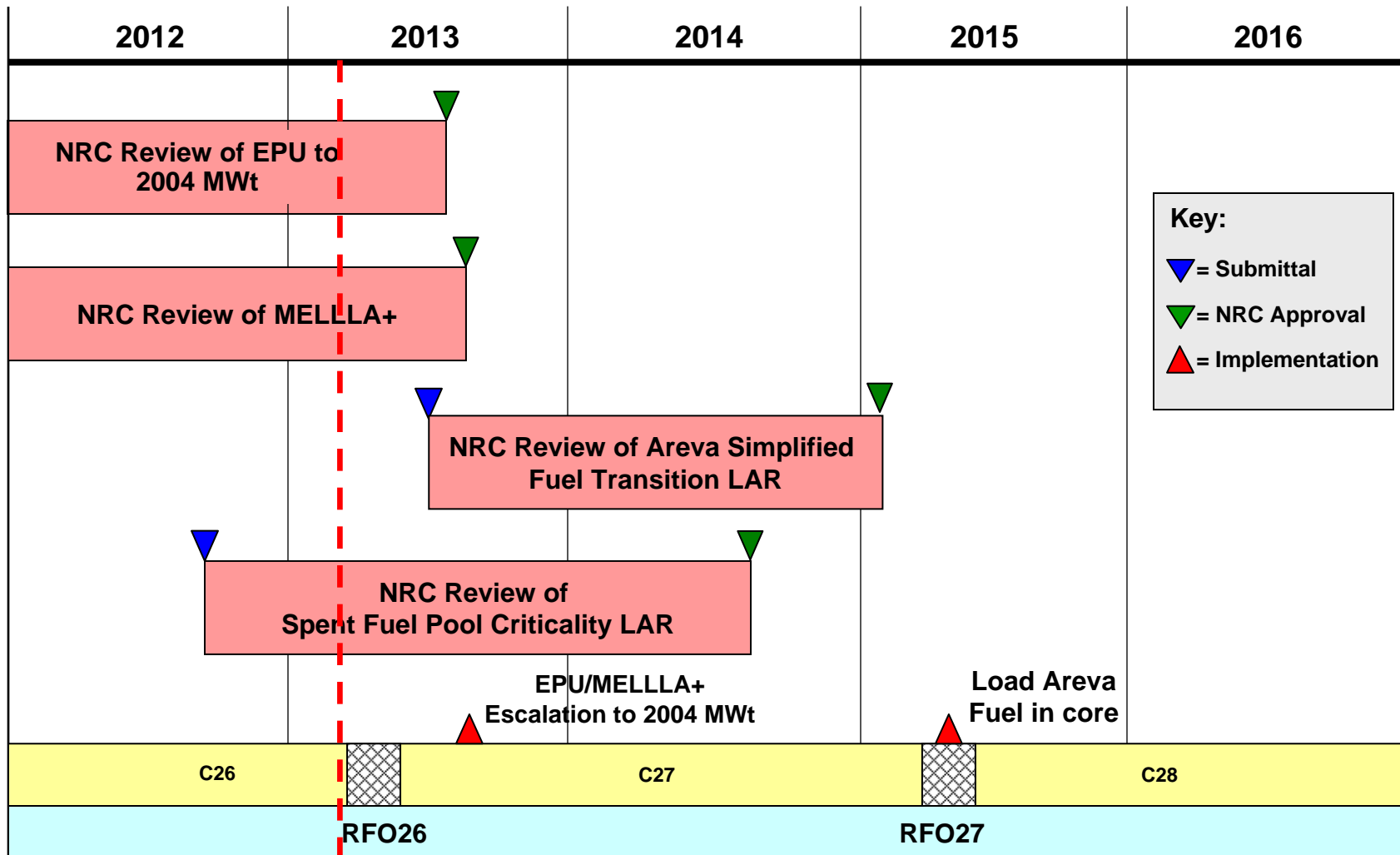
# Revised Licensing Plan

- Plan
  - Split the Fuel Transition into 2 phases
    - Phase I - Submit AREVA Simplified Fuel Transition in July 2013 prior to completion of EPU review
    - Phase II – Determine best option(s) to achieve full EPU power using AREVA fuel
- Objectives
  - NRC approval of AREVA Fuel Transition prior to Cycle 28 refueling outage (January 2015)
  - Avoid “linked” amendments

## Revised Licensing Plan – Phase I

- Phase I – LAR for Simplified AREVA Fuel Transition
  - Similar submittal to NRC previously approved fuel transition
  - Perform analyses at EPU/MELLLA conditions
  - “difficult and challenging” portion of NRC review (EFW) would be eliminated
  - Submit no later than July 2013
  - NRC complete approval at EPU/MELLLA conditions by January 2015 to support 2015 refueling outage

# Revised Licensing Plan – Phase I





## Revised Licensing Plan – Phase 2

- Determine best option(s) to achieve full EPU power using AREVA fuel
- Current options being explored:
  - Submit LAR to implement AREVA Extended Flow Window
  - Submit LAR to implement MELLLA+ for AREVA fuel
  - Install upgraded Jet Pumps to use up to 105% of the flow window (already licensed)

## Questions for Simplified Fuel Transition

- Assuming Simplified Fuel Transition is submitted for MNGP EPU power level without an EFW, requires disposition of the following questions:
  - Does this constitute a linked amendment with EPU/MELLLA+?
  - What happens to MELLLA+ approval when Simplified Fuel Transition is approved?
  - What happens to accessibility to all regions of power-flow map at EPU without MELLLA+?
  - Is ATWSi analysis needed?

## Simplified Fuel Transition Not Linked to EPU/MELLLA+

- EPU/MELLLA+ approval schedules will overlap with submittal of Simplified Fuel Transition
- Simplified Fuel Transition analyses performed at EPU MELLLA (not MELLLA+) conditions
- Licensing approach:
  1. AREVA analyses used to bound plant operation conditions
  2. CAP and Steam Dryer analyses for EPU not affected by Simplified Fuel Transition
  3. EPU review nearly complete when Simplified Fuel Transition submitted
- Not linked to EPU/MELLLA+

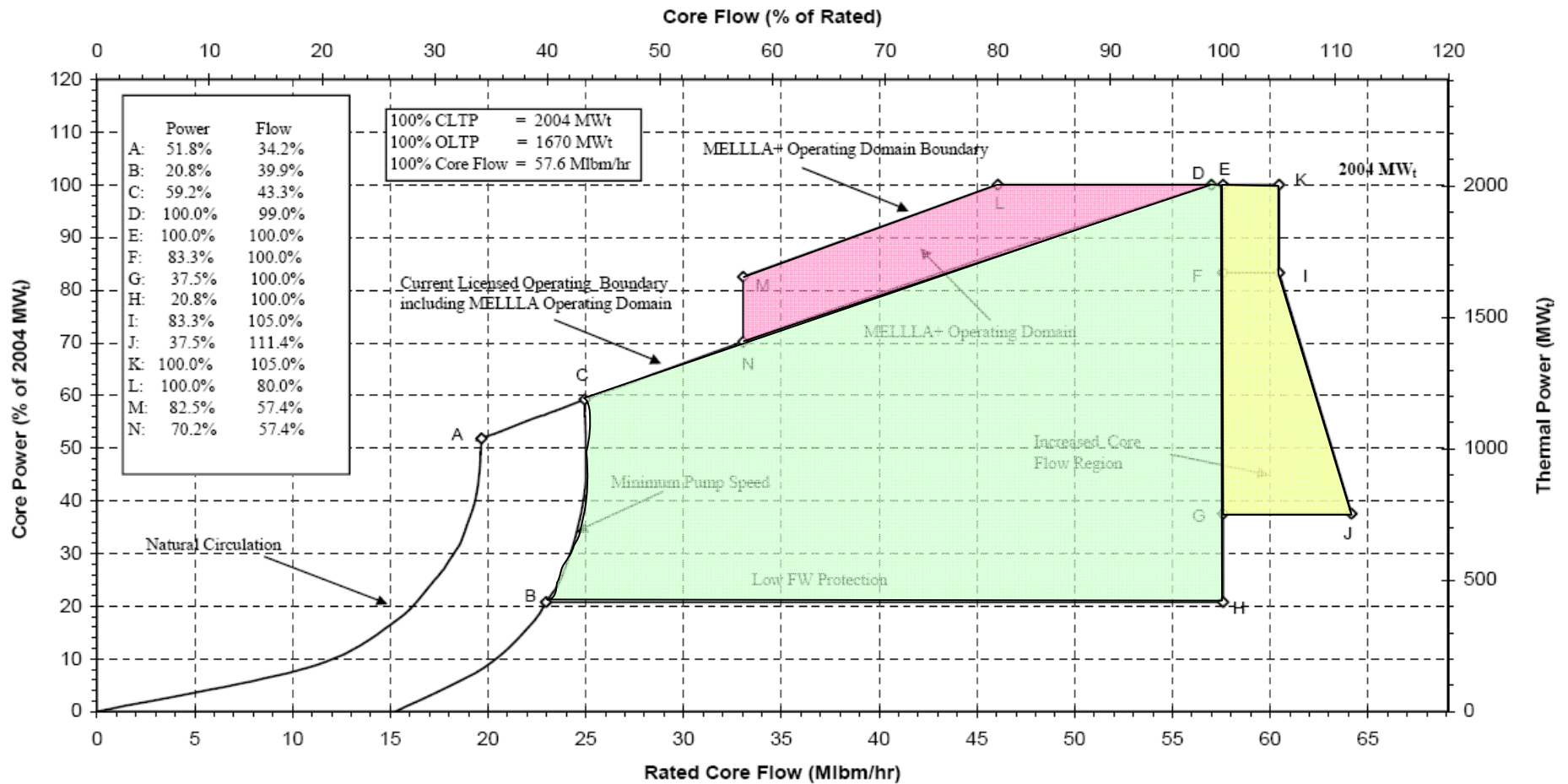
## Simplified Fuel Transition without GE MELLLA+

- MELLLA+ topically approved for GE14 fuel type only
  - For MNGP this would be a TS defined methodology
- MELLLA+ methods are included in MNGP COLR
- Licensing approach:
  - MELLLA+ amendment applies to GE14 fuel only
  - Simplified Fuel Transition LAR will remove MELLLA+ TS (e.g. Thermal Power – High Scram line)
  - Cycle 28 COLR (transition core) will remove MELLLA+ methods
- Removal of MELLLA+ addressed in Simplified Fuel Transition LAR

## Simplified Fuel Transition Operation Within Power-Flow Map

- Operation will be within the EPU/MELLLA Power-Flow Map
  - Operation will be conducted with an adequate flow window
- Licensing approach:
  - Analyses will conservatively cover the entire EPU/MELLLA Power-Flow Map
    - MELLLA operating domain
    - Increased Core Flow region
    - Off-rated conditions
- EPU/MELLLA Power-Flow Map analyzed in Simplified Fuel Transition LAR

# Power-Flow Map (EPU-M+)



## Simplified Fuel Transition Analysis for ATWS Instability

- Operation within the MELLLA domain will be addressed by a detailed disposition
  - Generically addressed by the BWROG for MELLLA in NEDO-32047 and NEDO-32164
  - No change in maximum rod line under EPU/MELLLA
  - Consistent with previously approved fuel transition at EPU conditions
- Licensing approach:
  1. AREVA analysis described above
  2. Analysis ATWSi for EFW is deferred
- ATWSi for EPU/MELLLA analyzed in Simplified Fuel Transition LAR

# Summary

- Simplified Fuel Transition LAR will be submitted no later than July 2013 with requested approval no later than January 2015
  - Removes AREVA EFW from the Fuel Transition
  - Follows precedent from previous fuel transition (including ATWSi analysis)
  - Not a linked amendment with EPU/MELLLA+
  - MELLLA+ approval will be removed from TS and COLR
  - Power-flow map at EPU conditions is attainable without MELLLA+



## Acronym List

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- ABSP – Automatic Backup Stability Protection
- ACRS – Advisory Committee on Reactor Safeguards
- ATWS – Anticipated Transient Without Scram
- ATWS – ATWS with instability
- BSP – Backup Stability Protection
- BWR – Boiling Water Reactor
- BWROG - Boiling Water Reactor Owners Group
- CAP – Containment Accident Pressure
- COLR – Core Operating Limits Report
- CPR – Critical Power Ratio
- CSA – Criticality Safety Analysis
- DSS-CD – Detect and Suppress Solution - Confirmation Density
- ECCS – Emergency Core Cooling System
- EFW – Extended Flow Window
- EO-III – Enhanced Option III
- EPU – Extended Power Uprate
- GEH – General Electric - Hitachi
- GNF – Global Nuclear Fuels
- LAR – License Amendment Request
- LHGR – Linear Heat Generation Rate
- LOCA – Loss of Coolant Accident
- LTR – Licensing Topical Report
- MAPLHGR – Maximum Average Planar Linear Heat Generation Rate
- MELLLA - Maximum Extended Load Line Limit Analysis
- MELLLA+ – Maximum Extended Load Line Limit Analysis Plus
- MNGP – Monticello Nuclear Generating Plant
- MWt – Megawatts Thermal
- NRC – Nuclear Regulatory Commission
- OPRM – Oscillation Power Range Monitor
- SPT – Stability Protection Trip
- TCD – Thermal Conductivity Degradation
- TS – Technical Specifications