



**ENERGY  
NORTHWEST**

MELLLA+/Extended  
Power Uprate

License Amendment Strategy

# Acronyms in this presentation

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- EN - Energy Northwest
- CGS - Columbia Generating Station
- MELLLA+ - Maximum Load Line Limit Analysis Plus
- EPU - Extended Power Uprate
- MUR - Measurement Uncertainty Recapture
- LTP - Licensed Thermal Power
- OLTP - Original License Thermal Power
- CLTP - Current Licensed Thermal Power
- SAR - Safety Analysis Report
- PUSAR - Power Uprate Safety Analysis Report
- MWt - Mega-Watts thermal
- ATWS - Anticipated Transient Without Scram

# Combined Application Opening Remarks

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- ✦ Energy Northwest (EN) is pursuing a combined application for Extended Power Uprate (EPU) and a Maximum Extended Load Line Limit Analysis Plus (MELLLA+) for the Columbia Generating Station.
- ✦ Columbia's application will result in 120% OLTP

## Columbia Generation

	LTP	Amended	Increase from CLTP	Increase from OLTP
1983	3323 MWt			
1995	3486 MWt	Stretch	4.90%	4.90%
2017	3544 MWt	MUR	1.66%	6.65%
2031	3988 MWt	EPU	12.50%	20%

# Why are we requesting this approach?

- ✦ BWRs control power using two options: control rod movements and flow adjustments
  - Increase operational flexibility and safety by reducing the number of rod manipulations during the cycle
  - MELLLA+ expands the operating domain
  - MELLLA+ needed to achieve / maintain EPU power

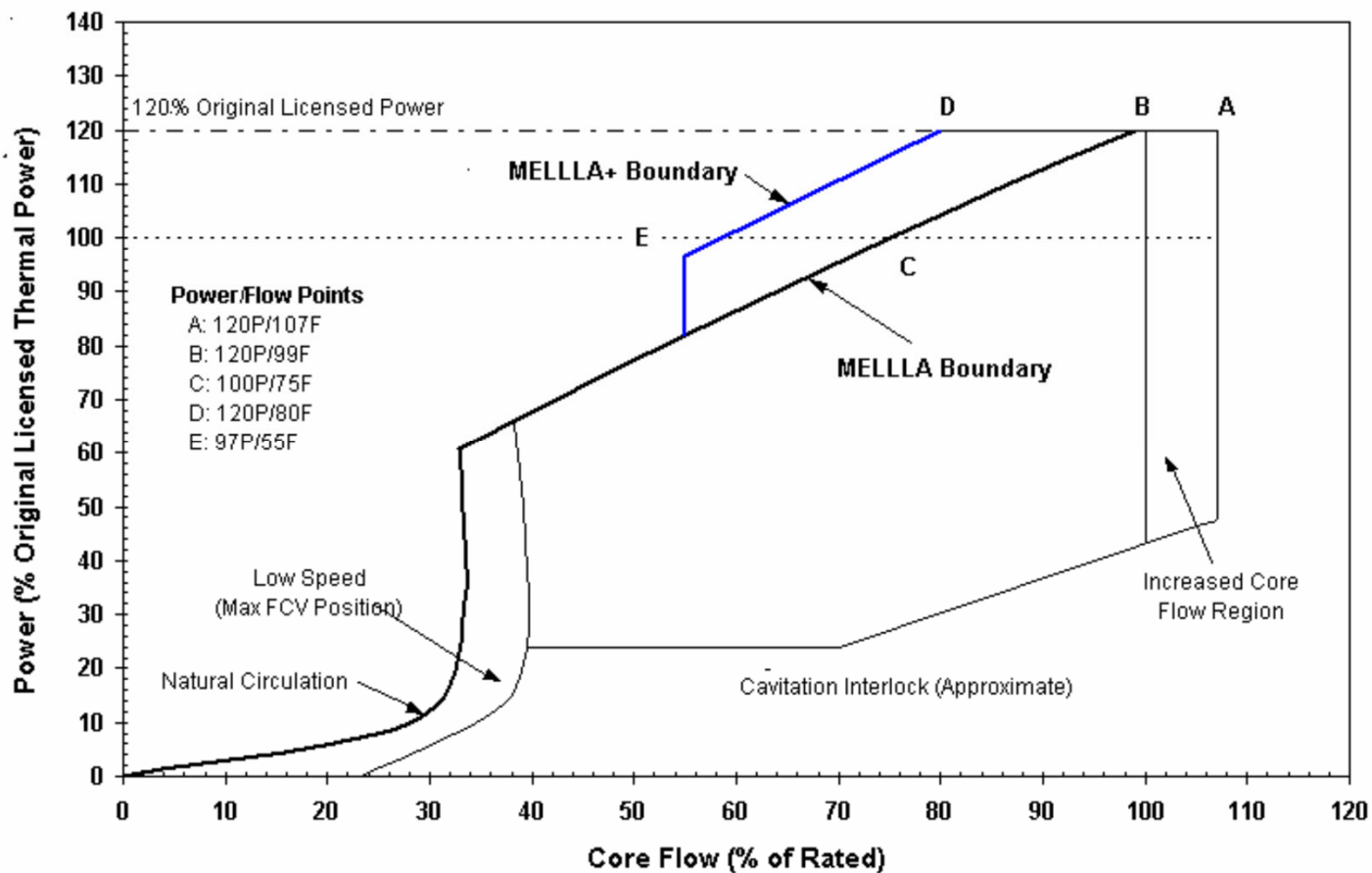
It reduces Operator burden thus safer operations

# Why are we requesting this approach?

- ✦ Makes the plant easier to operate for Reactor Operators
- ✦ Ease of operation reduces the risk of mistakes
- ✦ Ease of operation equals less distraction and facilitates keeping a big picture view of all operating parameters

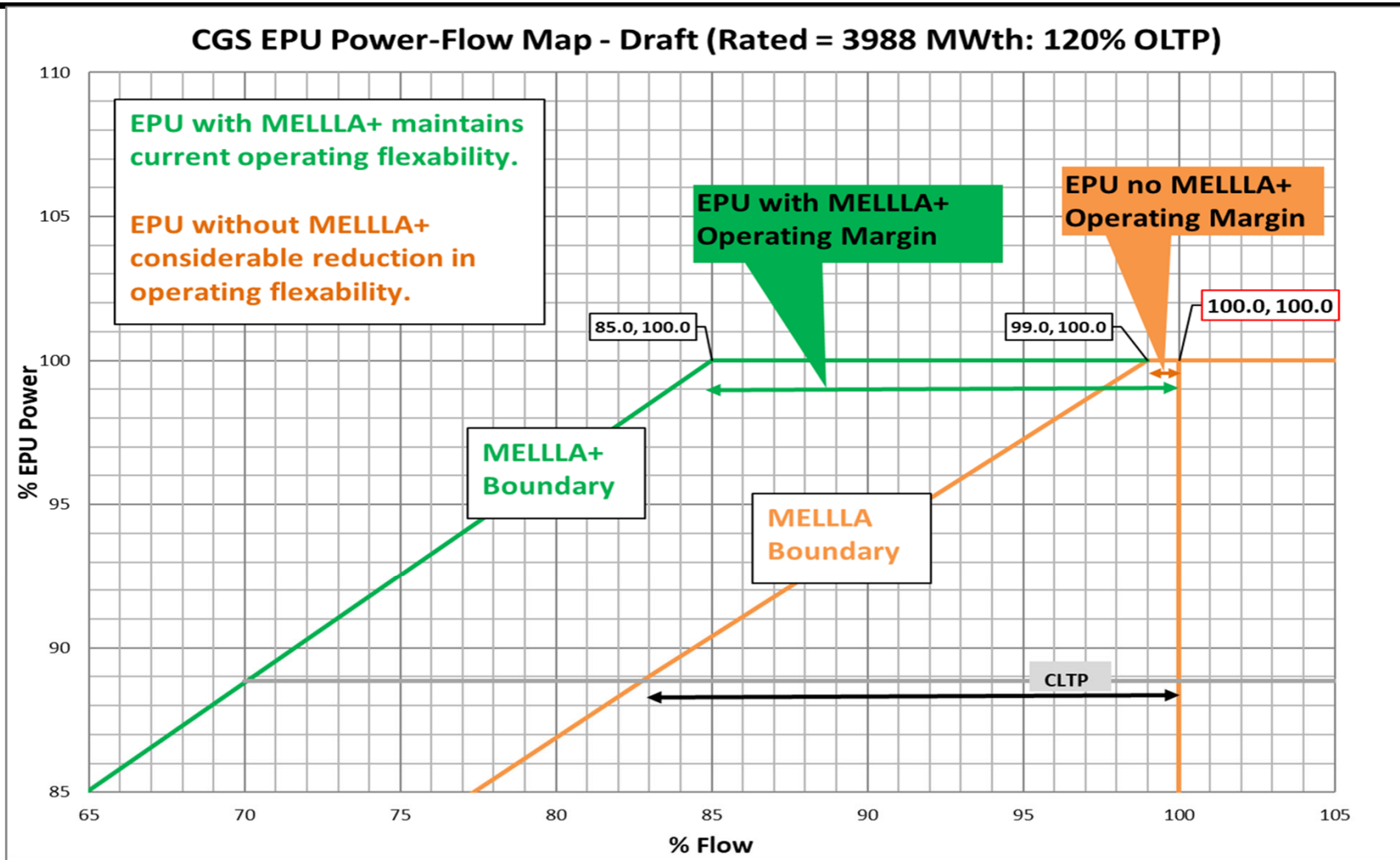
It reduces Operator burden thus safer operations

# Power to Flow Map (NUREG/CR-7179)



**MELLLA = Maximum Extended Load Line Limit**  
**MELLLA+= Maximum Extended Load Line Limit Plus**

# Power to Flow Map



# Benefit to Columbia's Operation

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- ✦ Improved Reactivity Management
  - Fewer control rod manipulations at high power
  - Fewer fuel conditioning flow ramps
  - Reduces Operator burden
  - Higher capacity factor (more electricity for the public)
- ✦ Improved Fuel Reliability
  - Pellet clad interaction (PCI) fuel conditioning margin.
- ✦ Improved Safety and Reliability
  - Less complicated fuel and core design
  - Less complicated cycle management



# Licensing Operating Experience Inputs

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- ✦ **St. Lucie combined LAR for EPU and MUR**
  - This represented a net increase in licensed thermal power of approximately 11.7% which includes a 10.0% EPU and a 1.7% MUR. Approved 9/24/2012
- ✦ **Turkey Point combined LAR for EPU and MUR**
  - This represented a net increase in licensed thermal power of approximately 14.7% which includes a 13% EPU and a 1.7% MUR. Approved 6/15/2012
- ✦ **Submittals from Monticello for EPU and MELLLA+**
  - This represents EPU / MELLLA+ submittals that were coinciding
  - EPU was submitted 11/05/2008; approved 12/09/2013
  - MELLLA+ was submitted 1/20/2010; approved 02/28/2014
- ✦ **Browns Ferry (Most recent approvals)**
  - EPU submitted 9/21/2015; approved 8/14/17
  - MELLLA+ submitted 2/23/2018; approved 12/26/2019
- ✦ **Evolving NRC Guidance**

# Columbia's Licensing Action Request

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- ✦ Columbia will submit a combined licensing action
  - This will combine MELLLA+ and EPU submittals
- ✦ Columbia's submittal is in the interest of public health, safety, and security as it will reduce operator burden
  - Makes the plant easier to operate for Reactor Operators
  - Ease of operation reduces the risk of mistakes
  - Ease of operation equals less distraction and facilitates keeping a big picture view of all operating parameters

# Safety Analysis Report (SAR)

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- ✦ Development of Combined MELLLA+/EPU SAR
  - The Combined SAR will have all relevant information for both MELLLA+ and EPU and:
    - Incorporates NRC's Review Standard for EPU (RS-001 rev 0) guidance into the development of the Extended Power Uprate Safety Analysis Report (PUSAR) as the base document
    - Adds MELLLA+ SAR language into applicable PUSAR sections.
    - Adds unique, MELLLA+ SAR topics as new sections in PUSAR (e.g., ATWS instability)
    - PUSAR sections not impacted by MELLLA+ clearly identify no impact (e.g., AC Power Systems)
- ✦ Combining MELLLA+ and EPU submittals results in synergies for both the licensee and the approvers

# Takeaways

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- ✦ EN will submit a combined license amendment request (in CY 2028) summarizing:
  - The necessary analysis to expand the operating domain via MELLLA+ and to increase thermal power to an EPU power level of 3988 MWt
- ✦ The submittal will:
  - Conform with RS-001 and applicable NRC approved topical reports
  - Align with submittals by St. Lucie, Turkey Point, and Monticello
  - Support implementation in Columbia's 2031 refueling outage
  - The submittal will not include MUR