



Constellation Energy



Calvert Cliffs Transition to AREVA Fuel



The way energy **works.**

NRC Meeting – White Flint

March 19, 2009

Non-Proprietary

Introductions

The following Constellation and AREVA personnel are attending today's meeting in support of the presentation and discussions.

Constellation

- Kevin Nietmann – Project Manager
- Tim Schearer – Technical Project Manager
- Pat Furio – Calvert Cliffs Licensing Supervisor
- Phil Wengloski – General Supervisor, Fuels

AREVA

- Rod Kliewer – Project Manager
- Bob Baxter – LOCA Supervisor
- John Link – Advisory Engineer, Safety Analysis
- Gayle Elliott – Licensing Supervisor

Meeting Purpose

- Provide the NRC staff with our licensing plans and schedules for transitioning Calvert Cliffs from Westinghouse to AREVA fuel.
- All material in this handout has been determined to be **NON-PROPRIETARY**.

Agenda

- Fuel Transition Overview
- Safety Analyses
- Discuss Submittals and Schedule
- Feedback

Overview

- Constellation signed a contract with AREVA in Dec 2007 to transition Calvert Cliffs from Westinghouse to AREVA fuel starting with the fresh fuel delivered for the 2011 RFO.
- Industry operating experience indicates that AREVA fuel has superior performance in Combustion Engineering (CE) designed plants using 14x14 fuel assemblies.
- Calvert Cliffs will be the last CE designed 14x14 plant to switch to AREVA fuel.

Phase-In of AREVA Fuel

- The following table provides the approximate Phase-In schedule.

<u>Unit 1</u>	<u>AREVA Fuel</u>	<u>Westinghouse Fuel</u>
Cycle 20 (2010-2012)	0%	100%
Cycle 21 (2012-2014)	44%	56%
Cycle 22 (2014-2016)	88%	12%
Cycle 23 (2016-2018)	100%	0%

<u>Unit 2</u>	<u>AREVA Fuel</u>	<u>Westinghouse Fuel</u>
Cycle 18 (2009-2011)	0%	100%
Cycle 19 (2011-2013)	44%	56%
Cycle 20 (2013-2015)	88%	12%
Cycle 21 (2015-2017)	100%	0%

- As an outage contingency and to provide flexibility in core design, the ability to reinsert Westinghouse fuel assemblies will be preserved in both analyses and licensing methodologies.

Calvert Cliffs Experience with AREVA Fuel

- Calvert Cliffs has AREVA Lead Fuel Assemblies (LFAs) with M5™ cladding.

Unit 2 Cycle 15 (2003-2005)

4 LFAs

Unit 2 Cycle 16 (2005-2007)

4 LFAs

Unit 1 Cycle 18 (2008-2010)

2 LFAs for high burnup (peak pin <70 GWD/MTU)

- All 4 LFAs were inspected during 2007 after 2 full cycles of operation.
- The inspections determined that the AREVA Lead Fuel Assemblies at Calvert Cliffs are performing as expected.
- Extrapolation of inspection results support a licensed peak pin burnup limit for AREVA fuel at Calvert Cliffs of 62 GWD/MTU.

AREVA Fuel Transition Scope (2011 RFO)

- Calvert Cliffs fuel assemblies will be essentially the same design as the fuel manufactured by AREVA for other CE 14 x 14 plants.
- Replace Incore Monitoring System (CECOR/BASSS) with the AREVA Incore Monitoring System (POWERTRAX).
- Increase peak pin burnup from 60 to 62 GWD (AREVA fuel only).
- Change Technical Specifications and licensing basis documents.
- Update 13 UFSAR Safety Analyses with AREVA methods.

Safety Analyses

- 13 UFSAR Safety Analyses will be reanalyzed by AREVA using NRC generically approved methodology.
 - The 13 safety analyses include all events with a Required Overpower Margin (ROP) impact and all events impacted by changing the fuel.
- The Calvert Cliffs current UFSAR Safety Analyses design bases will be maintained, i.e., not changed to SRP acceptance criteria.
- Calvert Cliffs will submit 2 of the 13 reanalyzed Safety Analyses to the NRC for review and approval.
 - Realistic Large Break LOCA (RLBLOCA), submittal required by NRC SER for EMF-2103(P)(A).
 - Loss of Forced Reactor Coolant Flow, submittal of one Non-LOCA event covered by EMF-2310(P)(A) is required per NRC letter dated November 13, 2003.

Realistic Large Break LOCA (RLBLOCA)

- EMF-2103(P)(A) Rev. 0 is the current NRC approved methodology.
- Sequoyah Unit 1 was approved by the NRC in September 2008 via the Rev 0 methodology and the NRC-negotiated “interim method”.
- The Calvert Cliffs submittal will be similar to the Sequoyah Unit 1 submittal in that we will use the Rev 0 methodology and address the following items from the “interim method”:
 - Fuel Rod Quench
 - Containment Pressure
 - Core Power
 - Forslund-Rohsenow
 - Rod-to-Rod Radiation
 - GDC-35
 - Break Size
 - Downcomer Boiling
 - Post-SIT Injection Condensation

Schedule for Non-Submitted AREVA Analyses

The following table provides the estimated completion date for those Safety Analyses that will not be submitted to the NRC but will be available for review by the NRC.

#	Safety Analyses	Current Estimated Completion Date
1	Main Steam Line Break	September 2009
2	Small Break LOCA	December 2009
3	Seized Rotor	January 2010
4	Control Element Assembly Ejection	February 2010
5	Control Element Assembly Withdrawal	April 2010
6	Boron Dilution	April 2010
7	Reactor Coolant System Depressurization	May 2010
8	Excess Feed Water Heat Removal	July 2010
9	Excess Load	July 2010
10	Asymmetric Steam Generator Event	October 2010
11	Control Element Assembly Drop	November 2010

Safety Analyses NOT Reanalyzed by AREVA

The following UFSAR Safety Analyses that continue to use Westinghouse methodology will be confirmed to remain valid and conservative:

- Loss of Load
- Loss of Feedwater Flow
- Loss of AC Power
- Feedline Break
- Steam Generator Tube Rupture

The following UFSAR Safety Analyses that use other methodologies will be confirmed to remain valid and conservative:

- Excessive Charging Event
- Fuel Handling Incident
- Containment Response
- Maximum Hypothetical Accident

Expected NRC Correspondence and Schedule

- One submittal is planned to include the following:
 - Technical Specification changes
 - RLBLOCA and non-LOCA analyses
 - M5 exemption
- Submittal is scheduled to allow 12 month review time by NRC staff
- Core loading scheduled for February 2011
 - Submittal expected no later than January 2010

Feedback

- Questions?
- Concerns?
- Comments?