Crystal River Unit 3
Extended Power Uprate

April 1, 2009

Progress Energy

Overview

- Background
- EPU submittal approach
- EPU technical issues
- Linked or related licensing actions
- Schedule
- Path forward

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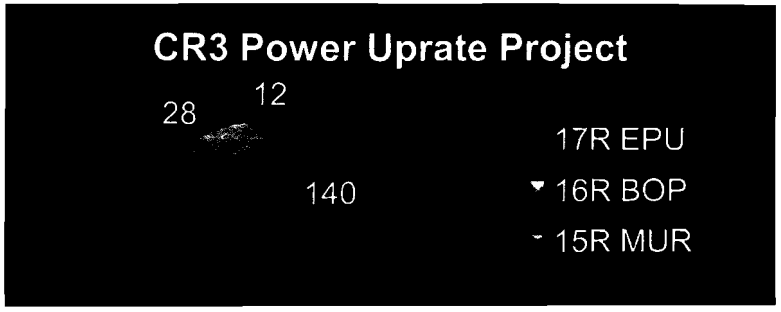
CR3 Background

- CR3 is a "B&W 177 Fuel Assembly" NSSS Plant
- Babcock and Wilcox (now AREVA) was NSSS Supplier
- Gilbert Commonwealth (Worley Parsons) was the A/E
- Key Features
  - Pressurized Water Reactor
  - Large Dry Containment
  - Once-Through Steam Generators
  - Integrated Control System
  - Constant RCS T_{avg} @ Power

CR3 EPU Background



CR3 has studied and implemented power uprates over the years of its operation:

- 2452 MWt original Rated Thermal Power (RTP)
- 2544 MWt in the early 1980s
- 2568 MWt in the late 1990s

Major Power Uprate Project Started Late in 2006. Three Phases:

2007/15R	2609 MWt	912 MWe	MUR
2009/16R	2609 MWt	940 MWe	BOP Eff
2011/17R	3014 MWt	1080 MWe	EPU

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CR3 EPU Background

PU Modification Scopes

Measurement Uncertainty Recapture (15R)

- Leading Edge Flow Meter
- Improved Main Steam Temperature and Flow Instruments

BOP Efficiency (16R)

- Low Pressure Turbines and Main Generator
- Moisture Separator Regenerative Heat Exchanger
- Support Systems (secondary cooling, Iso-Phase Bus Duct Cooling, etc)
- Various Heat Exchangers

CR3 EPU Background

EPU Modification Scope (17R)

- High Pressure Turbine
- Condensate Pumps
- ADV Enhancements
- LPI Cross-Tie/Hot Leg Injection
- Various Pumps and Motors

Primary Contractors for EPU

AREVA	Fuels, Safety Analysis and Licensing
AREVA/Parsons	BOP Engineering
Siemens	Turbine-Generator

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CR3 EPU Background

CR3 EPU	3014 MWt
Davis Besse (current w/MUR)	2817 MWt
CR3 (current w/MUR)	2609 MWt

CR3 EPU is a 15% increase above current rated thermal power; but, only 7% above B&W fleet experience.

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CR3 EPU NRC Meetings

Original Kick-Off Meeting	April 23, 2007
MUR LAR Submittal	April 25, 2007
MUR NRC Approval	December 26, 2007
EPU Update Meeting	May 19, 2008
Today's Meeting	April 1, 2009

EPU Submittal Approach

Format and Content Consistent with RS-001 using Ginna as model

Consistent with draft NEI Guidance (NEI 08-10)

Progress Energy is conducting extensive review of other EPU OE to optimize EPU LAR completeness and quality (RAIs, etc),

Draft LAR content being reviewed by AREVA and EPU licensing staff

Final LAR content will be re-reviewed by engineering (EPU staff, systems, programs and/or design)

Establishing independent Expert Panel for supplemental review

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EPU Submittal Approach

Environmental Report

Conducted benchmark visit to Browns Ferry. Format consistent with Browns Ferry and Susquehanna.

Utilized existing reports to the extent possible

- Used License Renewal ER content and contractor
- Used State approved Site Certification content
- Added or modified only those areas not previously addressed or which changed (i.e., CW flow increase assumed in Site Certification – no longer required).

Draft complete – no surprises.

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EPU Technical Details

- Follow-up on aspects discussed in prior meetings
- Address emergent issues
- Some require explicit NRC actions others are simply reviewed for transparency and completeness
- Basis for inclusion will be discussed for each

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EPU Technical Details

Low Pressure Injection (LPI) system cross-tie modification is necessary to mitigate core flood line break with concurrent limiting single failure.

LPI cross-tie significantly improves core flood line break performance in a manner consistent with some of our peers.

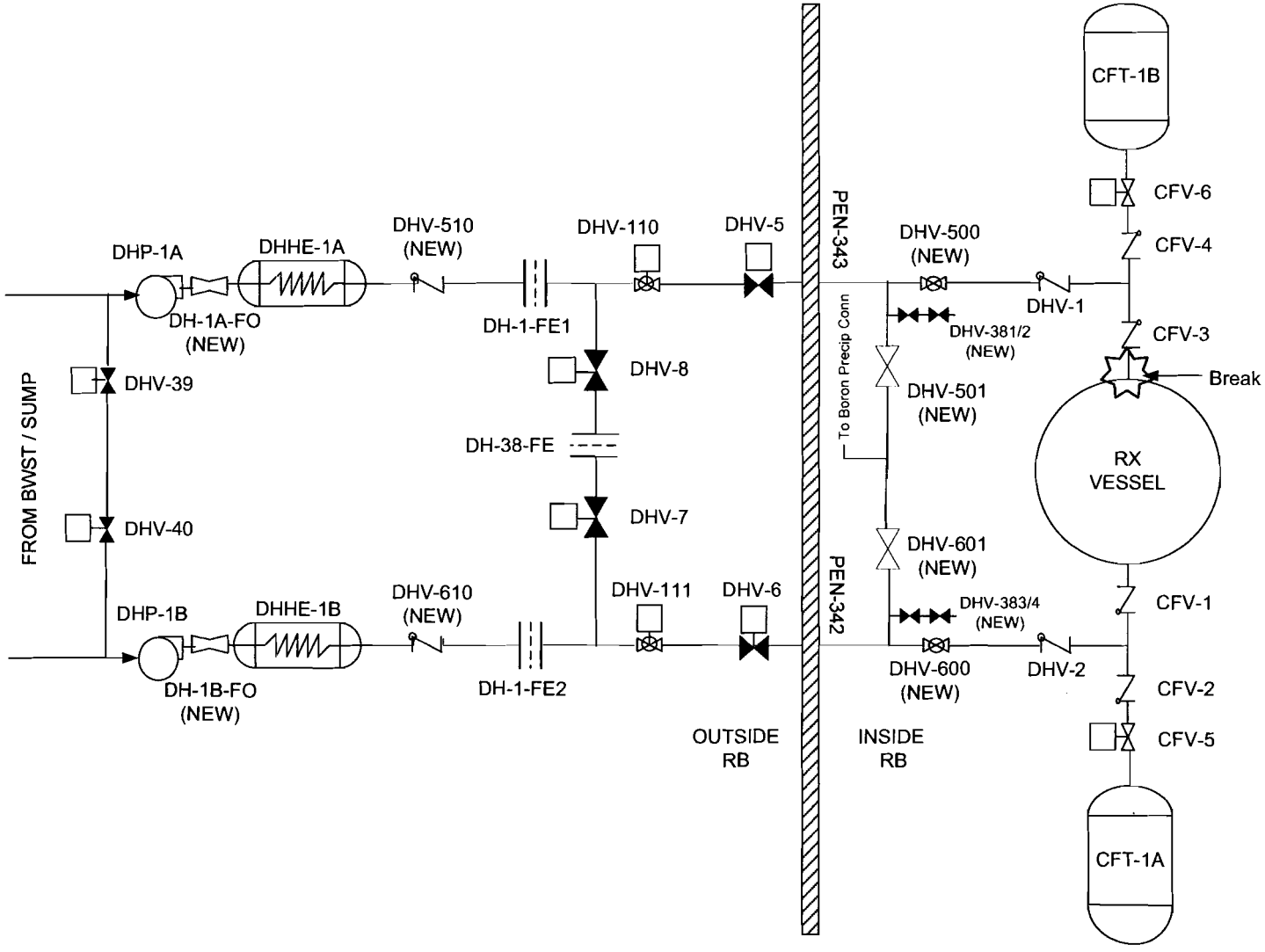
Modification adds Hot Leg Injection flowpath from common line.

Hot Leg Injection replaces currently licensed active Boron Precipitation mitigation sub-systems.

- Makes mitigation single-failure proof
- Reduces operator burden

See Schematics that follow.

LPI Cross Tie Conceptual Design



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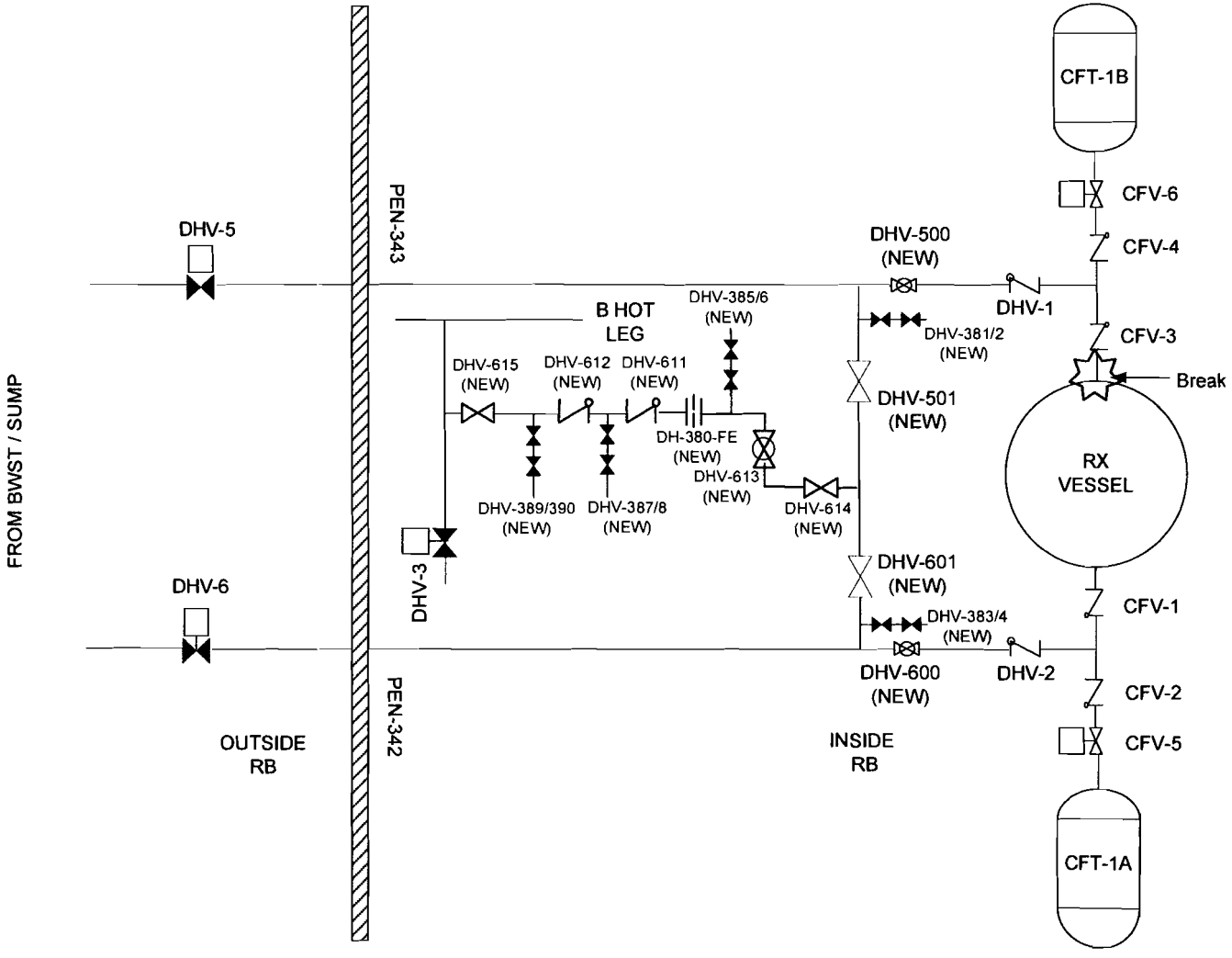
Hot Leg Injection Conceptual Design



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EPU Technical Details

Enhanced secondary depressurization is necessary to meet SBLOCA objectives at EPU conditions. It is not needed for Appendix K compliance; but, to avoid long post accident operation at elevated temperatures.

- Increasing size of Atmospheric Dump Valves (ADVs)
- Making ADVs safety-related
- Coupled with existing, simple, related manual action
  - Open ADVs on Loss of Sub-cooling Margin
  - Concurrent (same control switch) with raising target SG levels

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EPU LAR Technical Details

Margin Management

- CR3 continues to be committed to an extensive margin management program
  - Consistent with INPO Best Practice 09-003 "Excellence in the Management of Design and Operating Margins"
  - Consistent with NEI 08-10 "Roadmap for Power Uprate Program Development and Implementation" (currently a draft)
- Regular updates to our Plant Nuclear Safety and Nuclear Safety Review Committees
- Details to be captured in appropriate Engineering Change packages
- To be validated by testing where appropriate

EPU LAR Technical Details

Operational and Post Modification Testing

CR3 committed to thorough power ascension and testing program

CR3 developing comprehensive margin management program including appropriate testing to confirm operational margin

CR3 developing extensive vibration monitoring program

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EPU LAR Technical Details

Large Transient Testing

- CR3 has recognized the need and is thoroughly assessing the impact of the EPU on original CR3 Hot Functional Testing as required by the Standard Review Plan and RS-001
- CR3 is evaluating modeling options (transient codes, simulator, etc.) to support testing needs determination.
- CR3 is evaluating appropriate large transient test scope based on other utility operating experience
- CR3 plans to schedule additional discussions on this subject prior to submittal.

EPU LAR Technical Details

Dose Related Aspects

- Application of Alternate Source Term to CR3 was approved September 17, 2001
- Meteorological data has been updated to support current X/Q values
- Accident dose calculations completed
  - Site Boundary
  - Control Room/TSC
- On-site doses being updated
  - Input to EQ evaluations and calculations
  - Input to 'Mission Dose' calculations

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EPU LAR Technical Details

Environmental Qualification Evaluation Underway

Preliminary Reactor and Intermediate Building Pressure/Temperature profiles and preliminary dose conditions complete

Temperature and pressure inputs will be finalized prior to submittal

LAR will include confirmation of future work to demonstrate qualification (i.e. list SSCs that may require modification or changes in replacement schedule).

All calculation and qualification files will be updated as part of EPU implementation.

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EPU LAR Technical Details

Grid Stability

Analysis completed in 2007

Submitted, reviewed and approved as part of MUR LAR (NRC review limited to MUR case)

Included three phases

- MUR Impacts
- EPU Impacts
- Levy Impacts

Noted switchyard and transmission modifications necessary to support new build (Levy) not EPU

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EPU LAR Technical Details

LOCA Status

- As noted by NRC, inputs to support of NRC confirmatory calculations were based on existing Analysis of Record (i.e., MUR conditions not yet EPU)

- The full spectrum of all accident and transient analyses necessary to support EPU are complete

- One substantive aspect of SBLOCA remains not fully resolved (EFW wetting).

EPU LAR Technical Details

EFW Wetting

- Another B&W NSSS plant recently filed 10 CFR 50.46 report to the NRC due to a greater than 50F PCT increase for SBLOCA (102F).

- AREVA notified CR3 that it will be applicable to CR3 after Steam Generator Replacement in 16R. There are differences in the designs
  - Similar - There is a gap between shroud and EFW entry Tube Support Plate
  - Dissimilar - CR3 design includes a 'gap filler bar' that reduces gap and encourages pooling

- BWC conducted EFW flow distribution testing last week. The results were encouraging.

- AREVA will revise CR3 SBLOCA analysis for 16R and 17R configurations.

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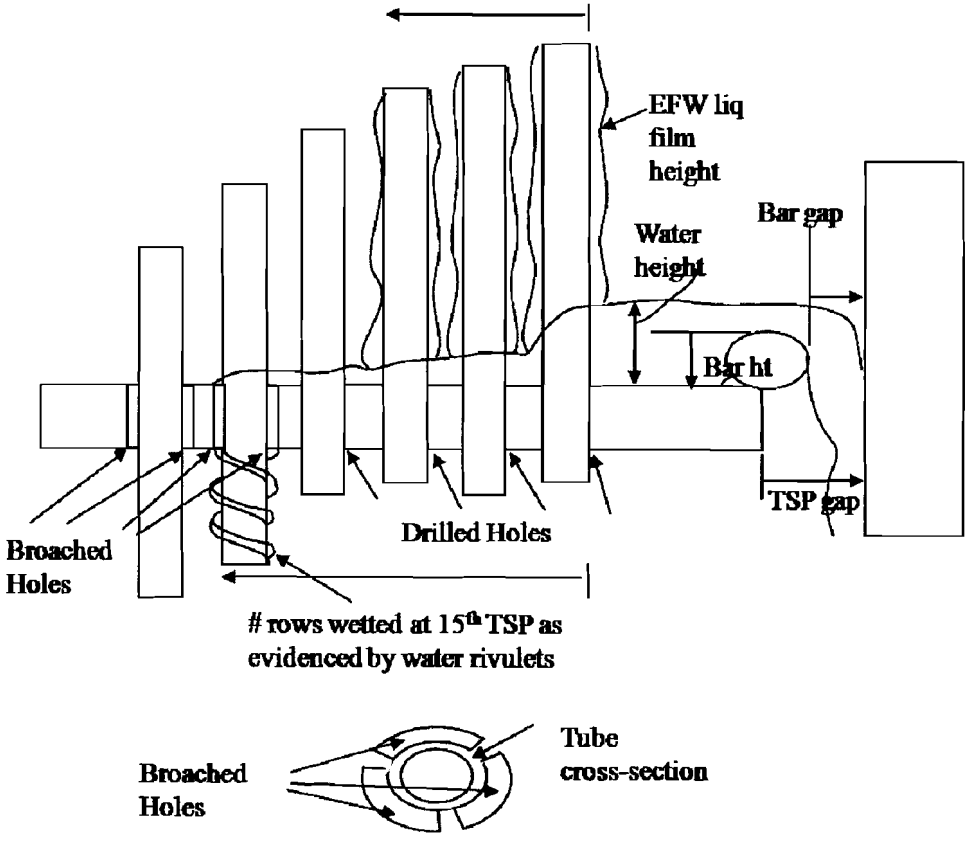
EFW Wetting (CR3)



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Linked Licensing Action

LAR #307 Rod Ejection Accident (REA) Analysis Methodology

- The proposed methodology is the same as that in ANP-10286P which is the Topical Report addressing REA Methods for the US EPR.
- The AREVA REA analysis methodology has been demonstrated to be applicable to CR-3 through the evaluation of a bounding sample problem
- Knowledge gained from the NRC review of the EPR Topical should facilitate review of the CR3 LAR

Linked or Related Licensing Action

LAR 310 adopts TSTF-490 "Deletion of E Bar Definition and Revision to RCS Specific Activity Technical Specification"

- A primary objective of TSTF-490 is to replace E Bar with Dose Equivalent Xe-133 (DEX) because DEX provides a better indicator of failed fuel conditions
- NRC review more complicated than CLIIP presumed since related dose calculations are not yet reviewed and approved
- CR3 and NRC are determining best path forward

Related Licensing Action

Set-point Methodology

- EPU LAR will include changes to ITS Setpoints
- Revision 4 of TSTF-493 to be sent to the NRC this Spring
- CLIIP should be available Fall, 2009
- CR-3 will commit to adopt one of options in the CLIIP

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EPU LAR Schedule

June 30, 2009 conservatively chosen at project inception

Recent discussions with NRC indicate to Progress Energy that later date is more appropriate.

Additional time can be constructively used by PE

EPU LAR will be submitted by September 25, 2009

EPU Amendment is requested by October 1, 2010 to meet 17R EC issuance milestone in support of effective work planning.

Closing Thoughts

- Modifications primarily to the secondary-side of plant and installed in well-managed increments
  - MUR related changes in 15R (LEFM and others)
  - Efficiency improvements in 16R
  - Final modifications in 17R
- Strong commitment to effective project management
- Strong commitment to effective communications
- Strong commitment to use of Operating Experience

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Comments/Questions?

What did we not address that the NRC wants to hear more about?

What can we do to facilitate your reviews going forward?

We have identified the need to further discuss large transient testing with the staff prior to EPU submittal

AREVA and we remain committed to support a safety analysis workshop at an appropriate time frame.

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