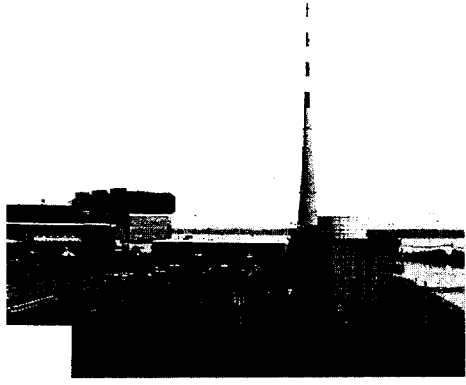


# Tennessee Valley Authority Browns Ferry Nuclear Plant Extended Power Uprate



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TVA/NRC Meeting  
Nuclear Reactor Regulation - Rockville MD  
December 5, 2001



# Agenda

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- ◆ **Introduction/Meeting Objectives**
- ◆ **Background**
- ◆ **Project Overview**
- ◆ **Power Uprate Major Modifications**
- ◆ **Power Uprate Approach**
- ◆ **Proposed Submittals**
- ◆ **Proposed Submittal Schedule**
- ◆ **Associated Topics**
- ◆ **Summary and Open Discussion**

Tim Abney

# Introduction/Meeting Objectives

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- ◆ **Introduction**
  
- ◆ **Meeting Objectives**
  - **Formally Notify NRC of Plans for Extended Power Uprate**
  - **Define Required Submittals**
  - **Describe Major Modifications Necessary for EPU Implementation**
  - **Discuss Submittal Content and Depth of Information**
  - **Obtain NRC Concurrence of TVA's Proposed Schedule**
  - **Gain NRC Insights From Previous Extended Power Uprates**

# Background

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- ♦ **TVA Obtained License Amendments for 5% Power Uprate in September of 1998 for Units 2 and 3**
  - **Implemented on Unit 3 in October of 1998**
  - **Implemented on Unit 2 in March of 1999**
  
- ♦ **TVA Board of Directors Approved Extended Power Uprate Project for Browns Ferry Units 2 and 3 in March of 2001**
  - **Needed to Help Meet the Growing Demand for Power by TVA Customers**
  - **Important for Continued Cost Effective Operation of BFN**

## Background (Cont.)

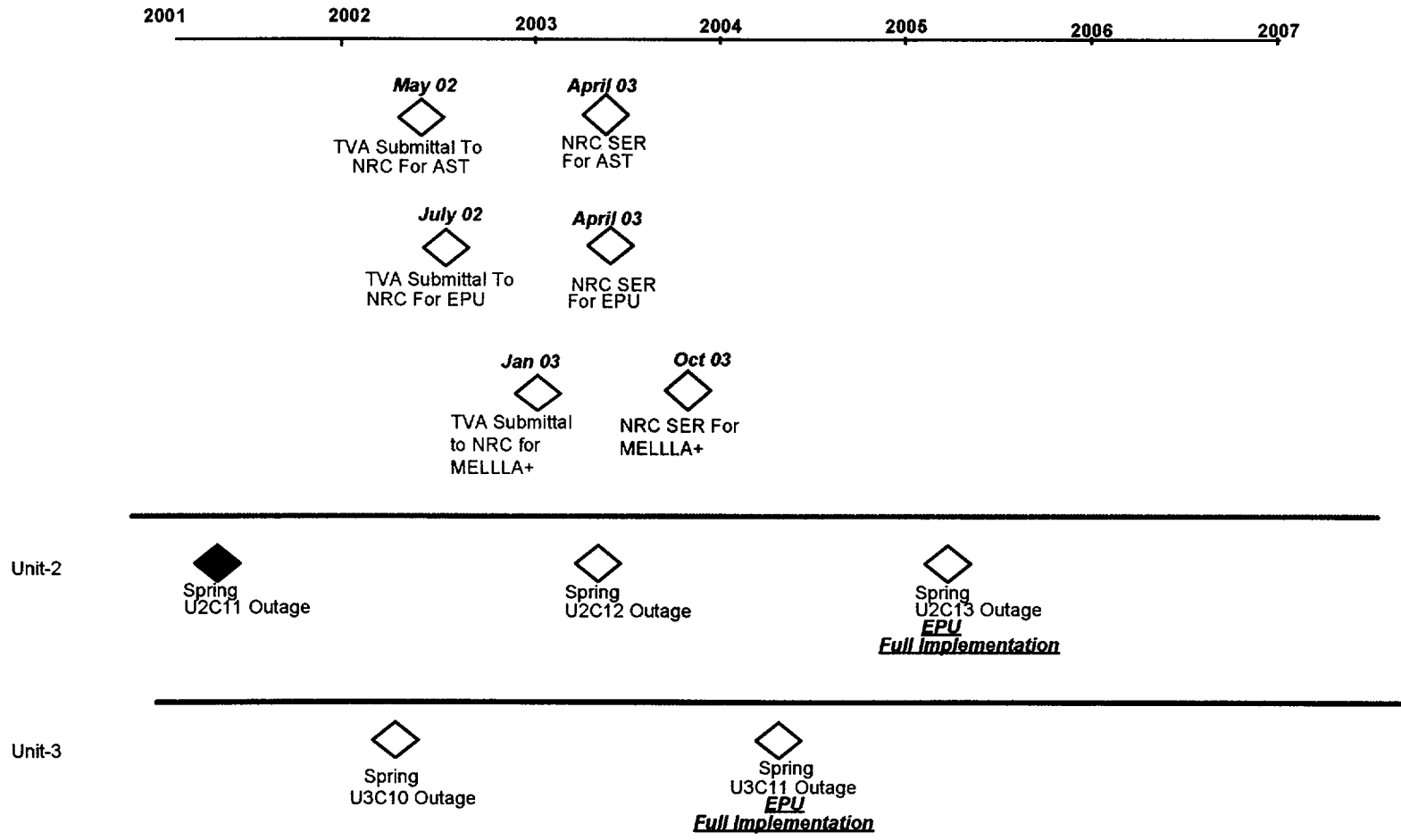
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- ◆ **TVA has Made a Major Commitment to Safely Implement Extended Power Uprate**
  - **Dedicated Engineering Team**
  - **Integrated Schedule Developed**
  - **Analyses in Progress**
  - **Factor in “Lessons Learned” From Previous Power Uprate Efforts**



# Project Overview



Ed Hartwig

# Power Uprate Major Modifications

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- ◆ **Preliminary List of Major Modifications**
  - **Replace Current High Pressure Turbine Steam Path**
  - **Modify Feed Pump Turbines**
  - **Modify Condensate System**
    - **Modify Demineralizers**
    - **Replace Condensate Pump Motors**

# Power Uprate Approach

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- ◆ **Power Uprate Will Consist of a 20 Percent Increase in Core Thermal Power From the Original Licensed Core Thermal Power**
  - **Original Thermal Power 3293 MWt**
  - **Current Thermal Power 3458 MWt (5 Percent Uprate)**
  - **Proposed Thermal Power 3952 MWt (Extended Power Uprate)**
    - **Increased Thermal Power With More Uniform (Flatter) Core Power Distribution**
    - **Corresponding Increase in Feedwater/Steam Flow**
    - **No Increase in Operating Pressure**
    - **No Increase in Maximum Core Flow**



## Power Uprate Approach (Cont.)

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- ◆ **BFN Initial Plant for Full Implementation of GE's Constant Pressure Power Uprate Licensing Topical Report (CLTR)**
  - **CLTR Currently Under NRC Review**
  - **Analysis Based on No Increase in Operating Pressure**
  - **Reduction in Analysis and Information Submitted to NRC From Previous Power Uprate Submittals**

# Power Uprate Approach (Cont.)

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- ◆ **Previous Extended Power Uprates Were Submitted Using GE's Boiling Water Reactor Extended Power Uprate Licensing Topical Report (ELTR 1 & ELTR 2)**
  - **Developed by GE During Initial Extended Power Uprate Efforts at Hatch and Monticello**
  - **Used for Duane Arnold, Quad Cities, Dresden, Clinton, and Brunswick**
    - **Clinton and Brunswick Used CLTR Approach for Four Areas of Analysis**

- ◆ **Proposed CLTR Approach of Generic Evaluations**
  - **A Significant Reduction in Licensing Information Submitted As Compared to Previous ELTR Based Approach.**
  - **Approximately One Half of the Evaluations Required Under CLTR Approach Are Generic.**
  - **The Number of Transients Analyzed for the CLTR is Reduced From the ELTR Approach.**
    - **Transients Listed in the BFN UFSAR** **27**
    - **Transients Addressed in Recent ELTR SER** **16**
    - **Transients Evaluated in Reload Analysis** **6**

- ◆ **Proposed CLTR Approach of Generic Evaluations (Cont.)**
  - **The Disposition of Generic Areas Will Reiterate the Applicable Portion of the CLTR Generic Basis and BFN Specific Conformation.**
  - **The Disposition of Plant Specific Areas of Analysis Will Have the Same Level of Detail As Current EPU Submittals.**

# Proposed Submittals

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- ◆ **Extended Power Uprate**
  - **All Required Information According to the Constant Pressure Power Uprate Licensing Topical Report**
  - **Will Not Include Other Licensing Actions**
- ◆ **Maximum Extended Load Line Limit Analysis Plus (MELLLA+)**
  - **Will be Based on GE's Licensing Topical Report**
  - **Increases the Maximum Licensed Operating Boundary**
  - **Recover Essential Operating Flexibility by Restoring an Acceptable Operating Flow Range at EPU Power Level**
- ◆ **Alternative Source Term**
  - **Consistent With Reg. Guide 1.183**
  - **Incorporate Lessons Learned From Previous Utility Efforts**

Jackie Wright

# Proposed Submittal Schedule

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<u>Licensing Action</u>	<u>Submittal Date</u>	<u>Needed NRC Approval Date</u>
CLTR <sup>1</sup>	March 2001	March 2002
MELLLA+ LTR <sup>1</sup>	December 2001	December 2002
Alternative Source Term	May 2002	April 2003
Extended Power Uprate	July 2002	April 2003
MELLLA+ BFN	January 2003	October 2003

1 Submittal by General Electric

Tim Abney

# Associated Topics

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- ♦ **Control Room Habitability**
  - **Control Room Inleakage Tested in 1992 (3117 CFM) Percent Power Uprate and CREVs Issue**
    - **1998 Power Uprate NRC Safety Evaluation**
    - **1999 Safety Evaluation Radiological Dose Calculations Associated With Power Uprate**
      - **Confirmed Control Room Doses are Within General Design Criteria-19 Limits**
  - **Increased MSIV leakage**
    - **2000 NRC Safety Evaluation**
  - **NRC Previously Approved BFN's Control Room Habitability Issues**

## Associated Topics (Cont.)

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- ◆ **TVA Instrument and Control Calculation Setpoint Methodology Will Be Used for EPU**
  - **Consistent With Instrument Society of America (ISA) 67.04**
  - **TVA Methodology Reviewed and Accepted As Part of :**
    - **Units 2 and 3 Recovery**
    - **BFN 5 Percent Uprate**
    - **BFN 24 Month Fuel Cycle**



## Associated Topics (Cont.)

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- ♦ **CLTR Reg. Guides**
  - **TVA Submittal Will be Consistent With the Current BFN Licensing Basis**
  - **CLTR References a Number of Reg. Guides, Some of Which are Not Applicable to BFN Licensing Basis**
  - **TVA Will Not Commit to Reg. Guides Referenced in the CLTR That are Not Part of the BFN Licensing Basis**
    - **Justification Will be Provided**

# Summary and Open Discussion

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- ◆ **Schedule Is Important for Meeting Projected Load Demand**
- ◆ **Uprate Submittal Will Follow Generic Approach**
- ◆ **Extended Power Uprate Schedule Is Achievable**
- ◆ **Open Discussion**

Tim Abney