

# AGENDA

## Crystal River 3 Major Projects Status

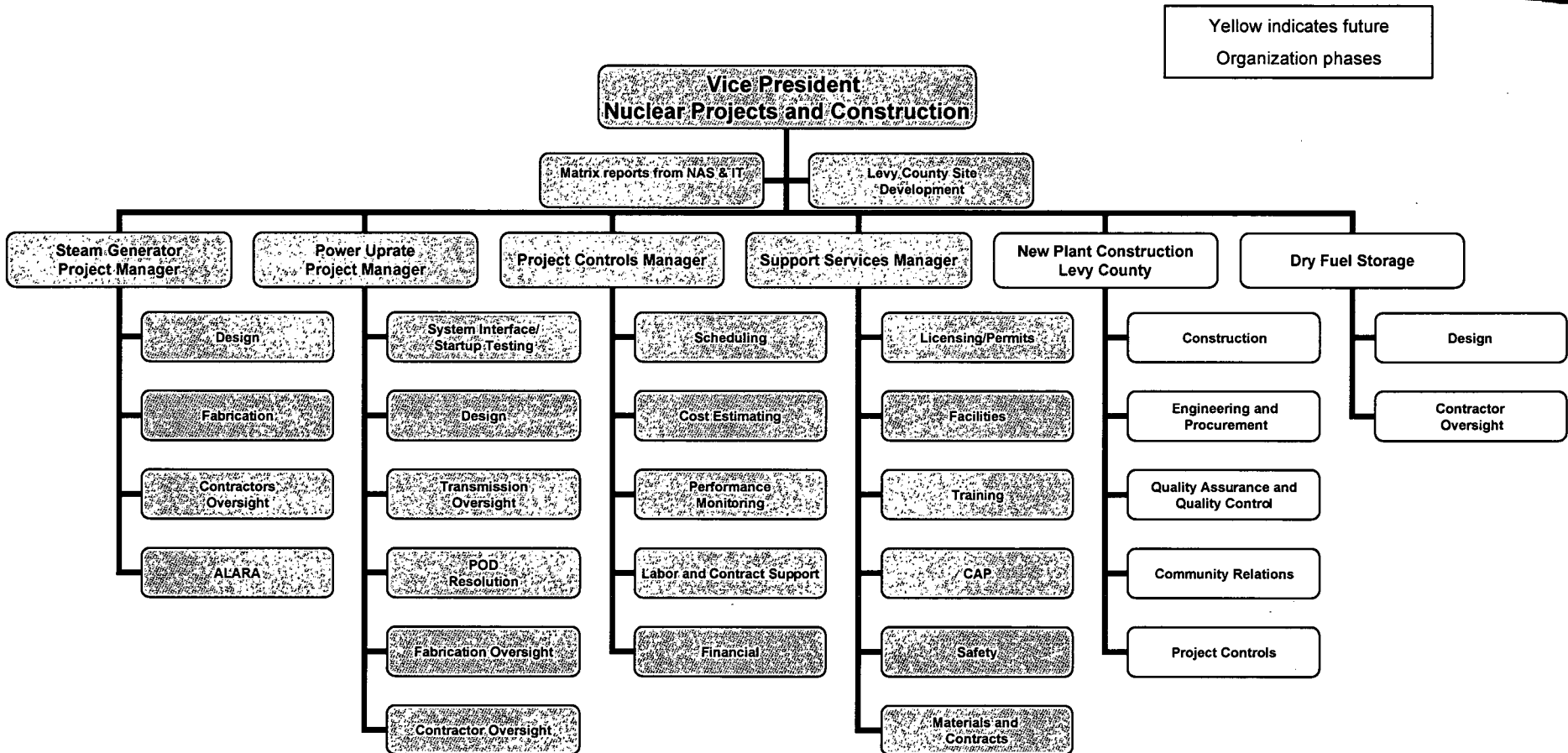
- Introduction Dale Young
- Projects Danny Roderick
- License Renewal Mike Heath
- Steam Generator Replacement Ken Wilson
- Power Level Increases Ken Wilson
- Conclusion Paul Infanger

# Major Projects Organization

- Purpose and Vision
  - ▶ Allow Line Management to Retain Operational Focus
  - ▶ Key Projects
    - ◆ Steam Generator Replacement
    - ◆ Power Level Upgrades
    - ◆ Dry Cask Storage
    - ◆ Levy County
  - ▶ Critical Skill Sets
    - ◆ Project Management
    - ◆ Construction Management
- Organizational Staffing Plan



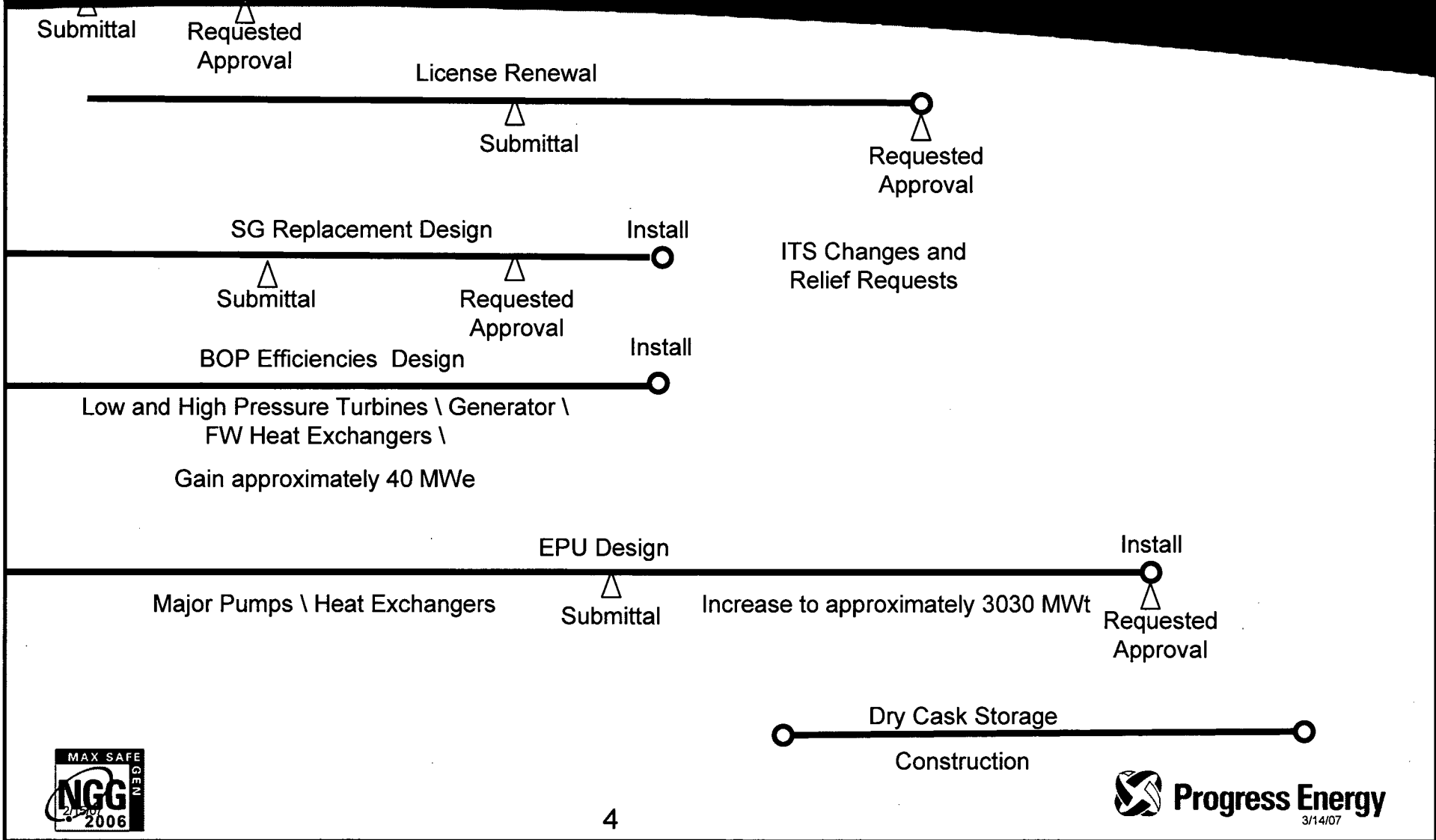
# NGG Construction Organization



# CR3 SITE PLAN / SCHEDULE

2007 2008 2009 2010 2011 2012  
 1st 2nd 3rd 4th 1st 2nd 3rd 4th 1st 2nd 3rd 4th 1st 2nd 3rd 4th 1st 2nd 3rd 4th

MUR 1.6% Increase  
 2609 MWt



# License Renewal and Projects Interfaces

- License Renewal Project Overview
- Extended Power Uprate Impacts on License Renewal
- Steam Generator Replacement Impacts on License Renewal

# License Renewal Project Overview

- NRC has Renewed the Operating Licenses for Robinson and Brunswick Plants
- Harris Plant Application Submitted – November, 2006
- CR-3 Submittal Scheduled – January, 2009
- License Renewal is a Corporate Project
  - ▶ Progress Energy Management
  - ▶ Core Staff – Progress Energy Engineers Supplemented by Contract Engineers
  - ▶ Average Staff Experience: 25+ Years



# Extended Power Uprate Impacts on License Renewal

- Fluence Projections Based on Uprated Core Design
- Thermal Fatigue
  - ▶ Minor Changes to Temperature and Pressure
  - ▶ LRA Will Address

# Extended Power Uprate Impacts on License Renewal

- Revised Mass Energy Release Calculation
  - ▶ Impacts on Time Limited Aging Analyses (i.e., EQ VQPs) Must be Addressed in EPU License Amendment Request
- Other Transient and Accident Analyses
  - ▶ Could Result in Changes that would Impact LRA Scope
- EPU Changes Addressed by 10 CFR 54.37(b)

# Steam Generator Replacement Impacts on License Renewal

- Steam Generators Replaced – Fall, 2009
  - ▶ Minor Impact on License Renewal
  - ▶ Materials and Aging Effects will be Addressed as a LR Application Update (10 CFR 54.21 (3)(b))
  - ▶ Program Changes Addressed by:
    - ◆ 10 CFR 54.21 (3)(b), and
    - ◆ Improved Technical Specification Change

# License Renewal Interface With CR-3 Plant and Projects Staff

- All Aging Management Programs Reviewed by Plant Staff
- All Time-Limited Aging Analyses Reviewed by Plant Staff
- Final Application Reviewed by PNSC
- License Renewal Project Maintains Ongoing Interface with CR-3 Major Projects Group

# License Renewal Update Requirements

- 10 CFR 54.21(3)(b) Requires Updates
  - ▶ Annually – 1st Quarter 2010
  - ▶ Three Months Prior to Issuance of License – 3rd Quarter 2010
- 10 CFR 54.37b Requires Periodic Updates

# Steam Generator Replacement

- Replacement Scheduled in 2009 for Business Reasons
  - Prior to Impacting Cycle Durations
  - During a Year with Three Total Refueling Outages, and Only One Outage in the Fall
  - Good Progress Made During N-2 (last) AND N-1 (next) Outages
- B&W Canada is Primary Component Manufacturer

# Steam Generator Replacement

- CR-3 Carefully Monitoring Oconee “Lessons Learned”
  - ▶ Progress Energy and CR-3 have Maintained Good Relationships with Duke Energy, and Especially with Oconee
  - ▶ CR-3 Loaned Staff to Oconee During Replacements
  - ▶ We and They Use Same Third-Party Reviewers in Many Cases
  - ▶ The “Root Cause” and Related Reports were Carefully Reviewed within Project, PNSC, and Management



# Original Replacement Design Changes

- To Address Oconee Experiences BWC and CR-3:
  - ▶ Changed Tube Support Plate Material 'Back' to Carbon Steel
  - ▶ Eliminated Main Steam Outlet Flow Restrictor Feature
  - ▶ Returned to 'Floating' Tube Support Plate Design
  - ▶ Relocated and Added Additional Tie Rods
  - ▶ Added One and Redistributed Tube Support Plates
  - ▶ Altered Tube Support Plate Broach Downstream Geometry

# Original Replacement Design Changes

- Other Changes are Being Made for Various Reasons
- We are Evaluating the Impact of Proposed Revisions to Reg. Guide 1.20
- Limited Regulatory Impacts Include:
  - ▶ Change to Steam Generator Management (Inspection) Program
  - ▶ ITS Change Required for Steam Generator Inventory Curve
  - ▶ Some Relief Requests Likely are Needed

# Three Power Level Upgrades

- Measurement Uncertainty Recapture (MUR)
- Balance of Plant Efficiency
- Extended Power Uprate (EPU)

# Measurement Uncertainty Recapture (MUR)

- Typical 'Appendix K' Increase of 1.6% to 2609 MWt
- Relatively Recent (2002) Uprate to 2568 MW
  - Appendix K Analyses and Other Reviews Done to (100 + 2)% of 2568 MWt (2619 MWt)
  - MUR Remains Within that Value (100 + 0.4)% of 2609 (2619 MWt)
  - With Exception of Containment Analysis, the Previous Review and Approval is Bounding

# Containment Analysis

- The Only Significant New Analytical Effort was Associated with Containment Analysis
- Utilizes Current LOCA Evaluation Model (RELAP) to Calculate Mass and Energy Release for Main Steam Line Break and LOCA
- Uses Approved GOTHIC Model to evaluate Reactor Building Response (Previous Analysis used CONTEMPT)
- Condensing Surface Area Input was Increased from Value in FSAR but Large Margin Retained

# Margin Uncertainty Reduction

- CALDON Check-Plus LEFM System for Highly Accurate Feedwater Flow and Temperature Measurement
- Significantly Improved Feedwater Pressure, and Main Steam Pressure and Temperature Measurements
- Rigorous Input Calculations to CR-3 Standards
- Rigorous Heat Balance Uncertainty Calculation
- Consistent Treatment Within Fixed Incore Detector Monitoring System and Automated Unit Load Demand. CR-3 Uses the Secondary Heat Balance to:
  - ▶ Calibrate the NI's (FIDMS)
  - ▶ Automatically Control Output to RTP (AULD)

# Abnormal Operations

- Loss of LEFM (and Other Equipment) will be Controlled by CP-500 (CR-3 Functional Equivalent to Technical Requirements Manual)
  - ▶ AULD will Shift to Manual, Under Certain Conditions
  - ▶ Alarms will Alert Operator about Other Losses of Required Equipment
  - ▶ 12 Hours to Reduce Power (Prompt, but with Time to Properly Manage Reactivity Change)
  - ▶ 48 Hours to Reduce RPS Overpower Trip Setpoint from 104.9 to 103.3 (Allows Reasonable Time to Schedule)

# License Amendment Request Content

- MUR License Changes Limited to Rated Thermal Power and EFPD Definitions
- Revised Containment Analysis Results in its Change to 5.6.2.20
- Alden Results and Final Grid Stability Study will be Submitted when Available

# **MUR License Amendment Request**

**Requesting Approval for Restart from Refuel 15  
(Mid-November)**

**Recognize Challenging Schedule and Will  
Provide Timely and Thorough Responses to  
Meet NRC Needs**

# BOP Efficiency Improvements

- Low Pressure Turbines
- High Pressure Turbine
- Electrical Generator
- Feedwater Heaters
- Main Steam Reheaters

**No NRC Review or Approval Required**

# Extended Power Uprate

- Will Follow NRC Guidance
- Will Extensively Utilize Industry Experience
- Expect 3030 MWt
- Expect Major Plant Changes
- Some Changes will have been Accomplished Through Other Projects
  - ▶ Step-up Transformers replaced in 2007
  - ▶ Turbines and Generator modified in 2009
  - ▶ Steam Generator Replacement completed in 2009



# Ongoing and Future Efforts

- BOP Evaluation Underway to Determine Major Components and System Changes that May be Needed
- NSSS Evaluation Underway
  - ▶ Includes Complete Accident and Transient Reanalysis, Based on CR-3 Specific Design, and Done to Current Standards
  - ▶ Limited, if any, New Methods. If any are Identified, They will be Pursued before EPU LAR.
  - ▶ Preliminary Fuel Cycle Designs for Next Four Cycles

# Conclusions

- CR-3 Managing Multiple Complex Projects
- Interact With NRC Staff To Facilitate Approvals
- Request Feedback From NRC To Improve Process
- Comments or Questions?