

# Lake Chelan *Hydro Modernization*

*April 2006*



Lake Chelan  
*Hydro Modernization*  
April 2006

- ▶ Background
- ▶ Project Scope
- ▶ Timeline



# Lake Chelan

## *Hydro Modernization*

### *Background*

- ▶ Investigate Spare Turbine Runner: 2002
  - Minimize outage time
- ▶ Turbine Runner Replacement Feasibility: 2003
  - Significant efficiency gains possible
- ▶ Hydro Modernization Feasibility: 2004
  - Lessons learned from Rocky Reach and Rock Island
  - Addresses risks associated with generator
  - Cost/Benefit analysis of modernization options
- ▶ Equipment Condition Assessment: 2004
  - Most equipment at or near end of useful life
  - All equipment from head works to tailrace included
  - Equipment needing replacement within the next 10 years

# Lake Chelan

## *Hydro Modernization*

### *Background*

- ▶ Feasibility Approved: Q1 2005
  - Generation Management approval
  - Board presentation and tour
- ▶ Bid Document Preparation: Q2 2005 – Q1 2006
  - Turbine, generator, governor
  - Spillway gantry crane
  - Spillway stop logs and site work
  - Intake gates and hoist
- ▶ Bidding Process: Q2 2006 – Q3 2006
  - Resolution to advertise
  - Mandatory site visits
  - Resolution(s) to award

# Lake Chelan

## *Hydro Modernization*

### *Background*

- ▶ Hydro Modernization Financial Analysis
  - Anticipated 40 year life
  - Includes plant O&M
  - Modernization capital and O&M projects
  - Debt service
- ▶ Hydro Modernization Timing Analysis
  - District financial model
  - Power Market and lake level management
  - Outage start and duration

# Lake Chelan

## *Hydro Modernization*

*Background*

### ► Analysis Results

- Efficiency gains pay for 70% of project costs
- Positive internal rate of return
- Least cost, least risk with current scope and schedule
- Greatest benefit with spring outages
- Increased efficiency offsets power production lost to Chelan River flow



# Lake Chelan

## *Hydro Modernization*

### *Project Scope*

- ▶ Powerhouse Projects
  - LC Hydro Modernization
  - LC Bridge Crane Rejuvenation
  - LC Small Drainage Pump and OWS
  - LC Small Power and Lighting
  - LC Cooling Water Supply
- ▶ Headworks Projects
  - LC Spillway Stop Logs and Hoist
  - LC Intake Gate Improvements
  - LC Headworks Power Distribution Upgrade
- ▶ Switchyard Projects
  - LC Relay Replacement
  - LC 115 kV Breaker Replacement



# Lake Chelan *Hydro Modernization*

*Project Scope*

- ▶ LC Hydro Modernization
  - Replace 75 year old generator stators
  - Replace turbine runner and other components
  - Replace governors and controls
  - Efficiency gains pay for 70% of all project costs
  - Estimated \$12,000,000



# Lake Chelan

## *Hydro Modernization*

### *Project Scope*

- ▶ LC Spillway Stop Logs and Hoist
  - Stop Logs
    - ▶ Flexibility in FERC required tainter gate maintenance
    - ▶ Emergency shut off in some failure modes
  - Hoist
    - ▶ Gantry crane used to handle stop logs
    - ▶ Gantry crane also used lift some tainter gates
    - ▶ Jib crane assists with tainter gate maintenance
  - Estimated \$1,000,000

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## *Board Timeline*

- ▶ LC Hydro Modernization
  - Resolution to Advertise – April 2006
  - Resolution to Award – September 2006
  - First Unit Outage – March 2008
- ▶ LC Spillway Stop Logs and Hoist
  - Resolution to Award (Hoist) – July 2006
  - Resolution to Award (Stop Logs) – August 2006
- ▶ LC Bridge Crane Rejuvenation
  - Resolution to Award – October 2006



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## *Hydro Modernization*

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- ▶ 70% Paid by Efficiency Increases
- ▶ Maintain Existing Capability
  - reduces need to purchase power on the open market
- ▶ Modernized Facility
  - More efficient, more reliable, safer

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## Questions?