Agenda

- Background
- Schedule
- Current Status
- Licensing
- Replacement Steam Generators
- Transportation
- Implementation
- Disposal of Original Steam Generators
- Q&A
**SONGS Background**

- Started SONGS 2 & 3 Construction: 1974
- Commercial Operation: August 1983 - Unit 2  
  April 1984 - Unit 3
- Licensed to Operate: Until 2022
- Nuclear Steam System Supplier: Combustion Engineering
- Architect/Engineer: Bechtel
- Turbine Supplier: English Electric
- Unit Output: 1,150 Megawatts each
- ABB-CE Steam Generator, Model 3410, two S/G per unit
- I-600 MA Tubing
Unit 2 Tube Plugging Projections

- Current Plugging Values
  - Unit 2: 13.5% Effective Plugging (Includes Sleeves)
  - Unit 3: 7.6% Plugging (No Sleeves)
- SG Inspections Before Cycle 16 Steam Generator Replacement Outage (SGRO)
  - Unit 2: Cycle 15
  - Unit 3: Cycle 14 & 15
- Plugging Limit is 21.4%
- Do Not Expect to Reach Plugging Limit
## Schedule for SONGS Steam Generator Replacement

<table>
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<tr>
<th>Task Name</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
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Benchmarking

- Plant Benchmarking
- Fabricator Benchmarking
- Loan Employees
- Future Benchmarking Plans

- Recently Completed SGRO
  - Palo Verde 1 & 2
  - Beaver Valley 1
  - ANO
  - Callaway

- Future SGRO
  - Ft. Calhoun
  - Watts Bar
  - Comanche Peak
  - Palo Verde 3

Palo Verde RSG Transport
Current Status

- CPUC Application for Steam Generator Replacement Project (SGRP) Submitted February 2004

- Estimated Cost at $680m (2004 $)

- CPUC Decision December 2005
  
  - EIX Board Accepted CPUC Decision March 2006
- Will Be Implemented Under 10CFR 50.59
- No Power Uprate
- Associated Technical Specification Changes
  - Identification 2007
Replacement Steam Generators (RSG) Fabrication

Mitsubishi Heavy Industries Kobe, Japan
- Contract Award September 28, 2004

2A Primary

RSG 2ATube Sheet

2A Secondary
Oversight

- Design Reviews
- Technical Meetings (SONGS, Kobe)
- SCE Resident Personnel @ Kobe
- Special Engineering Visits
- Readiness Reviews
- Independent Inspections
- Audits

SONGS 2B Channel Head
Some Key Design Improvements

- Larger Surface Area
- Alloy 690 Thermally Treated Tubing
- Improved AVB Design
- Integral Steam Nozzle
- Improved Material for Tube Supports
- Forged Shell

S/G 3A Lower and Middle Shell
S/G 2A Balance Ring, Extension Ring, & Tubesheet
# Replacement Steam Generators

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<th>Original</th>
<th>RSG</th>
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<tr>
<td>Weight</td>
<td>620 tons</td>
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<tr>
<td></td>
<td>643.6 Tons</td>
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<tr>
<td>Height</td>
<td>65’6”</td>
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<tr>
<td>Upper Section Diameter</td>
<td>22 feet</td>
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<tr>
<td>Diameter</td>
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<tr>
<td>Tubes</td>
<td>9,350 per SG</td>
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<tr>
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<td>9,727 per SG</td>
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<td>3/4 inch diameter</td>
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RSG Transportation to SONGS

- Heavy Lift Cargo Ship from Japan to Port of Long Beach
- Ocean Barge from Long Beach to Camp Pendleton
- Heavy Transport Vehicle from Camp Pendleton to SONGS
Key Implementation Considerations
Compact Site/Space Limitations
Key Implementation Considerations
Containment Penetration

- 28’ x 28’ Opening
- 33.5’ Above Ground Level
- Over Equipment Hatch
- 4 ft Thick, Reinforced Wall
- 100 Cubic Yards Concrete
- Approximately 50 Tendons Will Be Removed
Key Implementation Considerations
Containment Tendon Design

Rancho Seco Tendon Validation Test
Key Implementation Considerations

Containment Interferences

Cable Trays Affected by Containment Breach
Key Implementation Considerations
Installation Contractor

Bechtel
Awarded Installation Contract
December 2005

Original SONGS AE
Current Maintenance Contractor for SONGS

Significant SGR Experience

Equipment hatch during a normal refueling outage

Early Project Involvement
Disposal of OSG’s Offsite Is Required Due to SONGS Compact Site

- OSG’s Large Size Requires Segmentation to Facilitate Shipping
- Disposal at Energy Solutions, LLC, (formerly Envirocare of Utah, LLC) Planned