Success Seismic Remediation Project
Introduction

Overview

– Seismic Problem at Success Dam
– Recent Milestones
– Risk Analysis and Operating Restriction
– Alternative Selection
– Current Status
– Success Spillway Enlargement
– Challenges
Success Seismic Remediation Project
Location Map

Success Dam
Success Seismic Remediation Project Key Facts

- Dual Purpose Reservoir – Flood Control & Irrigation
- Completed in 1961
- Original Cost $14.1M
- 185 ft high X 3,450 ft long
- Earth-filled dam
- Storage capacity = 82,300 acre-ft
- Provides 47-year flood protection to the city of Porterville and 200,000 acres downstream
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Primary Earthquake Sources

- **Active Faults within 100-mile radius**
  - Premier Fault – 13 miles (M 6.75) **MCE** *
  - San Andreas – 72 miles (M 8.0) **OBE** **
  - Owens Valley – 52 miles (M 7.6)
  - White Wolf – 57 miles (M7.5)

  *Maximum Credible Earthquake – worst predicted earthquake (max ground acceleration = 0.28g)

  **Operating Basis Earthquake – expected during life of project (max ground acceleration= 0.1g)
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Primary Seismic Sources

- Success Dam
- San Andreas M8.0 (OBE)
- Premier Fault M 6.8 (MCE)
- Owens Valley M7.5
- White Wolf M7.5
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Historic Earthquakes

Peak Ground Acceleration (PGA)

- Worst case
- Best case
- Mean

“0.07g failure threshold”

- San Andreas
- Owens Valley
- Kern County/White Wolf
- Coalinga
- San Simeon
Most of the problem materials are the stream deposits known as “Recent Alluvium”
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Dam failure at early stages of MCE

Maximum Credible Earthquake

Upstream slumping

DISTANCE FROM CENTER LINE, Ft

-700 -600 -500 -400 -300 -200 -100 0 100 200 300 400 500
### Success Seismic Remediation Project Milestones

<table>
<thead>
<tr>
<th>Year</th>
<th>Event Description</th>
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<tbody>
<tr>
<td>1999</td>
<td>Corps completes DSAP Evaluation Report</td>
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<td>2000</td>
<td>Construction General Funds appropriated</td>
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<td>2000-2003</td>
<td>Further studies and modeling indicate Recent Alluvium will liquefy.</td>
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<td>2003-2004</td>
<td>Risk assessment performed</td>
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<td>Sep 2004</td>
<td>Selection of Roller Compacted Concrete as preferred remediation alternative</td>
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<td>Nov 2004</td>
<td>CE-SPK Dam Safety Committee recommends temporary operating elevation restriction of 620’ or approximately 1/3 capacity</td>
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<tr>
<td>Nov 2004</td>
<td>RCC analysis and studies begin</td>
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Risk Analysis Results

- Risk of uncontrolled release of the reservoir: 1/285 per year. Required 1/10,000

- Short-term risk reduction: Elevation 620’
  - Eliminates overtopping
  - Reduces seepage failure risk to 1/950
  - Reduces loss of life to within acceptable guidelines
  - May only be in effect for 7 years.

- Long-term risk reduction requires remediation of dam
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Risk Analysis and Operating Restriction

- Effects of reservoir restriction
  - Loss of Recreation - $2.8M/year (average)
  - Flooding in Tulare Lakebed (wet years = 20%) - $.06M/year (average) - Range $0 - $3.2M
  - Loss of Storage (Agricultural water users) - $1.4M/year (average) - Range $0 - $3.0M
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Current Status

- RCC Design and Engineering
  - Foundation exploration - 75% complete
  - Structural Analysis - 30% complete
  - Environmental Impact Study (EIS) started
  - Quarry Sites – initial testing begun
  - Tower and Conduit analysis started
  - Real Estate Plan started
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Ongoing and Future Contracts

- Sonic drilling for continuous core sample
- 100’ Shaft design and construction
- Concrete coring of inlet tower for seismic analysis
- Initial excavation of quarry site – 200 ton
- Geophysics testing to profile foundation
- Shear wave testing
- Panel of consultants review of RCC decision
- Rock screening and crushing
- Sample existing embankment for materials
Success Seismic Remediation Project
Spillway Enlargement Project

10 ft curve ogee in spillway

Success Dam and Reservoir
Success Seismic Remediation Project
Spillway Enlargement Project

- PCA signed June 2003
- Non-Federal Sponsors
  - Lower Tule River Irrigation District
  - The Reclamation Board, State of CA
- Estimated cost $28M
- Dual Purpose Project
  - Increase Flood Control from 1:47 to 1:100
  - Increase storage capacity by 29,000 ac-ft
- Work stopped pending further progress on seismic remediation of Success Dam
Success Seismic Remediation Project
Challenges

- **Roller Compacted Concrete Dam**
  - Foundation materials inconsistent
  - Cement availability and price stability

- **Real Estate Acquisition**
  - Real Estate Plan dependent upon EIS
  - Costs of mobile home park relocations
  - Purchase 40-acre parcel before EIS

- **Funding**
  - Large FY07 and FY08 funding requirements
## Success Seismic Remediation Project
### Accelerated Schedule for RCC

<table>
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<tr>
<th>Accelerated Schedule</th>
<th>2004</th>
<th>2005</th>
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<td>Seismic Analysis of Dam</td>
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<td><strong>Funding Requirements ($170M)</strong></td>
<td><strong>$4M</strong></td>
<td><strong>$8M</strong></td>
<td><strong>$50M</strong></td>
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<td><strong>$18M</strong></td>
<td>$5</td>
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* (does not include new tower or conduit)

- **Potential risks due to foundation, tower, conduit**
SUCCESS DAM
Questions

Success Dam and Reservoir