Long-Term Asset Planning & Pipeline Condition Assessments

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BAYWORK Maintenance & Asset Management Workshop
May 30, 2018
Overview

- SCVWD Background
- Asset Management Planning Tool
- Pipeline Condition Assessments
- Q&A
SCVWD Background
SCVWD Background

- 10 reservoirs
- 3 pump stations
- 142 miles of pipelines
- 4 water treatment plants
- 393 acres of recharge ponds
- 275 miles of jurisdictional streams

Source of water:
- 55% imported water
- 40% from Delta
- 15% Hetch-Hetchy
- 40% local water
- 5% recycled water
SCVWD Background

Software

- Maximo - work orders, documents maintenance and replacement of assets
- AMPT - management strategies, schedules future work and forecasts financial commitment
Asset Management Planning Tool

R & R projected 100 years

<table>
<thead>
<tr>
<th>Install Range</th>
<th>Total Annualized R&amp;R</th>
<th>Total Valuation</th>
<th>Total Assets</th>
</tr>
</thead>
<tbody>
<tr>
<td>1932 - 2017</td>
<td>$58,223,171</td>
<td>$7,265,533,359</td>
<td>11,096</td>
</tr>
<tr>
<td>Average % Consumed</td>
<td>40 %</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Replacement Cost</td>
<td>$5,661,906,567</td>
<td></td>
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</tbody>
</table>

Replacement & Rehabilitation

- Valuation
  - 75%
  - 11%
  - 6%
  - 7%

- Annual Average
  - RAW WATER TRANSMISSION AND DISTRIBUTION
  - SOURCE OF SUPPLY
  - TREATED WATER TRANSMISSION & DISTRIBUTION
  - WATER TREATMENT
<table>
<thead>
<tr>
<th>Year of Activity</th>
<th>Asset ID</th>
<th>Asset Name</th>
<th>Asset Class</th>
<th>Activity Name</th>
<th>Activity Type</th>
<th>Activity Description</th>
<th>Useful Life</th>
<th>Install Year</th>
<th>Activity Cost</th>
<th>Project Type</th>
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</thead>
<tbody>
<tr>
<td>2018</td>
<td>641491</td>
<td>PACHECO PUMP UNIT #1...</td>
<td>Mechanical</td>
<td>Capital</td>
<td>Rehabilitation</td>
<td>std. rebuild (no i..</td>
<td>50</td>
<td>1987</td>
<td>$900,000</td>
<td>Capital</td>
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<td>Capital</td>
<td>Rehabilitation</td>
<td>std. rebuild (no i..</td>
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<td>1987</td>
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<td>50</td>
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<td>Capital</td>
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<td>Rehabilitation</td>
<td>std. rebuild (no i..</td>
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<td>std. rebuild (no i..</td>
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<td>std. rebuild (no i..</td>
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<td>Capital</td>
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<tr>
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<td>Capital</td>
<td>Rehabilitation</td>
<td>std. rebuild (no i..</td>
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<td>$900,000</td>
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<td>Capital</td>
<td>Rehabilitation</td>
<td>std. rebuild (no i..</td>
<td>50</td>
<td>1987</td>
<td>$900,000</td>
<td>Capital</td>
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</tbody>
</table>
Federal CVP
SFDR1 – owned by U.S.
Maintained by SCVWD
Maintenance Cost
Shared with SBCWD
## Asset Management Planning Tool

### PCCP Management Strategy

<table>
<thead>
<tr>
<th>MS</th>
<th>Type</th>
<th>Freq., Yr</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><strong>Inspection</strong> - Unmanned; Eddy Current inspection. Cost is per mile. Size 1 = # of miles of pipe (located in asset registry). Cost per Size 1 = $100k/mile</td>
<td>10</td>
<td>$791,000</td>
</tr>
<tr>
<td>2</td>
<td><strong>Inspection</strong> - Manned; Visual, Sounding, &amp; Eddy Current inspection. Cost is per mile. Size 1 = # of miles of pipe (located in asset registry). Cost per Size 1 = $100k/mile. Note: this activity needs to coincide with the dewatering activity #3.</td>
<td>10</td>
<td>$791,000</td>
</tr>
<tr>
<td>3</td>
<td><strong>Dewatering</strong> - Basic cost to dewater and refill pipeline. Size 2 = (Diameter)x(miles of pipe), this value is located in the asset registry and is a pre-calculated value. Cost per Size 2 = $500.</td>
<td>10</td>
<td>$500,000</td>
</tr>
<tr>
<td>4</td>
<td><strong>Rehabilitation</strong> (This activity covers significant rehab activities like large weld repairs; composite or steel slip lining; segment replacement; etc.) Cost = $300k/per stick and rehabbing 5 sections per repair. This will be a Set Cost = $1.5 M. Note: this activity needs to coincide with the dewatering activity #3.</td>
<td>10</td>
<td>$1,500,000</td>
</tr>
<tr>
<td>5</td>
<td><strong>Rehabilitation</strong> - This activity covers minor anticipated internal pipe repairs i.e. Weco Seals; grouting; spot weld repairs; etc. Size 1 = # of miles of pipe (located in asset registry). Cost per Size 1 = $10k. Note: this activity needs to coincide with the dewatering activity #3.</td>
<td>20</td>
<td>$79,100</td>
</tr>
<tr>
<td>6</td>
<td><strong>Replacement</strong> (This activity covers pipeline replacement.)</td>
<td>100</td>
<td>$230,667,360</td>
</tr>
<tr>
<td>MS</td>
<td>Type</td>
<td>Freq., Yr</td>
<td>Cost</td>
</tr>
<tr>
<td>----</td>
<td>------</td>
<td>----------</td>
<td>---------</td>
</tr>
<tr>
<td>1</td>
<td>Replacement</td>
<td>50</td>
<td>$1,800,000</td>
</tr>
<tr>
<td>2</td>
<td>Rehabilitation (does not include bearings)</td>
<td>Remove activity</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Rehabilitation, Motor</td>
<td>12</td>
<td>$82,500</td>
</tr>
<tr>
<td></td>
<td>a) bearing inspection</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>b) test motor, clean and VPI rotor &amp; stator winding including retest. Balancing and vibration testing.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Rehabilitation, Stator and/or Rotor re-wind (as needed based on test results from activity #3)</td>
<td>12</td>
<td>$100,500</td>
</tr>
<tr>
<td>5</td>
<td>Rehabilitation, Bearings (as needed based on test results from activity #3)</td>
<td>12</td>
<td>$120,000</td>
</tr>
<tr>
<td>6</td>
<td>Rehabilitation (cooler)</td>
<td>24</td>
<td>$16,000</td>
</tr>
</tbody>
</table>
SFDR1 Asset Management Plan

Current State of our Assets

Total Value: $1.125B
Total Count: 449

- **Civil**
  - $1,042,557,911 (93%)
  - 145 Assets

- **Electrical**
  - $39,661,277 (4%)
  - 115 Assets

- **Mechanical**
  - $41,543,825 (4%)
  - 112 Assets

- **Instrumentation**
  - $1,989,810 (<1%)
  - 72 Assets

- **Admin**
  - $60,650 (<1%)
  - 5 Assets

**Total Value:** $1,125,000,000
SFDR1 Asset Management Plan

Long-term Forecast

Annual investment of $17.4M
### Pipeline Condition Assessments

#### Traditional Condition Assessments

<table>
<thead>
<tr>
<th>PoF Scale</th>
<th>Condition or State of Asset</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Fully functional. New or Recently Rehabilitated. Stable</td>
</tr>
<tr>
<td>2</td>
<td>Fully functional. Good. Stable</td>
</tr>
<tr>
<td>3</td>
<td>Monitor more closely for possible deterioration; may require more frequent monitoring in subsequent years</td>
</tr>
<tr>
<td>4</td>
<td>Some conditions point to possible failure; corrective action or renewal maybe recommended</td>
</tr>
<tr>
<td>5</td>
<td>Unable to satisfy one or more level-of-service (LOS) requirement.</td>
</tr>
</tbody>
</table>

![Pipeline Condition Assessment Tool](image1.png)

![Field Inspection](image2.png)
Poor maintenance documentation

Evidence of poor condition

Reliability concern
Pipeline Condition Assessments

Goals:
- Detailed condition assessment
- Information for future rehabilitation project
- Digital data collection in the field

Solution:
- Mobil app with custom survey
- Data in cloud
- Easy to update vault list
- GPS & picture capture
Pipeline Condition Assessments

Implementation

- New tablets
- Training
- Reconciling Source data
- Lists and maps
- WADITW
- Data Management
# Pipeline Condition Assessments

<table>
<thead>
<tr>
<th>Asset No.</th>
<th>Asset Name</th>
<th>Station</th>
<th>Location No.</th>
<th>Approx Location</th>
<th>Vault No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>E40361</td>
<td>MPL Line Valve Vault</td>
<td>10+16.08</td>
<td>94339009</td>
<td>Corner of Maxey Dr. &amp; Piedmont Rd.</td>
<td></td>
</tr>
</tbody>
</table>

[Map Image with annotations]

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![Image of MPL Line Valve Vault](image-url)
Pipeline Condition Assessments

**Yes/No Questions**
- Access Issue: *
  - Yes
  - No
- Vault Number Present Outside of Vault: *
  - Yes
  - No
- Pipeline Marker Present: *
  - Yes
  - No
- Access Ladder or Staircase: *
  - Yes
  - No

**Satisfactory Questions**
Pipeline Condition Assessments

Survey uploaded to Cloud for viewing and export
Pipeline Condition Assessments

- Advantages
- Lessons Learned
- Planned Improvements
Questions?

Torrey Pines State Natural Reserve includes one of the world’s rarest pine trees—*Pinus torreyana*.
Extra Slides
SCVWD Asset Management Program

I. What is the current state of the assets?

1. Develop Asset Registry
2. Assess Performance, Failure Modes
3. Determine Remaining Life
4. Determine Life Cycle & Replacement Costs
5. Set Target Levels of Service (LOS)

II. What are the required levels of service?

6. Determine Business Risk ("Criticality")
7. Optimize O&M Investment
8. Optimize Capital Investment
9. Determine Funding Strategy
10. Build AM Plan

III. Which assets are critical to sustained performance?

IV. What are the best O&M and CIP investment strategies?

V. What is the best long-term funding strategy?
SCVWD Asset Management Program

- Asset Management Plans
- Data Collection CoF & PoF
- Communication
- Review Report
- Work Orders & CIP
- 5 yr Maintenance Work Plan