Asset Management – Finding the Value

Business Requirements

Reliability & Safety

Life Cycle Costs

System Requirements
AM Mission – Get Maximum Value out of our Assets

- Low Rates
- Reliable Power
- Safe System
- Reliable System
- Rate of Return
- Low Financial Risk

- Customers
- Employees
- Shareholders
Integrated Model System Data Structure, Corrective & Planned Work, Inspections, Failure Model, Equipment & Contracts, Labor, Spares, Risk

AM Plans
Maintenance & Replacement Strategies
AM Budgets
Equipment Needs
Spares Inventory
Labor Needs

System Performance

Data
Industry Data
KPI's
OMT Data
METS
AFM/GIS
Financial

Team
Crafts
Managers
Engineers
Subject Matter Experts

AM Cycle
Avista’s Asset Management Timeline

2003
- Integrated System Maintenance
- Electric Asset Optimization Status Report

2004
- AM committee makes recommendation for AM organization
- Vegetation Management in Rate Case

2005
- AM group with two engineers
- 14 programs
- Rate Case Attempt

2006
- ARMS introduced RCMC cost and AVSim

2007
- Wood Pole Management Plan
- Chance Cutout Program
- Gas Meter Project
- Rate Case Success

2008
- Wood Pole Management Implemented
- Chance Cutout Value Demonstrated
- Rate Case Success

2009
- Integrated Distribution Feeder Analysis
- Little Falls HED AM paper
- Partial Rate Case Success

2010
- Third Member of AM Hired
- Decision to take AM company wide
- Rate Case Success
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- Wood Pole Management Implemented
- Chance Cutout Value Demonstrated
- Rate Case Success

**2008**
- Wood Pole Management Improved
- Chance Cutout Value Demonstrated
- Rate Case Success
- Integrating Distribution Feeder Analysis
- Little Falls HED AM paper
- Partial Rate Case Success

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- Third Member of AM Hired
- Decision to take AM company wide

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- Rate Case Success
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How we win

• Demonstration of value
• Quantified Comparison of Alternatives
• Continuous Feedback
• Team Approach
• Information Integration
Early Successes

- WPM
- Vegetation Management
- Chance Cutouts
- URD Cable Replacement
- Wildlife Guards
- Gas Meters
Overall OMT Trend – Jan - Jun

![Graph showing the number of OMT events from 2004 to 2011. The trend shows an initial increase, peaking around 2008, and then a decline.](image-url)
Asset Management Related Events – Jan - Jun

Number of OMT Events

Year

2004 2005 2006 2007 2008 2009 2010 2011
Wildlife Guard Program Results – Jan - Jun

![Graph showing the number of OMT events for birds and squirrels from 2004 to 2011. The number of events for birds is relatively low and stable, while the number of events for squirrels shows a peak in 2006 and another peak in 2009.]
Submit an Offer
• Optimize Value of Programs
• Demonstrate the Value
• Support Function
• By Program or Project Basis
• Recommendation Mode
• Niche Role within Company
Role of ARMS

- Systematic Process
- Integrated Approach
- Deals with Bad Data
- Provides the Answers
Future AM

- Company wide
- Decision Authority
- Department Level
- Expanded Role
- Releasing Value from all Assets
Chance Cutout Replacement Related OMT Events

Number of OMT Events

Year

2004 2005 2006 2007 2008 2009 2010 2011

Cutout/Fuse
Phases of AM Analysis

**Phase 1**
- Strategic Analysis
- Noxon Plant – GSU Analysis
- High Level Performance Predictions

**Phase 2**
- Gen Circuit Breaker Maintenance Planning
- Continuous Improvement
- Optimized Strategy Budget Prediction
- Labour Usage Prediction

**Phase 3**
- Tactical Optimization
- Future – Plant Model?
- Detailed Performance Predictions
- Optimized Spares Holding Criticality Ranking
AM Related OMT Trends

Events are increasing at a rate of 312 events/yr

Click to edit Master title style

Top 10 AM Upward Trends

<table>
<thead>
<tr>
<th>No.</th>
<th>Sub-Reason</th>
<th>Change per Year</th>
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<tbody>
<tr>
<td>1</td>
<td>Tree Growth</td>
<td>59</td>
</tr>
<tr>
<td>2</td>
<td>Connector - Sec</td>
<td>54</td>
</tr>
<tr>
<td>3</td>
<td>Conductor - Sec</td>
<td>31</td>
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<tr>
<td>4</td>
<td>URD Cable - Sec</td>
<td>19</td>
</tr>
<tr>
<td>5</td>
<td>Connector - Pri</td>
<td>16</td>
</tr>
<tr>
<td>6</td>
<td>Squirrel</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td>Tree Fell</td>
<td>6</td>
</tr>
<tr>
<td>8</td>
<td>Transformer UG</td>
<td>6</td>
</tr>
<tr>
<td>9</td>
<td>Pole-rotten</td>
<td>5</td>
</tr>
<tr>
<td>10</td>
<td>Transformer OH</td>
<td>2</td>
</tr>
</tbody>
</table>
Contributions to SAIFI Outage Causes - 2009

- Asset Management Related: 21%
- Undetermined: 20%
- Snow/Ice: 11%
- Maint/Upgrade: 9%
- Weather: 7%
- Wind: 7%
- Lightning: 6%
- Pole Fire: 4%
- Other: 4%
- Car Hit Pole: 4%
- Bird: 3%
- Forced: 3%
- Dig In: 1%

Total: 100%
AM Related Outage Causes - 2009

- Transformer - OH 3%
- URD Cable - Pri 3%
- Arrester 3%
- Switch/Disconnect 4%
- Cutout/Fuse 6%
- Tree Fell 15%
- Conductor - Pri 8%
- Other 10%
- Connector - Pri 12%
- Insulator 11%
- Lowside OCB/Recloser 10%
- Squirrel 15%
Distribution Feeder Management Plan

1. Wood Pole Management
2. Capital Follow-Up Work
3. Feeder Design Improvements
4. Vegetation Management
5. Wildlife Guards
6. URD and Padmount Inspection
7. PCB Transformers
8. Street Lights
Distribution Feeder Management Plan

- Crossarm
- Insulator
- Lightning Arrester
- Cut-Out
- Guy
- Pole
- Ground
- Stub

Wood Pole Management & Capital Follow-Up Work
Distribution Feeder Management Plan

- Primary Conductor
- Capacitor Bank

Feeder Design Improvements
Distribution Feeder Management Plan

Vegetation Management
Distribution Feeder Management Plan

Wildlife Guards
Distribution Feeder Management Plan

URD and Padmount Inspection
Distribution Feeder Management Plan

PCB Transformers
Distribution Feeder Management Plan

Street Lights
PCB Elimination Strategy

- **Next 6 Yrs to ND**
  - Spokane River Watershed
  - Pend Oreille Watershed
  - Remaining System Area

- **Next 20 Yrs Pre-'81**
  - OH thru WPM
  - Pad & Sub
Transformer Update

Purchased


# of Transformers: 0, 1000, 2000, 3000, 4000, 5000

Retired


# of Transformers: 0, 1000, 2000, 3000, 4000, 5000

AVISTA
Ninth and Central 12F4 Feeder Rebuild Results

All OMT Sub-Reasons except Maint/Upgrade

2010 is projected based on data through August 2010
Ninth and Central 12F4 Feeder Rebuild Results

![Bar chart showing annual results from 2005 to 2010 for various types of incidents including Cutout/Fuse, Weather, URD Cable - Sec, Tree Growth, Tree Fell, Squirrel, Snow/Ice, Service, Pole-rotten, Lightning, Crossarm-rotten, and Connector - Sec.](image-url)
In the Future for Asset Management

1. Define AM scope, organizational structure and decision rights
2. Focus more on balancing cost and service by prioritizing maintenance and inspection programs based on a mix of early-stage failure, reliability or cost experience and manufacturers
3. Create new focus on life-cycle costs while incorporating “affordable utility” concepts
4. Develop overarching asset mgmt. system to support information sharing across all phases of project life-cycle

Opportunity Prioritization

Asset Management Tier 1 Opportunities
Starting Point

- No CMMS
- No comprehensive WMS
- Accounting System - FERC
  - No Activity Based Accounting
  - No tracking of actual time per task
  - Estimating guides based on work done in 1969-1970

- Technology
  - Leader in use of GIS software
  - Legacy WMS for Distribution Construction work
  - Legacy Customer Service Solution
  - Custom Build Component Tracking system for Substations
  - Advanced Outage Management Tool for Distribution outages just implemented in 2005
  - Excel and Access reign!
Challenges Remaining

- Labor Resource Constraints
- Budget Constraints
- Proven Projects, Budgeted but not performed
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History

- Knew RCM was the way to go and develop AM strategic plans
- 2003 started work on Integrated System Maintenance
  - Question: Why should we do maintenance?
- 2003 Electric Asset Optimization Status Report
- 2004 AM committee makes recommendation for AM organization
- 2005 AM organization not adopted but created AM group with two engineers
- 2005 - 14 programs identified
- 2005 Rate Case Attempt - Failed to provide justification for program
History (2)

- 2006 ARMS introduced RCMCost and AVSim+ into Avista
- 2006 Begin to use interns to help with the data
- 2007 Wood Pole Management Plan - First Success
- 2007 Chance Cutout Program
- 2007 Individual AM Plan Development
- 2007 Gas Meter Project
- 2007 Succeeded in Rate Case
- 2008 WPM Implemented along with other programs
- 2008 Chance Cutout Value Demonstrated
- 2009 Integrated Distribution Feeder Analysis Demonstration
History (3)

- 2009 Little Falls HED AM paper
- 2009 Gas Meter Practices changed
- 2010 Third member hired
- 2010 Company Initiative to expand AM principles to all areas of the company