Optimized Well Field Management

- Increasing challenges
- Maximize value from existing assets
- Fully utilize “forgotten” operation and maintenance data
- Decision making tools in the hands of operators
Increasing challenges

Drought & Uncertainty

Increasing Costs, Affordability Concerns

Resource Depletion

1. Drought Monitor (http://droughtmonitor.unl.edu)
2. A Nationwide Assessment of the Geography of Water Affordability in the United States (https://doi.org/10.1371/journal.pone.0169488)
Increasing challenges

- Competition for shared resources
- Reduced availability
- Environmental constraints
- Source water vulnerability
- Climate uncertainty
- Competing demands for infrastructure investment
- Customer, regulator, and other stakeholder confidence

Reduced Groundwater Availability

Increasing Municipal Demand

2017 State Water Plan: Water for Texas (texasstatewaterplan.org)
Take full advantage of what you have

- Optimize operation to preserve efficiency
- Optimize maintenance to extend asset life
- Target least life-cycle cost (lowest long term rates)
- Defer or downsize capital investments
- Enhance operator decision making
Groundwater assets are unique

- Inter-related natural (aquifer) and built (infrastructure) systems
- Optimization requires integrated analysis
- Insights into interaction critical to operation and maintenance strategies
Common management approaches waste money

Loss of efficiency and yield → out of optimal operating range
Common management approaches waste money

Loss of efficiency and yield $\rightarrow$ out of optimal operating range

Efficiency $\downarrow$ Asset Life $\downarrow$

Energy Use $\downarrow$ Life-Cycle Cost $\uparrow$
Answers are hidden in existing records
Intelligent analysis provides insight
Potential benefits

- Can average production from existing wells be increased?
- Can energy costs be reduced?
- Can the rate of pump failure be reduced?
- What is the right frequency of maintenance?
- Is it possible to defer or downsize planned capital investments?
Results achieved

- Very critical well field for ASR water banking
- High demand, reactive maintenance
- Rapid loss of well efficiency
- Premature pump failure
- Water quality issues, including air entrainment
Results achieved

- 33% increase in firm capacity to 10.8 mgd
- Exceeded record for banked ASR water by more than 50%
- Reduction in premature pump failure
- 17% reduction in energy use per MG, $160,000 annual savings potential
- 24% reduction in life-cycle cost per MG
- Identified opportunities to enhance performance monitoring and use of data by operations
Discussion

Restore Capacity
Improve Management Strategy
Operational Decision Support

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