Horizontal: An Innovative Water Supply Well
Texas Alliance of Groundwater Districts
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HPWD: The Beginning

- **1949**: Texas Groundwater District Act passes
  - Recognizes “individual ownership of underground water”
  - Authorizes State Board of Water Engineers to designate underground water reservoirs and subdivisions of the same
  - May exercise powers and functions for conserving, preserving, protecting, and recharging underground water; enforce rules to prevent waste; require permits for drilling of water wells; provide for the spacing of wells and regulate production to minimize drawdown; require records for the drilling and equipping of water wells; perform surveys of the underground reservoir; develop plan: and carry out research projects

- **1951**: Voters agree to formation of the District

- **1953**: First rules adopted

- **Mission**: Protect, preserve and conserve groundwater within the District boundaries
Current Service Area approx. 7.5 million acres
Numerous annexations have added to the HPWD boundaries
90+ confirmed groundwater conservation districts in Texas
Chapter 36 of the Texas Water Code
HPWD is funded by ad valorem taxation.
2017 tax rate $0.0069 per $100 valuation.
FY 2018 budget $2.8 million
Service area includes all or portions of 16 counties

- 48 mostly rural communities
- *538,273 HPWD population
- 229,573 Lubbock population

*Source: U.S. Census Bureau
HPWD Overview - Industries

Agricultural industries

*2.1 mil beef cattle

**191,151 dairy cattle

3.5 mil acres row crops

*Source: 2012-2017 Llano Estacado Regional Water Plan (Texas Cattle Feeders)
**Source: Milk Market Administrator
HPWD: Background

- HPWD has issued over 50,000 permits
- Adopted well spacing and production rules
- Studies on recharge, minor aquifers, irrigation management
- Decades of annual water level measurements
- Participated in regional water planning
- Created hydrologic maps of water table elevation, base of aquifer, saturated thickness, water level changes
- Conservation education
Xcel Energy: The Location

- Tolk Station: Coal, 1,067 MW
- Plant X: Natural Gas, 411 MW
Xcel Energy: The View

Photos from atop the boilers at Tolk Station
Xcel Energy: Adaptation

- Hydrologic study conducted in 1949
- Continued purchase of water rights (~52,000 acres)
- Expansion to 80+ water supply wells
- Combined water usage approx. 14,000 ac-ft per year
- Recycling technology
- Reclaimed water from Lubbock (Jones Station)
- Miles of pipelines—approximately 25 miles from east to west
- Declining well yields
- Ogallala saturated thickness averages 40 feet in the area near Plant X
Horizontal Well: The Innovation

- November 2016—background, modeling and concept shared with HPWD staff
  - 500 feet of horizontal screened section
  - Comparison to multiple vertical wells
  - Uncertain of success
- Meeting with board members January 2016
- Permit issued in January 2016, applying existing rules in creative manner. Agreement to install monitoring wells.
- HPWD communication with county advisory committees
- Collaboration with Xcel communication staff
- Evaluation of aquifer properties and likely effects
Horizontal Well: The Monitoring Locations
Entry to exit distance is about 2,300 feet
Screened section is about 195 feet below land surface
Uses 2 pumps (combined capacity of about 700 gpm)
Constructed of 12 inch casing
Screened section is 10 inch wire
Well development is critical
Continuously operated
All 4 monitoring wells exhibit ~6 feet of drawdown
Maintenance?
Sedimentation?
Big Questions/Challenges

- How do we respond to “unconventional” thinking and creativity? More rules?
- Are people in your district engaged and educated?
  - Board of Directors
  - County residents
  - District staff
- How well do you know your aquifers?
- What is next?
  - Desalination
  - Aquifer storage and recovery
  - Minor aquifer development
- What are the thoughts of other water users?
- How well do we communicate?
- What can we learn from this?
- As existing water supplies decline, innovative projects will be more prevalent
- Flexibility helps address unconventional ideas and projects
- Innovation and creativity drive adaptation and resiliency
“Creativity is a way of living life, no matter our vocation or how we earn a living” - Madeleine L’Engle