Creative Solutions to Meeting the City of Wolfforth’s Water Demands

- Wolfforth is a GL city of approx. 5k in Lubbock Co.
- The city water supply is solely groundwater and is provided by 16 producing wells with 2 new ones to be added soon.
- Wells are in the Ogallala formation at a depth of around 200’ with saturated thickness around 45’.
- The City has grown over 70% since the 2010 Census.
- Annual growth rates are from 6% to 13%.
City of Wolfforth Technologies

- GIS
- Supervisory Control and Data Acquisition
  - To ensure we can sell most of what we produce
  - Efficient production
- Storage
  - Allows the wells and system recovery time
- Electrodialysis Reversal
  - Provides high quality treated water at minimal loss
- Electronic and Radio Read meters
  - Ensures accuracy in meter reading and saves man power
Well Management Websites
Electrodialysis Reversal
EDR Trains and Stacks
Stacks with Membranes Exposed
The EDR Timeline

- TCEQ moves arsenic MCL from 50 to 10 PPM
- Filtration options are investigated (early 2011)
- EDR established as favored technology
- Site trips made
- Discussions with TCEQ begin, as it is considered an Emerging Technology
- Rounds of discussions stall due to brine disposal
- EPA sends arsenic enforcement letter early in 2014
- EPA sends fluoride enforcement letter in February 2014
The EDR Timeline (cont.)

- Negotiations begin with GE to establish system design parameters and cost
- WATSYS samples are analysed to project design and end quality of product
- TCEQ establishes requirement to Pilot
- Pilot system order placed and 90 day pilot performed and completed December 2012
- Major projects established and C of O of $6.5 million issued, or $26/meter
  - Well Collection lines built
  - All ground and elevated storage refurbished and placed under TAP program
  - New 1.5 MG ground storage built
- EDR purchased and paid for so GE would release P&IDs and design
1.5 MG Storage
The EDR Timeline (cont.)

- Equipment for plant purchased as sole source under emergency conditions
- Construction begins prior to TCEQ approval in the Spring of 2014.
- All other projects finished prior to EDR completion
- EDR Construction finished with EDR fully functioning in Dec. of 2016
- Plant is released for production in May 2017 after citizen complains to TCEQ
EDR in production

- System has been up and running since May 2017 with little downtime other than maintenance
- Target blend is 75/25, Treated/Raw
- Off spec (brine) produced is from 6 to 10 percent of the total water that is sent through EDR
- All inputs increase with higher daily production
- pH levels have improved
- Total hardness has been decreased
- Citizens have remarked they have discontinued private water treatment
- Fluoride down to 3.31 mg/L and Arsenic down to .00556 mg/L in Q2 2019
Acid Pumps
EDR in production (cont.)

- Public works crews have been able to maintain the stacks, takes 2-3 employees most of a day
- Pre-filtration media has been costly, around $1100 per stack per change
- Chemical handling is an issue
EDR Future Mods

● Three new trains of stacks will be needed to keep up with growth
  ○ New capacity will add about 1.5 MG of treatment

● Full pre-filtration system is currently being designed
  ○ Objective is to reduce cartridge costs and improve life of membranes and plates in the stacks

● Separate acid handling facility is being designed
Challenges

- Blending of old/new technologies
- Regulatory issues
- Funding and debt
- Pre-filtration
Future options

- Deeper brackish groundwater requiring desal
- Sources farther from the City
- Purchasing from other Cities, regional systems
- Reuse
- Ice Pigging