



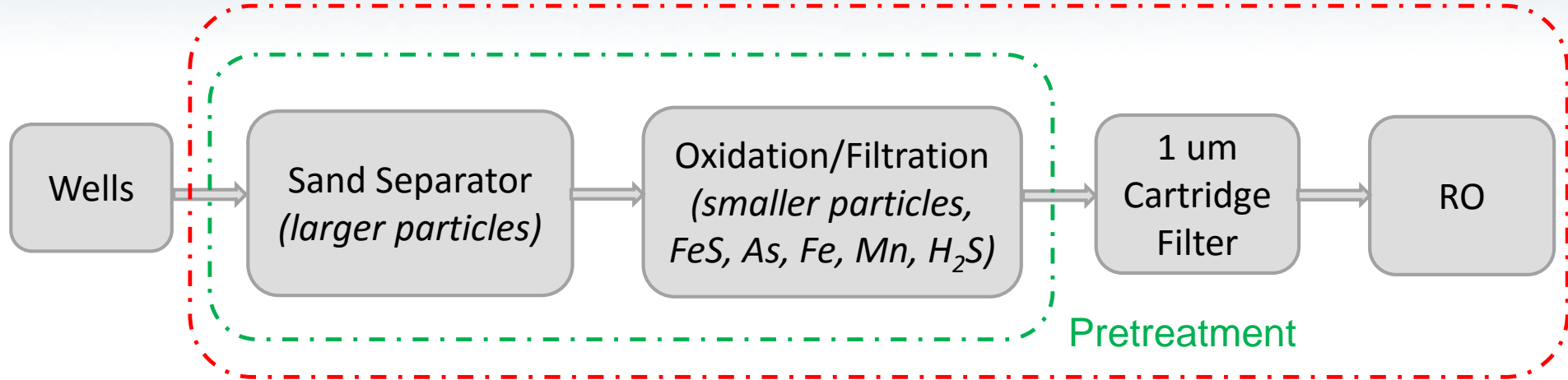
WTP Bench-Scale/Pilot Testing



Public Works Commission
Dec. 14, 2017



Pretreatment Process



Sand Separator pilot skid



Filtronics oxidation/filtration pilot skid





Sanding

Particles captured in raw water column



Particles captured in post-sand separator column



Completed Tasks (November):

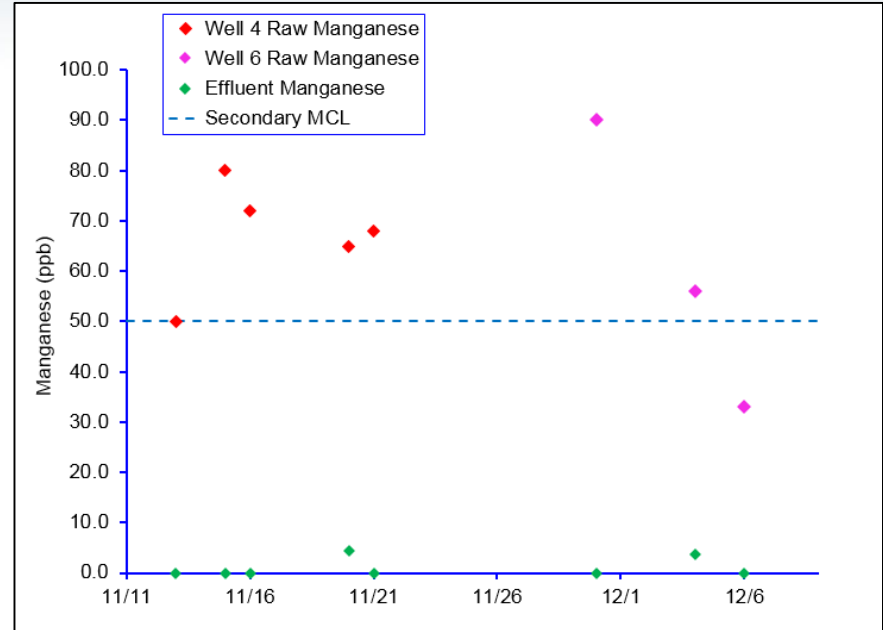
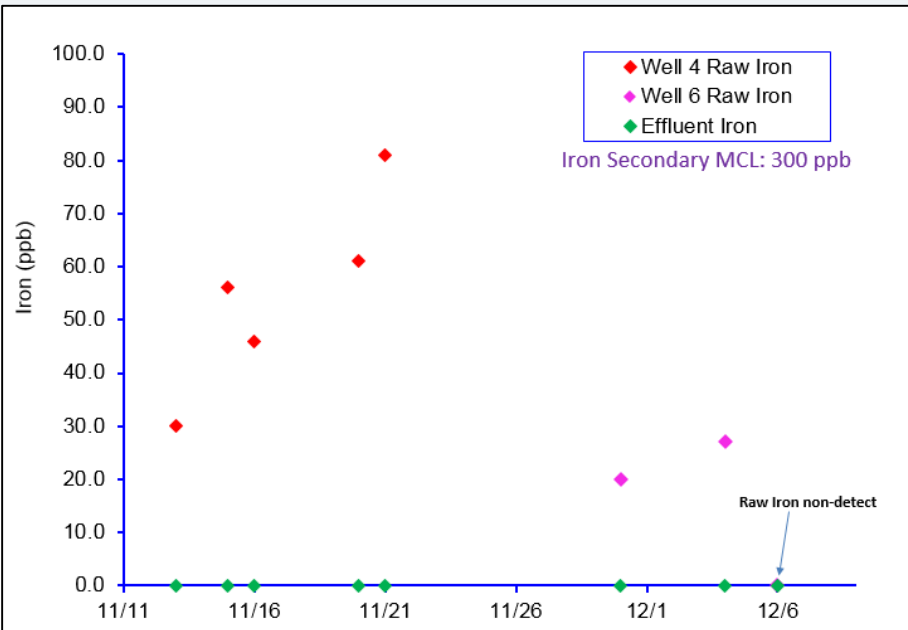
- Installed and operated sand separator for four weeks
- Well 2 (unexpected shutdown), Well 4, and Well 6 (currently ongoing)
- Particle size distribution and total suspended solids analysis

Results & Findings:

- 50 – 90% suspended solids removal
- Median particle size reduced from 18 μm to 3 μm
- Significant reduction in particle loading (photo comparison before/after)



Iron/Manganese



Completed Tasks (November):

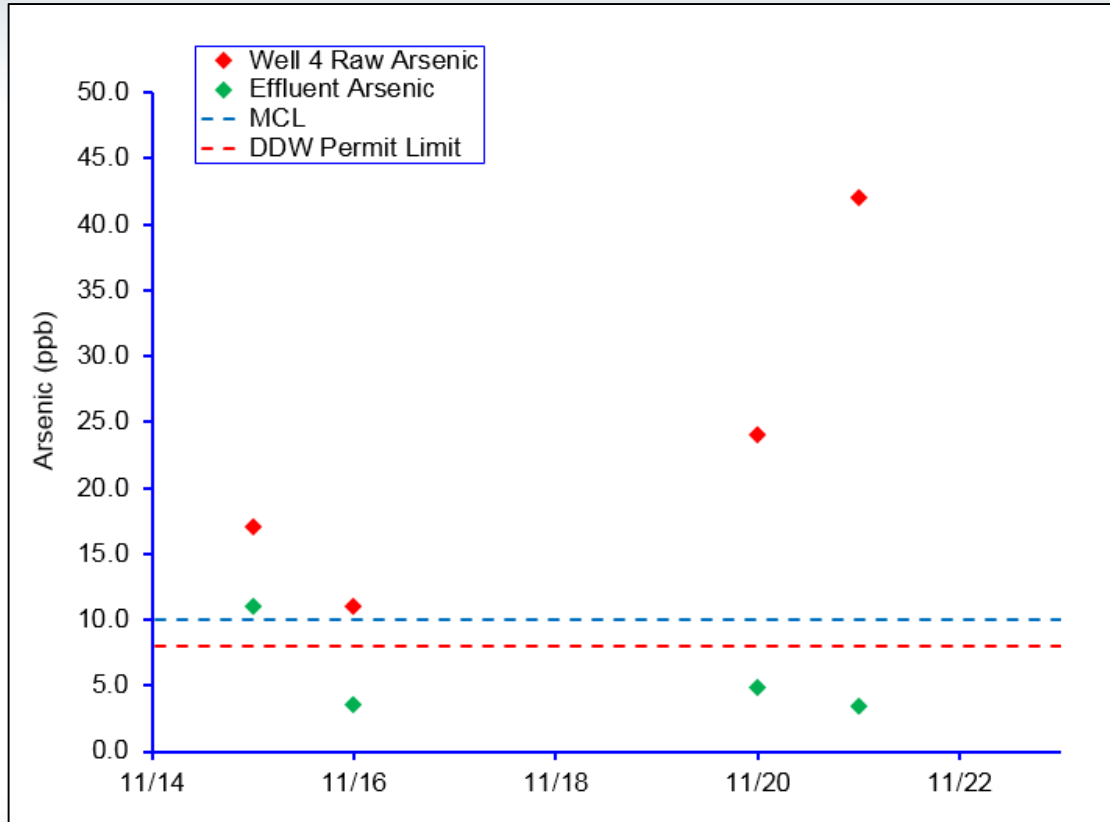
- Installed and operated Filtronics pilot (oxidation/filtration) skid for 3 weeks
- Well 2 (unexpected shutdown), Well 4, and Well 6 (currently ongoing)
- Monitor contaminants of concern (iron, manganese, *arsenic* and *hydrogen sulfide*)

Results & Findings:

- Iron and manganese removed to non-detect levels
- Arsenic removed to below MCL
- No hydrogen sulfide detected in effluent using in-house HACH field test kits



Arsenic



Well 4 (high Arsenic well) data shown only, Well 6 has non-detect Arsenic levels
Anomaly sample explanation (Nov. 15): Insufficient chemical dosing

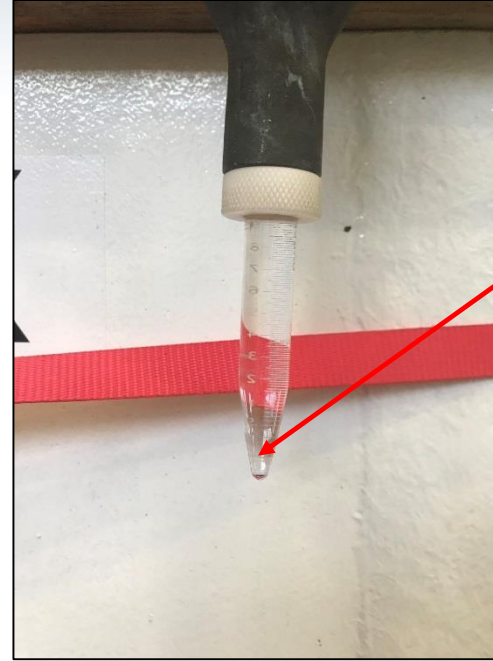


Iron Sulfide

Particles captured in raw water column



Particles captured in post-Filtronics column



Completed Tasks (November):

- Sand separator (remove colloidal particles of sand and iron sulfide) plus Filtronics (remove smaller particles through oxidation and filtration)
- Well 2 (unexpected shutdown), Well 4, and Well 6 (currently ongoing)
- SEM analysis

Results & Findings:

- Preliminary findings confirm no iron sulfide particles detected
- Minimal particles observed in Rossum sand tester (photo)
- Additional testing and analysis to verify consistency of removal



Next Steps

- Run Well 5
- Run blend of existing wells
- Run Maple Wells (highest Manganese levels), anticipated January 2018
- Run Filtronics effluent to RO single-element to simulate full-scale performance



Any Questions

