

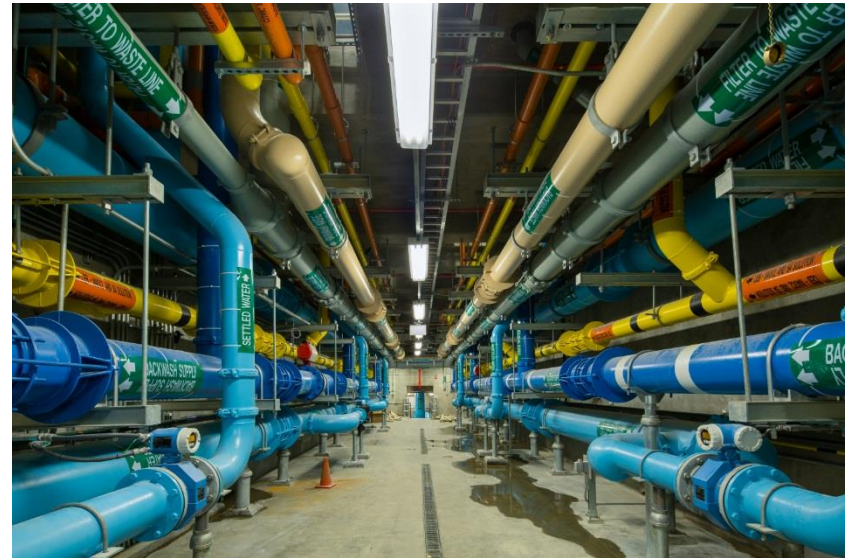


# Rueter-Hess Water Purification Facility

North America's **First** Ceramic  
Membrane Filtration Plant

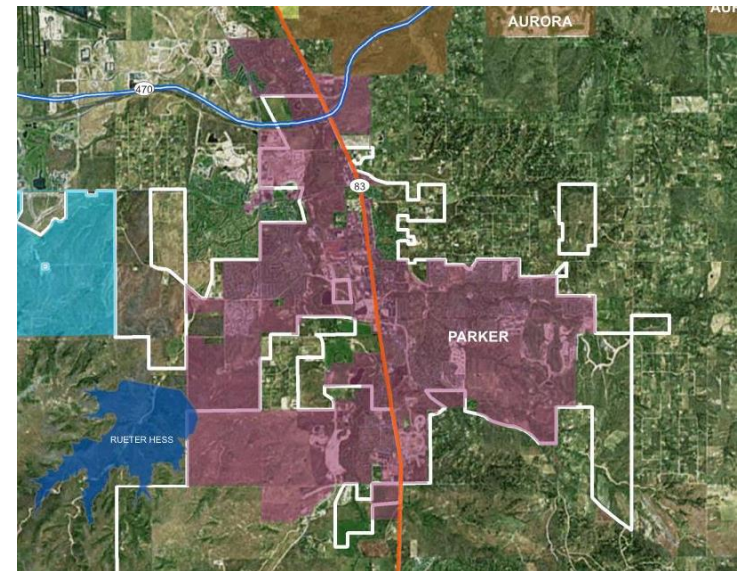
# Presentation Overview

- Background on Parker Water & Sanitation
- Reclaimed Water Loop
- Rueter-Hess Water Purification Facility
- Questions



# PWSD Service Area

- Approximately 50,000 Customers
- 27,600 acres (43 square miles)
- 17 well houses
- 30 operational deep groundwater wells
- Some alluvial water
- 2 wastewater treatment facilities
- 1 surface water plant (Rueter-Hess Water Purification Facility)



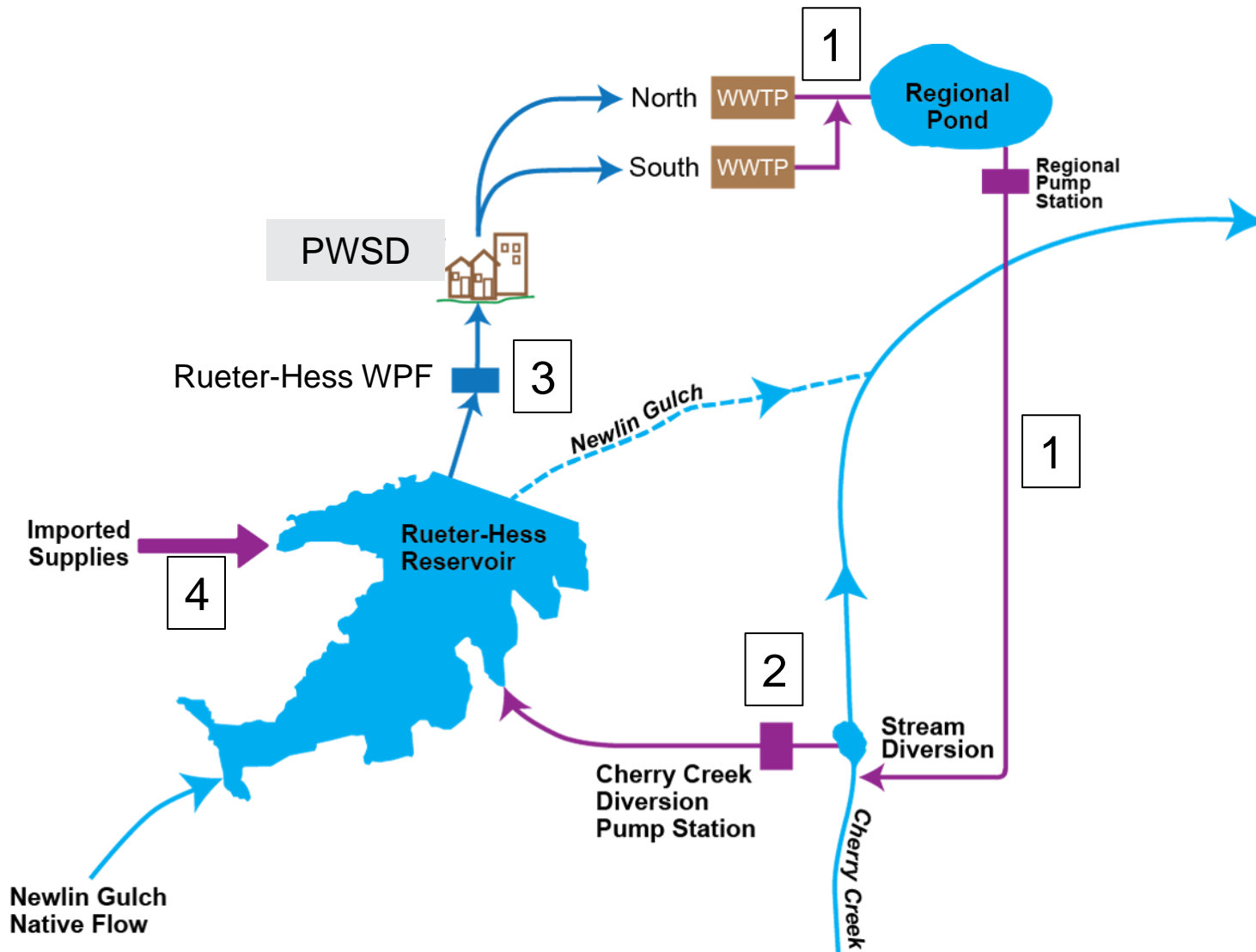
# Forecasted Water Demands

Year	Population	Average Day Demand (MGD)	Max Day Demand (MGD)
2015	45,900	7.2	17.9
2020	59,400	9.1	22.9
2025	71,500	10.8	27.1
2030	81,000	12.2	30.7
2035	89,200	13.4	33.8
Build-Out	122,200	18.5	46.2



- PWSD declining groundwater supply (currently 18 MGD but declining over time)
- Fully utilize water reuse
- Incorporate surface water treatment
- Rueter-Hess Water Purification Facility – 10 MGD, expandable to 40 MGD

# Reclaimed Water Loop





# Rueter-Hess Water Purification Facility

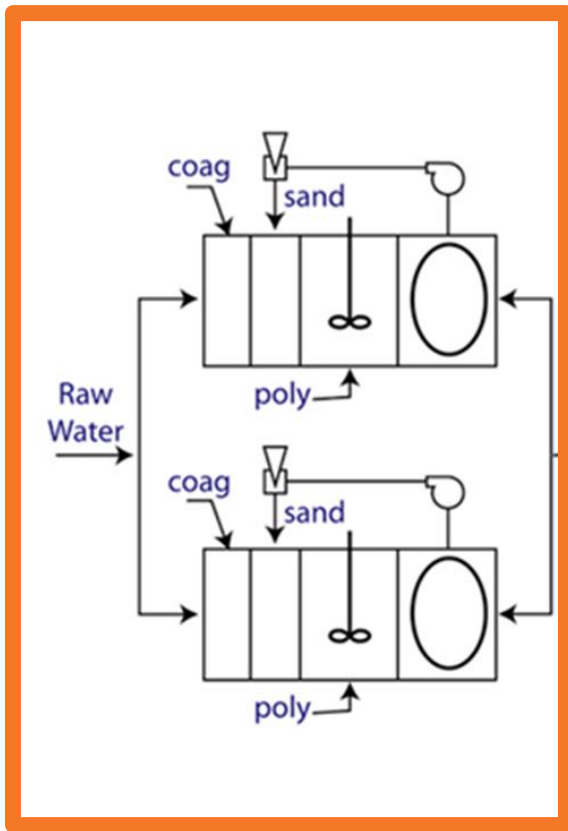
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# Project Challenges

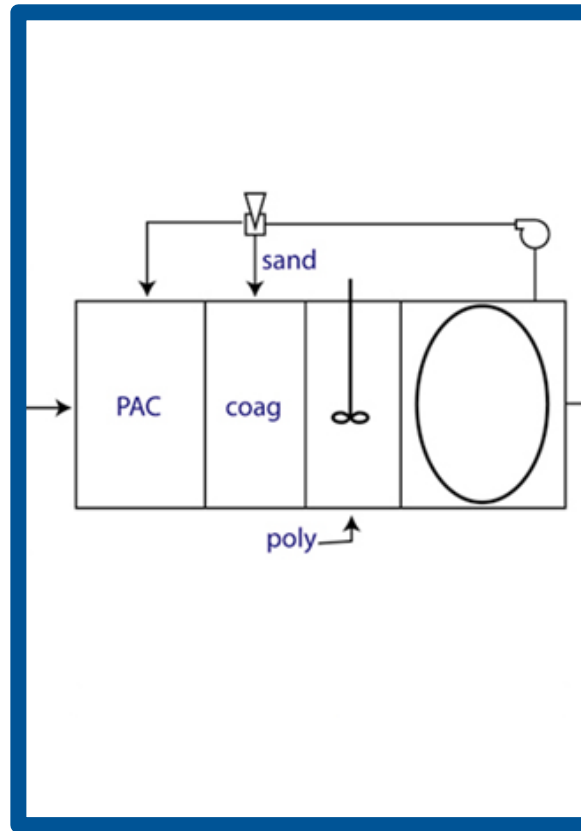
- At time of design, no source water existed (RHR not complete)
- Pilot tested using WW effluent
- RH Reservoir is off-stream, and was anticipated to have highly variable WQ characterized by:
  - High organic content including emerging contaminants
  - Seasonally high dissolved Mn
  - Seasonally high algae content
- Selected treatment train chosen for organic removal capability, flexibility and durability

# Selected Treatment Processes

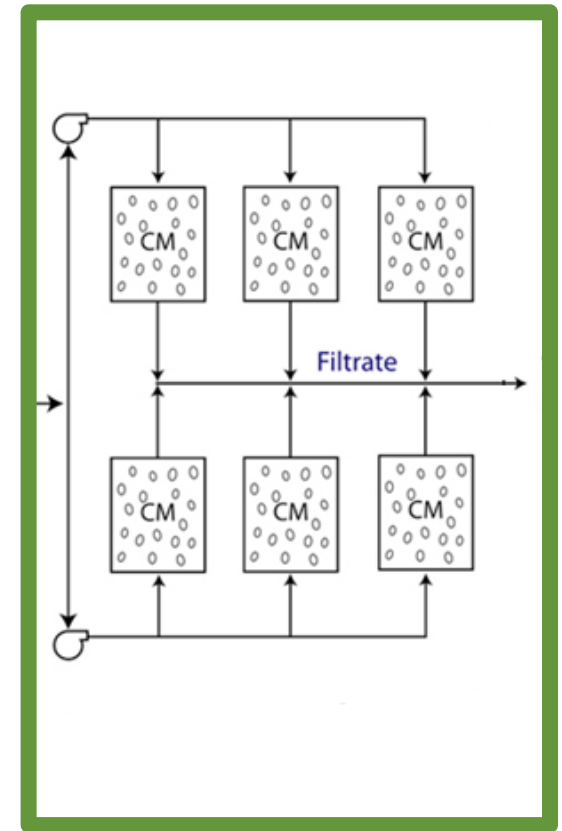
## Ballasted Sedimentation (Actiflo Turbo)



## Recirculating PAC (Actiflo CARB)



## Ceramic Membranes





# The Selected Approach

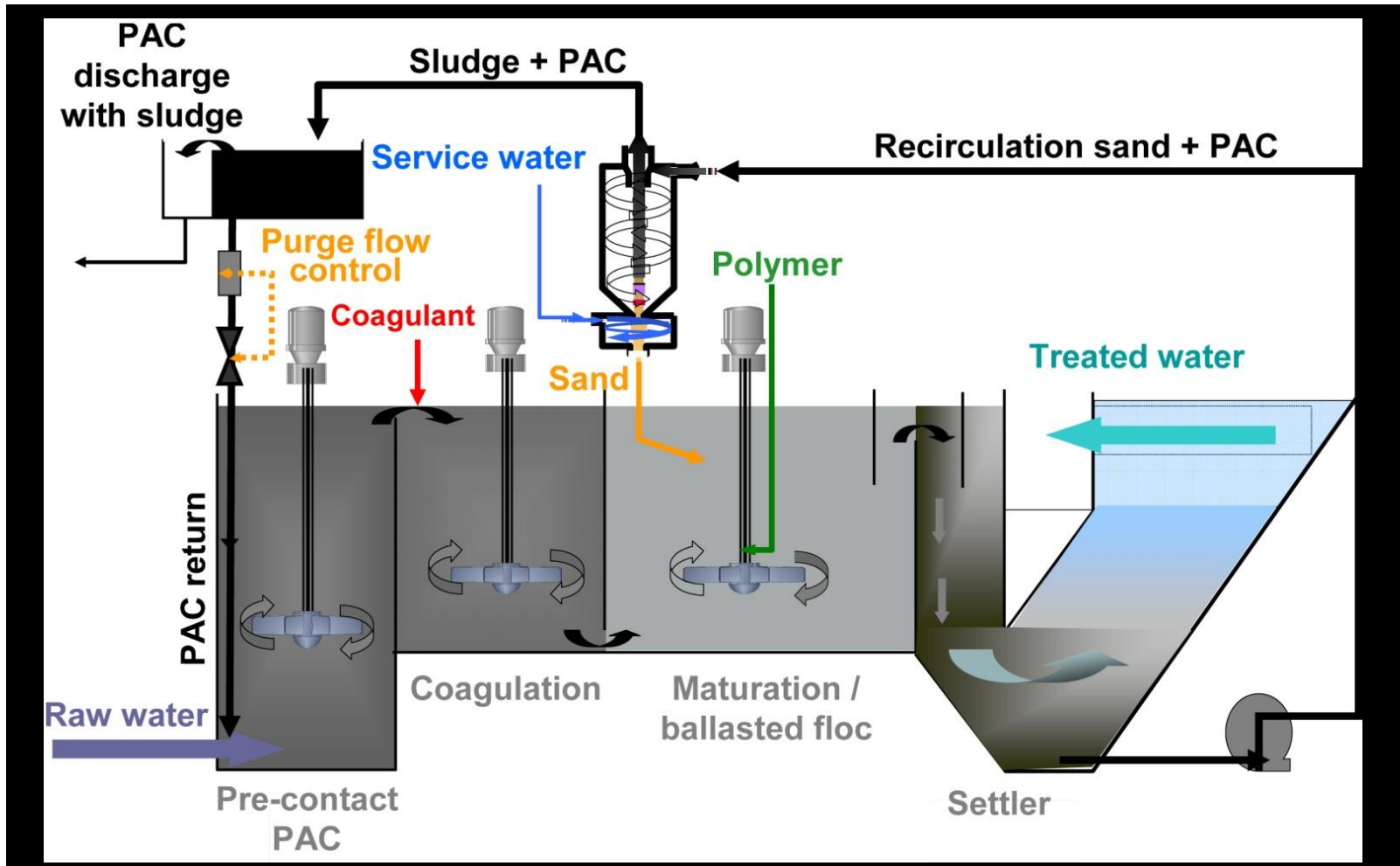
The selected approach offers the following:

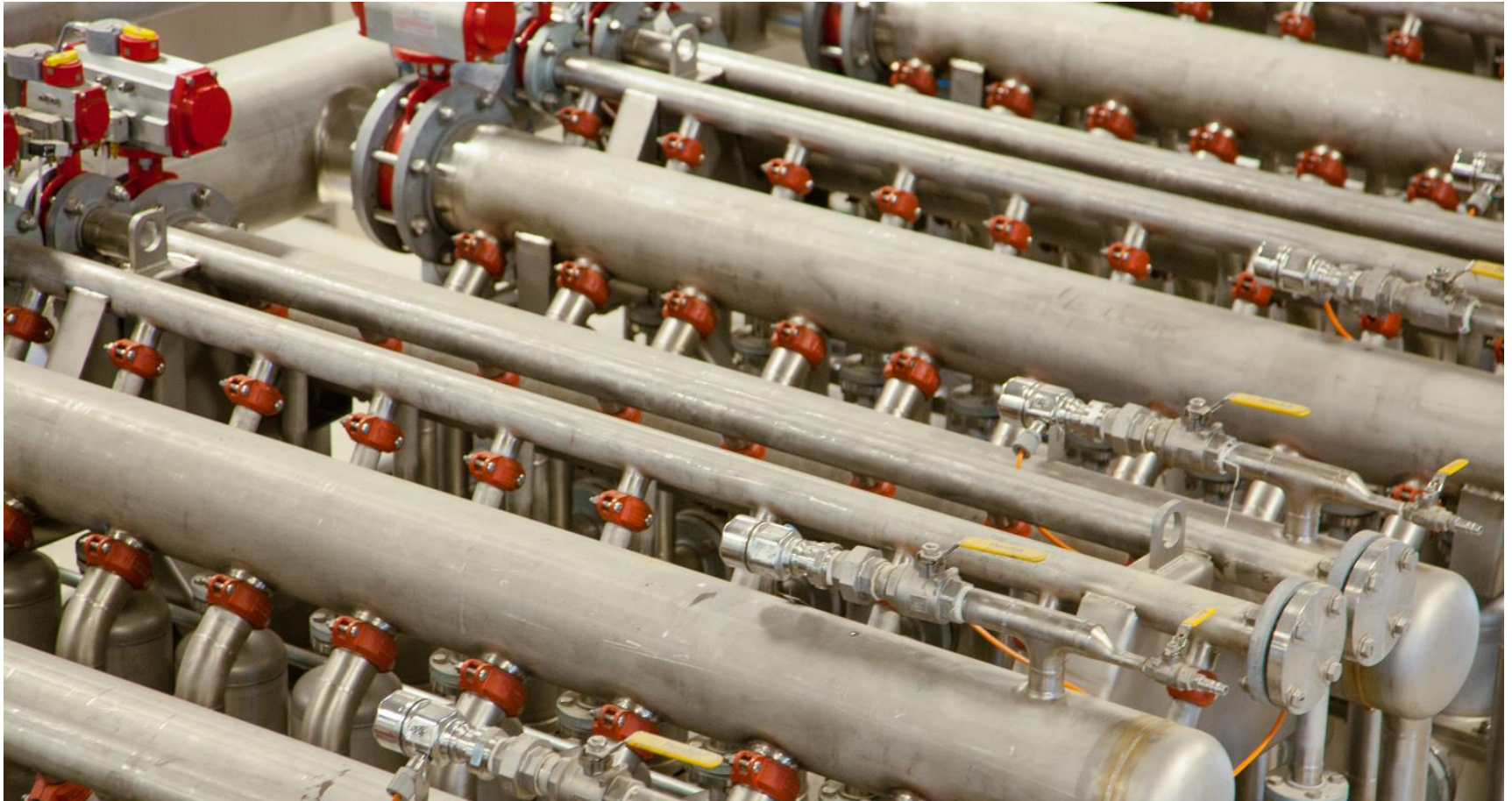
- **Ballasted Sedimentation:**
  - Excellent algae removal
  - Small footprint
- **Recirculating PAC:**
  - Small footprint
  - Maintains a PAC concentration of +/- 1000 mg/l to increase PAC effectiveness and efficiency
  - High DOC removal capability
  - Potential for significant emerging contaminant reduction
  - Operational flexibility (by varying PAC dose or concentration)
- **Ceramic Membranes:**
  - Durability / compatibility with upstream processes
  - Long expected life (20+yrs) – reduces life cycle cost

# Other Treatment Process Features

- Ferric chloride coagulant
- Potassium permanganate and chlorine dioxide for T&O, Fe and Mn control
- PAC for supplemental organic removal
- Sodium hypochlorite free chlorine disinfection (compatible with existing well waters)
- Sulfuric acid and sodium hydroxide used for pH adjustments

# Recirculating PAC Process (Krüger Actiflo-CARB)





## Ceramic Membranes

# Ceramic Membranes

- First large-scale application of ceramic membranes for potable water treatment in the U.S.
- 560 individual membrane elements arranged in 6 skids
- Flow through elements is under pressure (30 to 75 psi)
- Daily CEB with chlorine or acid
- Approximately 4-6 month CIP interval

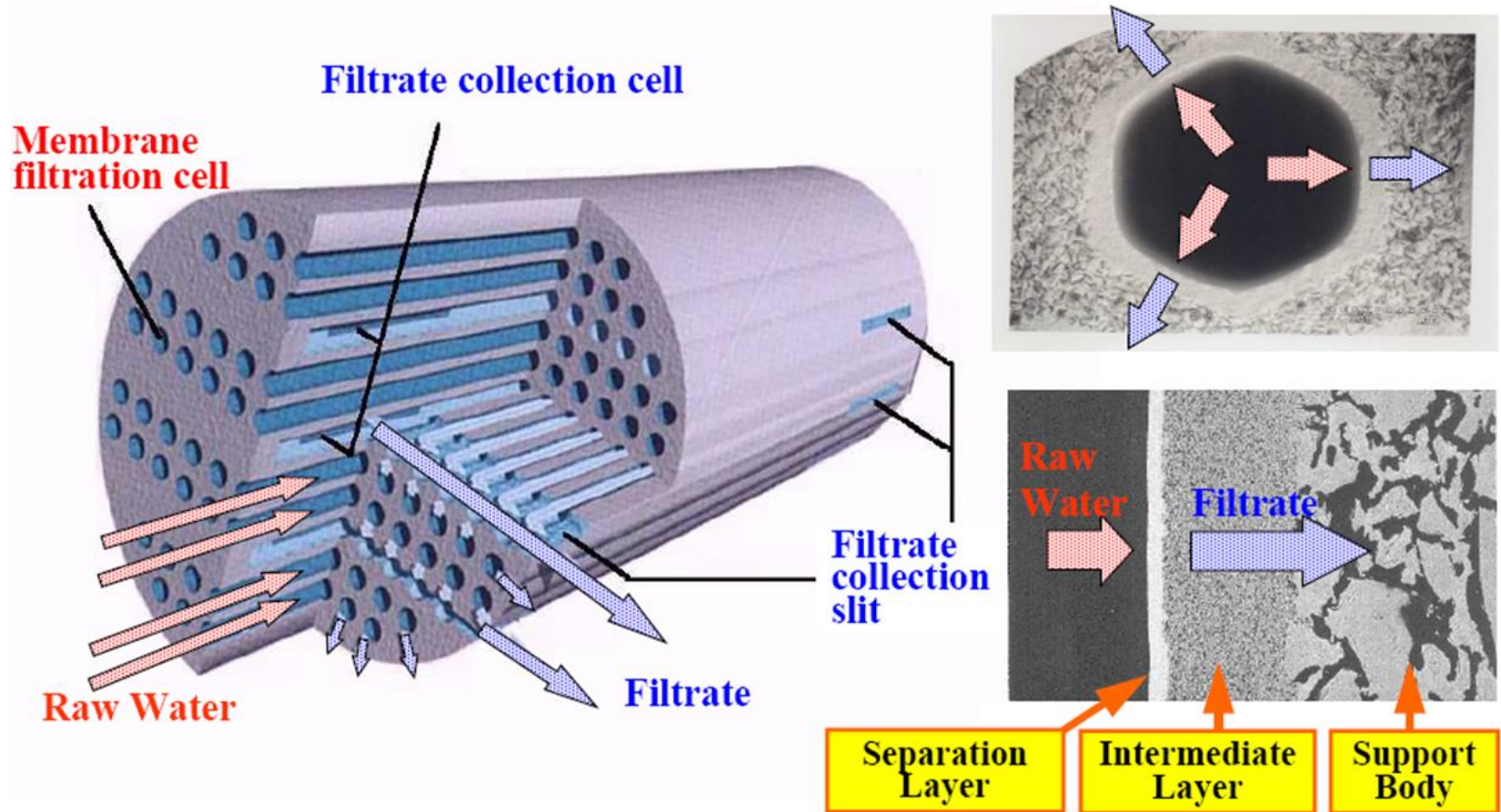


# Ceramic Membrane Element

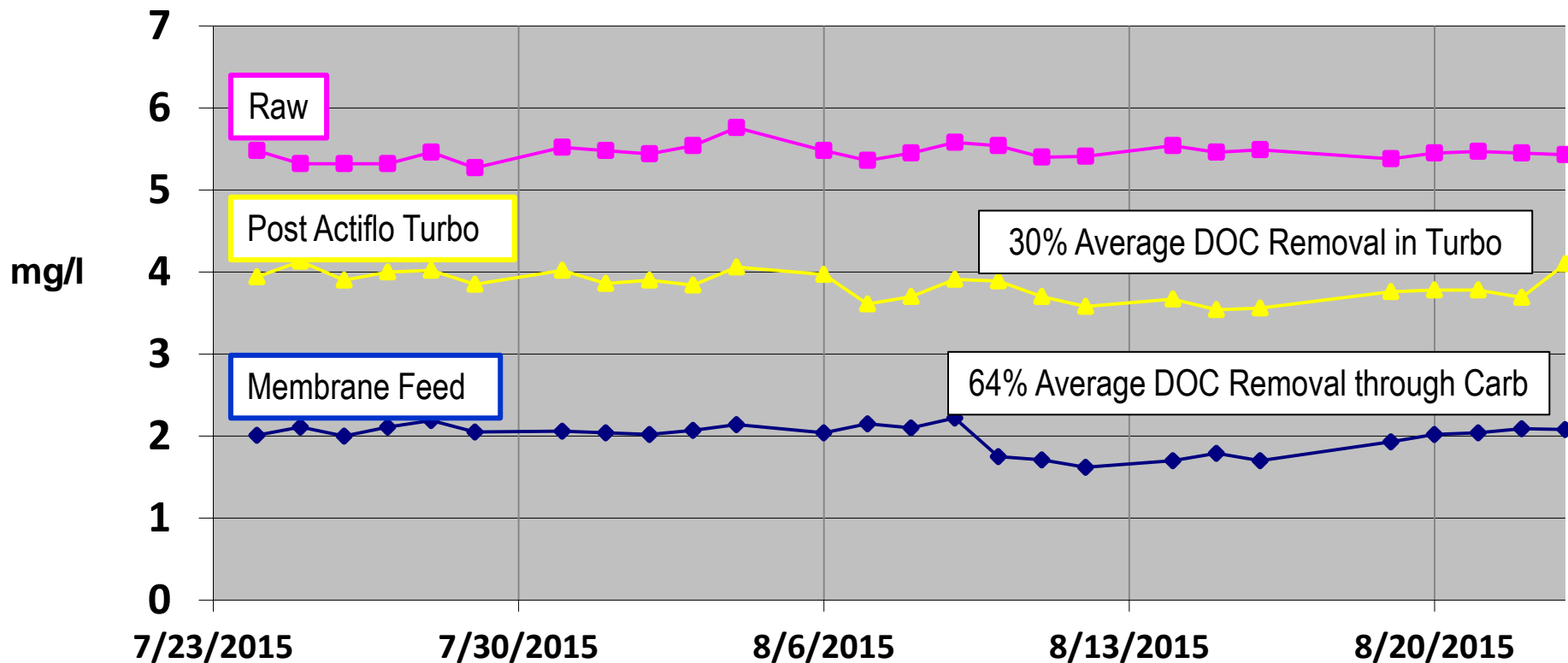
- 7.1 in diameter
- 59.1 in length
- 0.1  $\mu\text{m}$  pore size
- Up to 175 gsf
- Operates in dead end filtration
- Aluminum Oxide material



# Ceramic Membrane Element



# Organics Removal Performance







- Optimizing the system
- Reservoir monitoring
- Water quality program
- Partnership for Safe Water
- Operational plan for the District

## Moving Forward



## Acknowledgements

Construction Manager: **Garney/Weaver**

Equipment: **Kruger**

Contractor: **Western Summit Contractors, Inc.**

Contractor: **McDade-Woodcock, Inc.**



Questions?