

A Tale of two pilot tests

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Overview

- Paradise Point Pilot Testing
 - 15 mgd planned new WTP
 - Well field approximately 1 mile from WTP site
 - Manganese approximately 10 x MCL
- Bridge Road Pilot Testing
 - 50 gpm well
 - Remote system
 - Elevated iron, manganese, ammonia, arsenic
 - Existing system backwashes every 30 min



Paradise Point

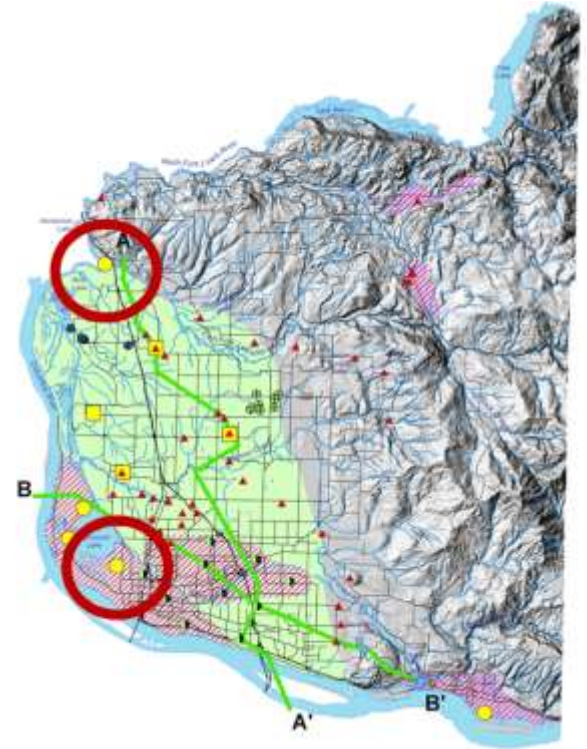
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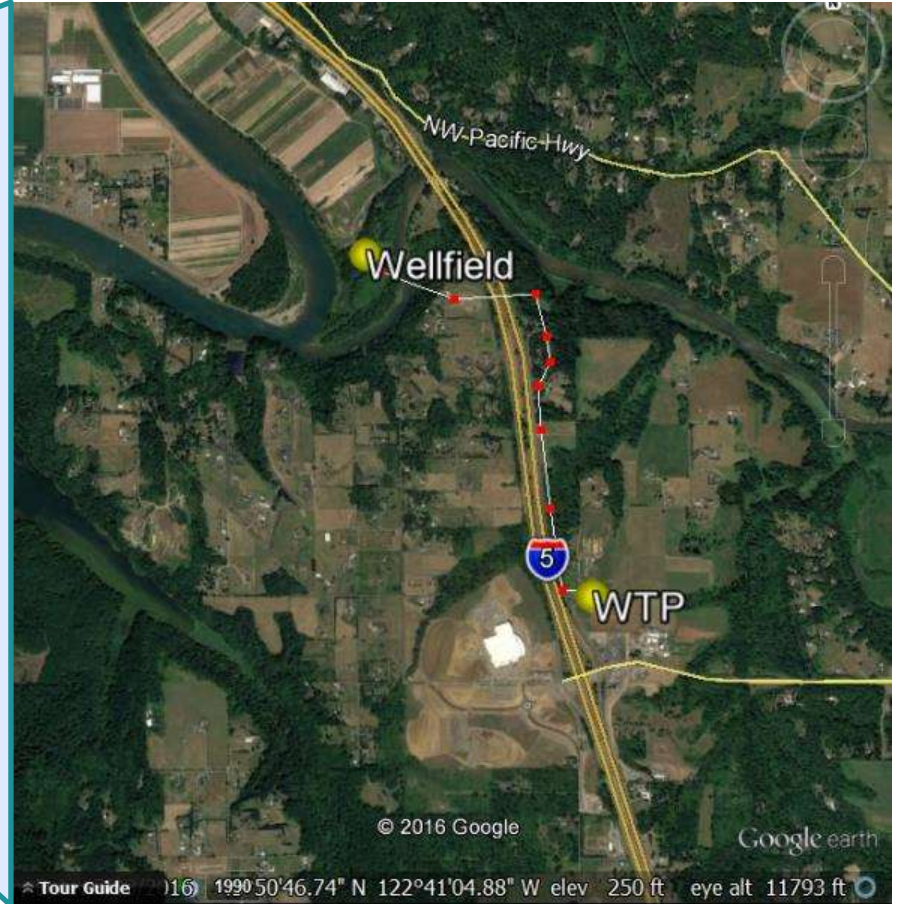
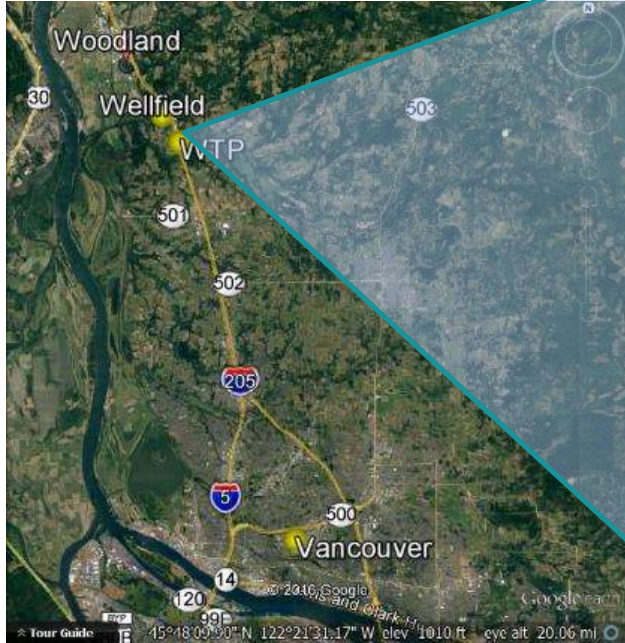
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Paradise Point Overview

- Long-Term Water Supply for Clark County
- Multiple Year Project
- Wellfield/Backwash Ponds
- River Crossing
- WTP & Pump Station
- Finished Water Transmission
- Planned Capacity Phases:
 - 2500, 5000, 7500, 10,000 gpm



Project

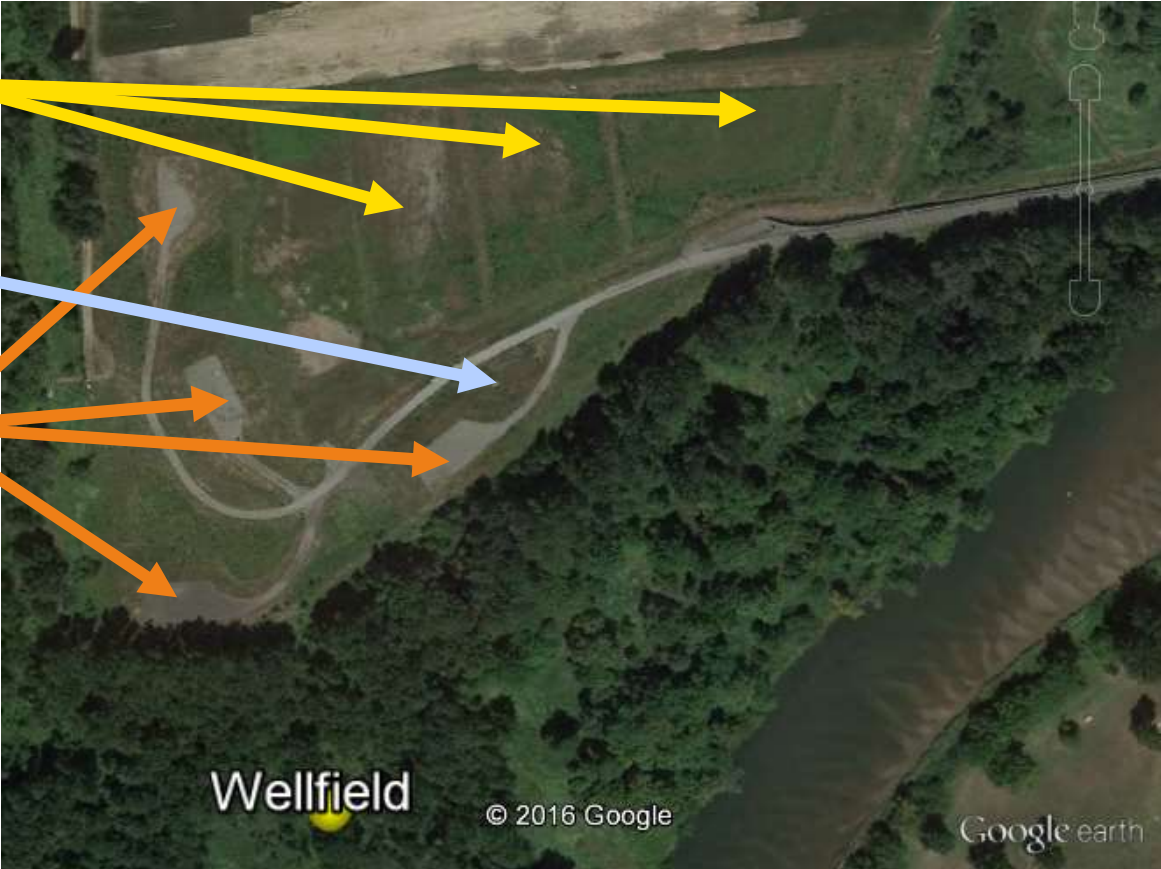


Wellfield and Sludge Pond Site

Backwash Ponds

River crossing Termination

Well Sites



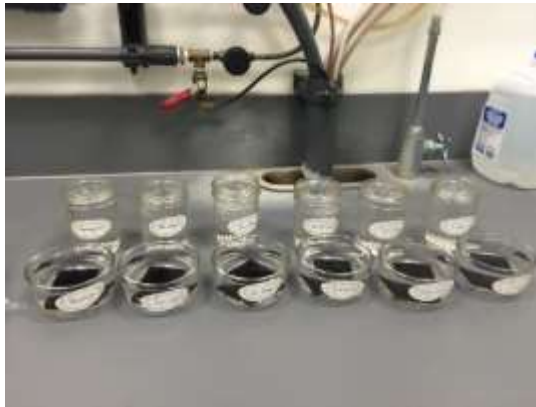
Wellfield

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Google earth

Pilot Testing

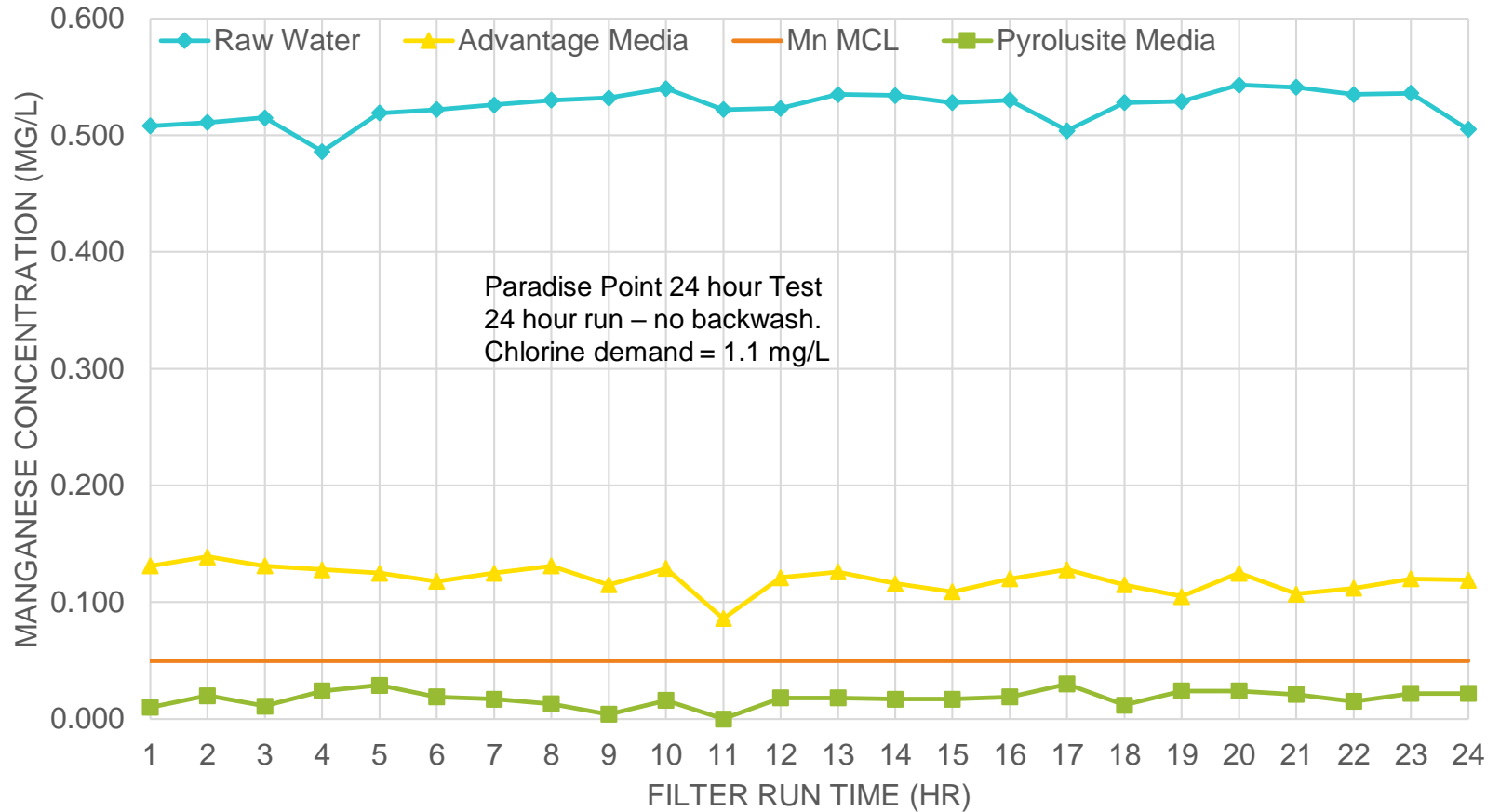
- Manganese Removal 0.6 to 0.02
- Low Iron – less than 0.01
- Chlorine Dose 2 mg/L
- Silica 40 to 50 mg/L - Not Adsorbed
- AS-741 and Advantage Media Tested
- Loading rates up to 12 gpm/sq ft were successful
- Settling within 1 hour
- Silica did not stick to glassware/tiles

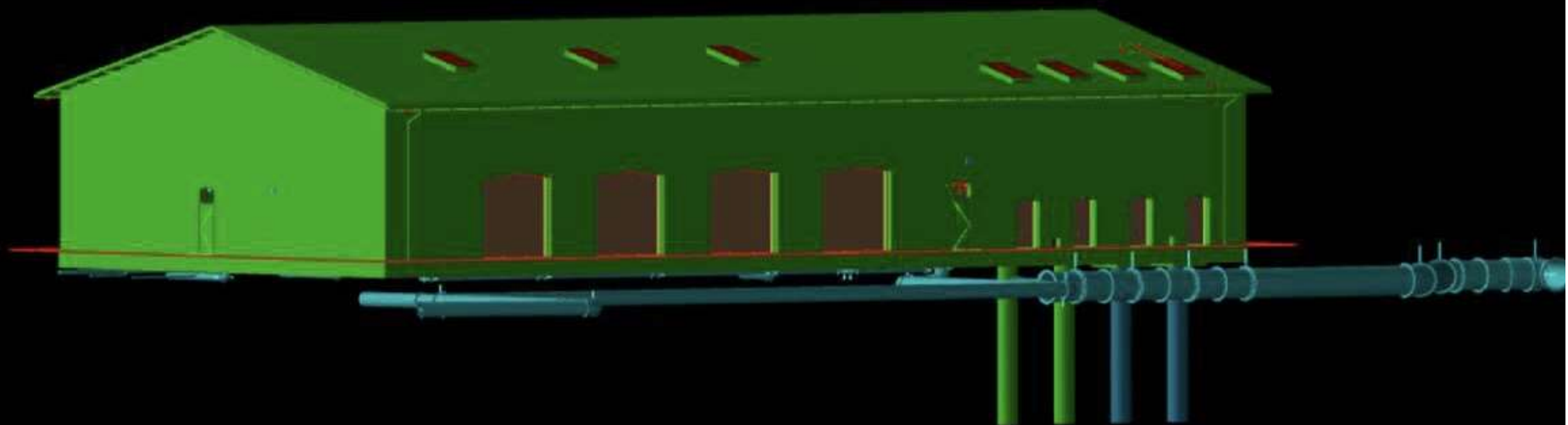


Paradise Point Month-Long Testing Results Manganese @ 14.4 gpm/sq ft



● Average 10.04166667
 ● High 5.020833333 14.39092357
 ● low
 ● Average + Std Dev
 ● Average - Std Dev





Bridge Road

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Water Quality Specialist

Clark Public Utilities

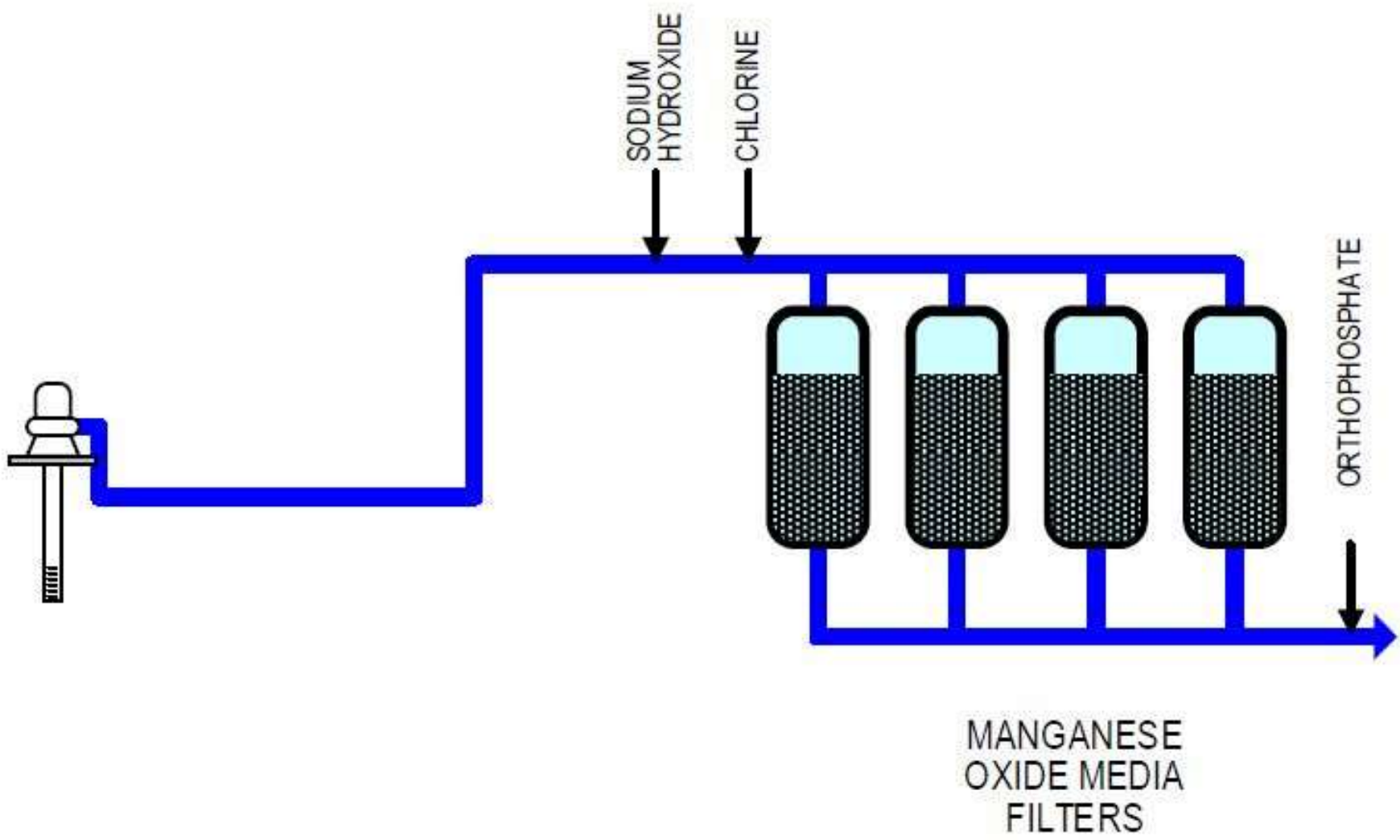
Duties include:

- process control and quality control – quality assurance
- maintain compliance with regulatory requirements
- designated operator in responsible charge



The challenge, when groundwater doesn't act like groundwater

This is a case study whose genesis was some small scale, boiler plate, general pilot testing. How could we extend runtimes specifically unit filter run volumes and how could we “simplify” the process thereby reducing labor.



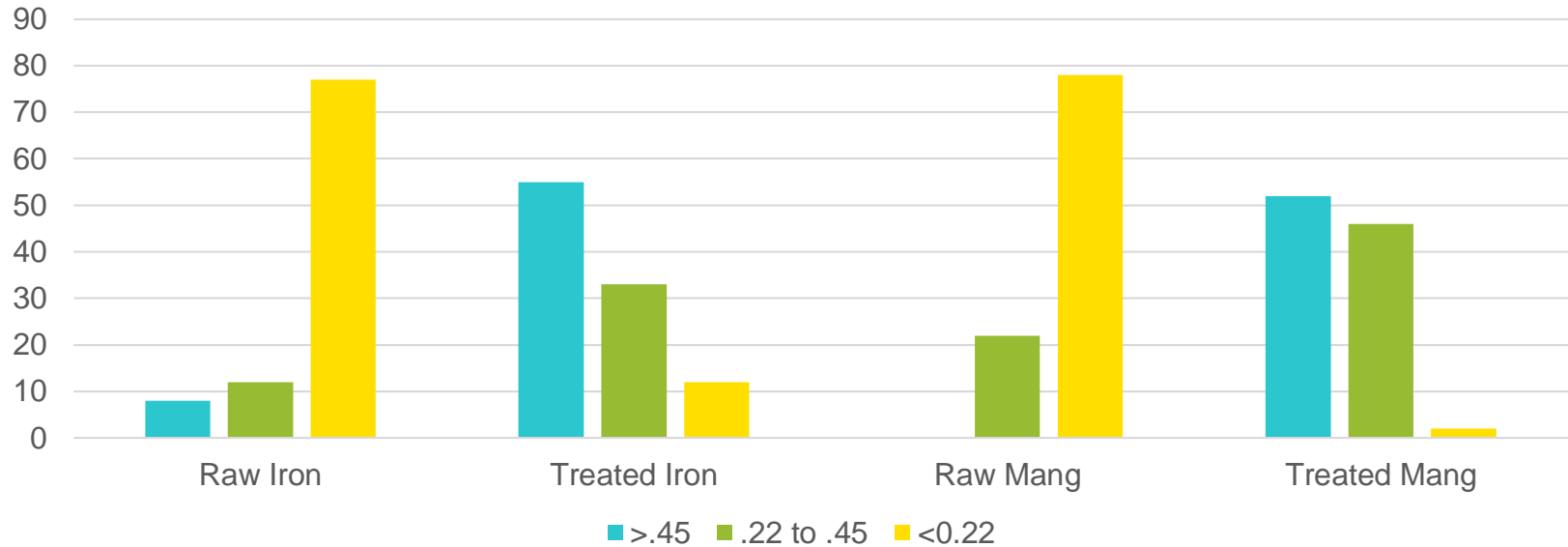
The particulars

- Community water system (13) connections – (25) residents
- 50 gpm well, 30,000 gallons of storage, 6” HDPE water main
- Pyrolusite filtration, sodium hypochlorite disinfection, orthophosphate corrosion control, sodium hydroxide pH adjustment.
- Raw water pH 6.5
- Raw water arsenic concentrations between 7 and 15 ppb
- Raw water iron concentrations between 3 and 14 mg/L
- Raw water manganese concentrations between 100 and 500 ppb
- Filter loading rate is 1.7 gpm/sq ft and UFRV is 1,225 gallons
- linear or tree type distribution. The well is on one end the reservoir the other.
The development is existing



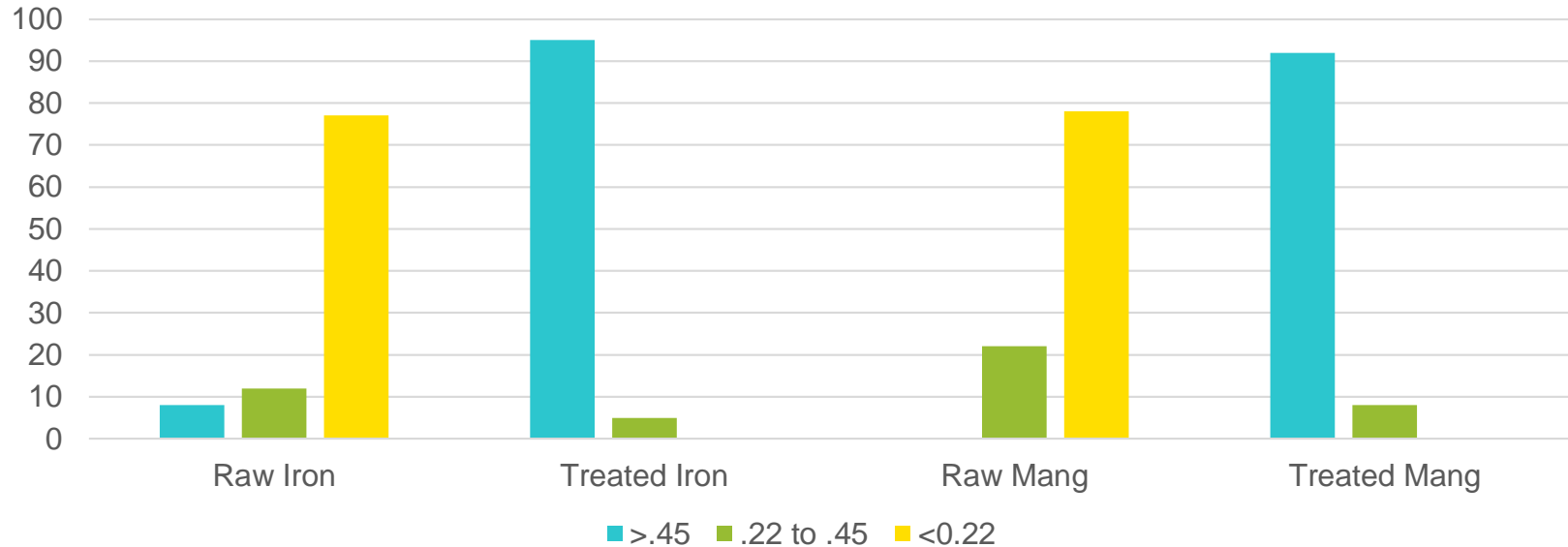
5 minute chlorine oxidation, filtration

Particle Size Distribution



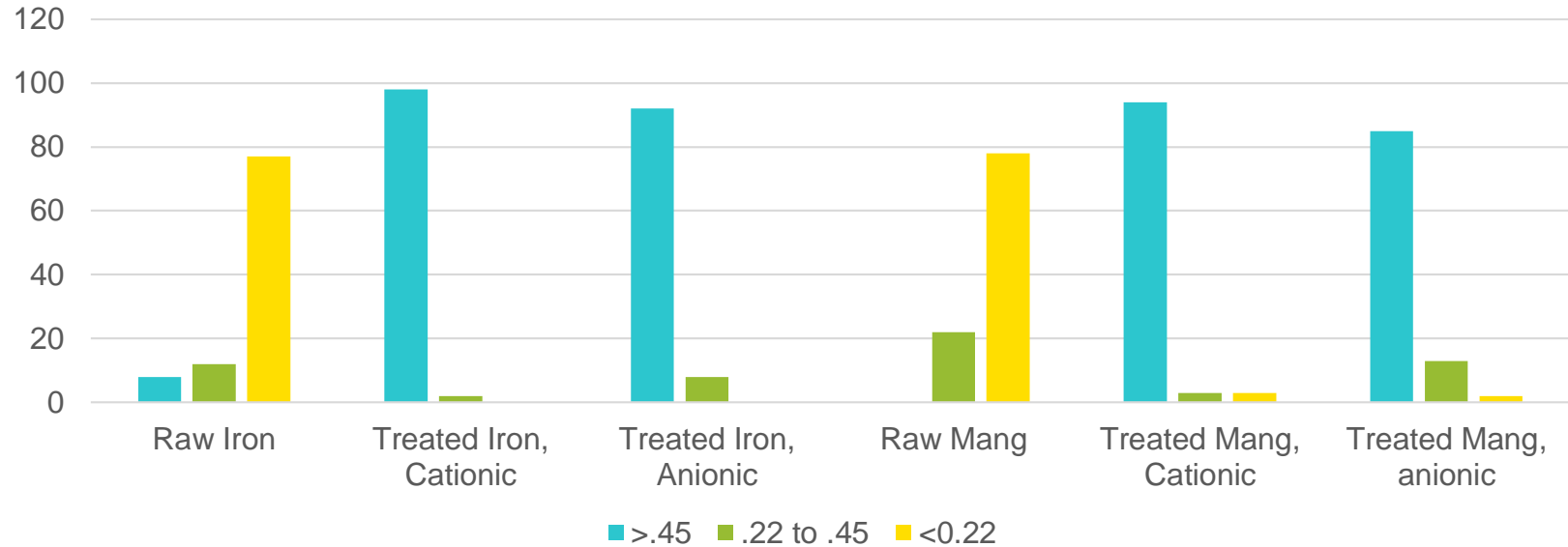
30 minute chlorine oxidation, filtration

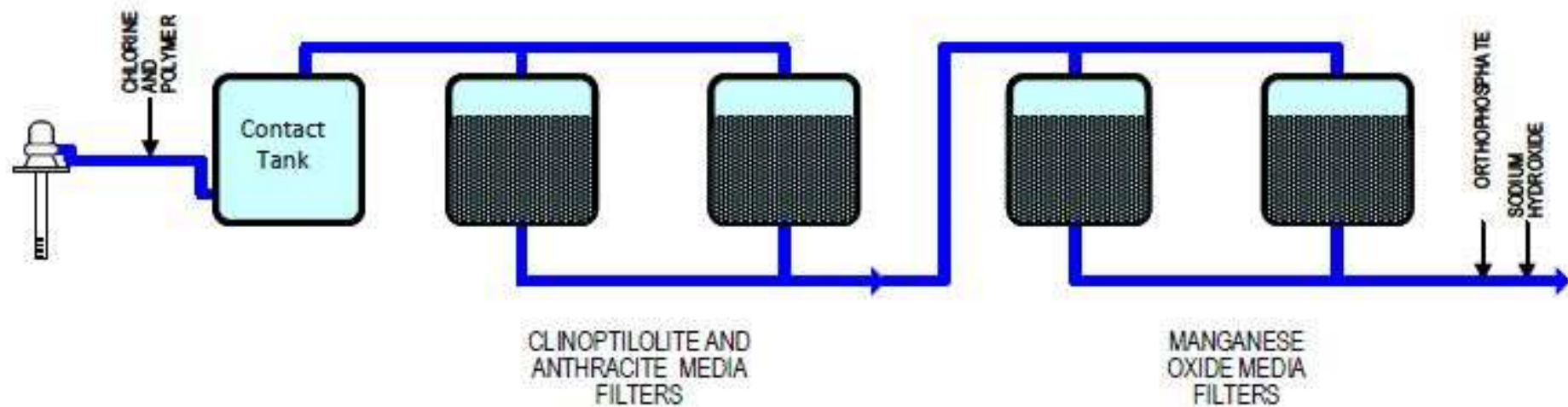
Particle Size Distribution



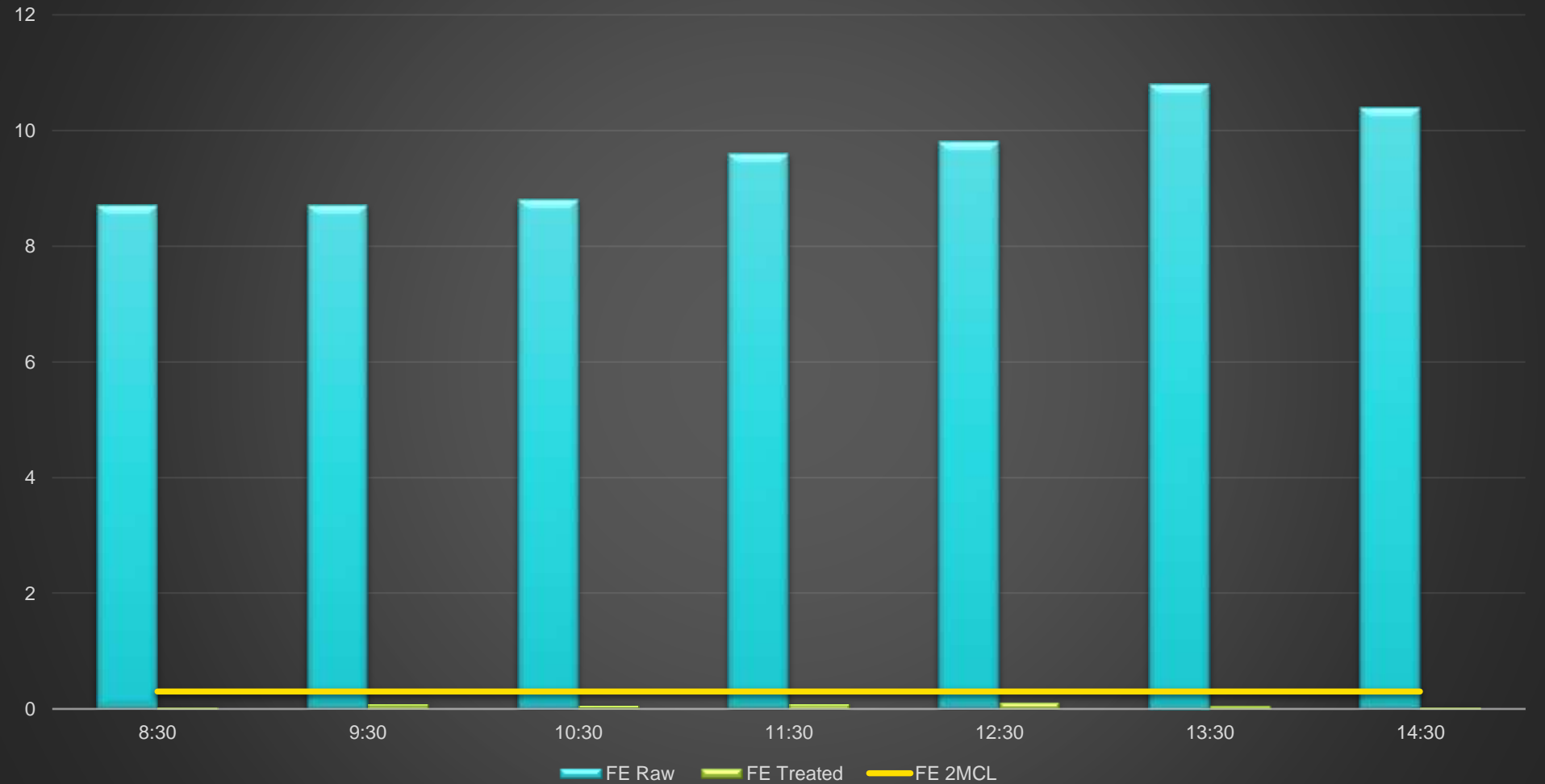
5 minute chlorine oxidation, .2 mg/L polymer, filtration

Particle Size Distribution

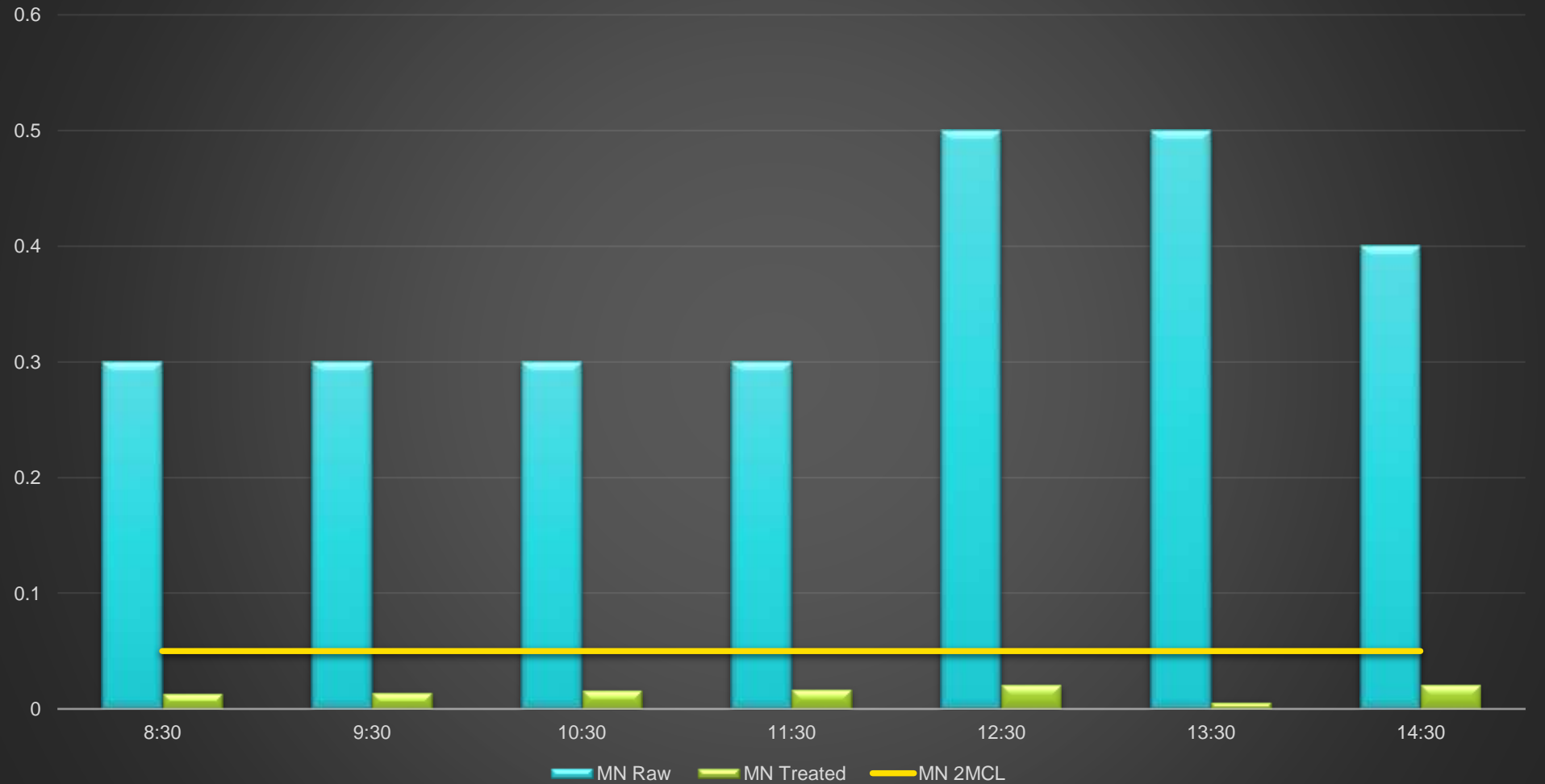




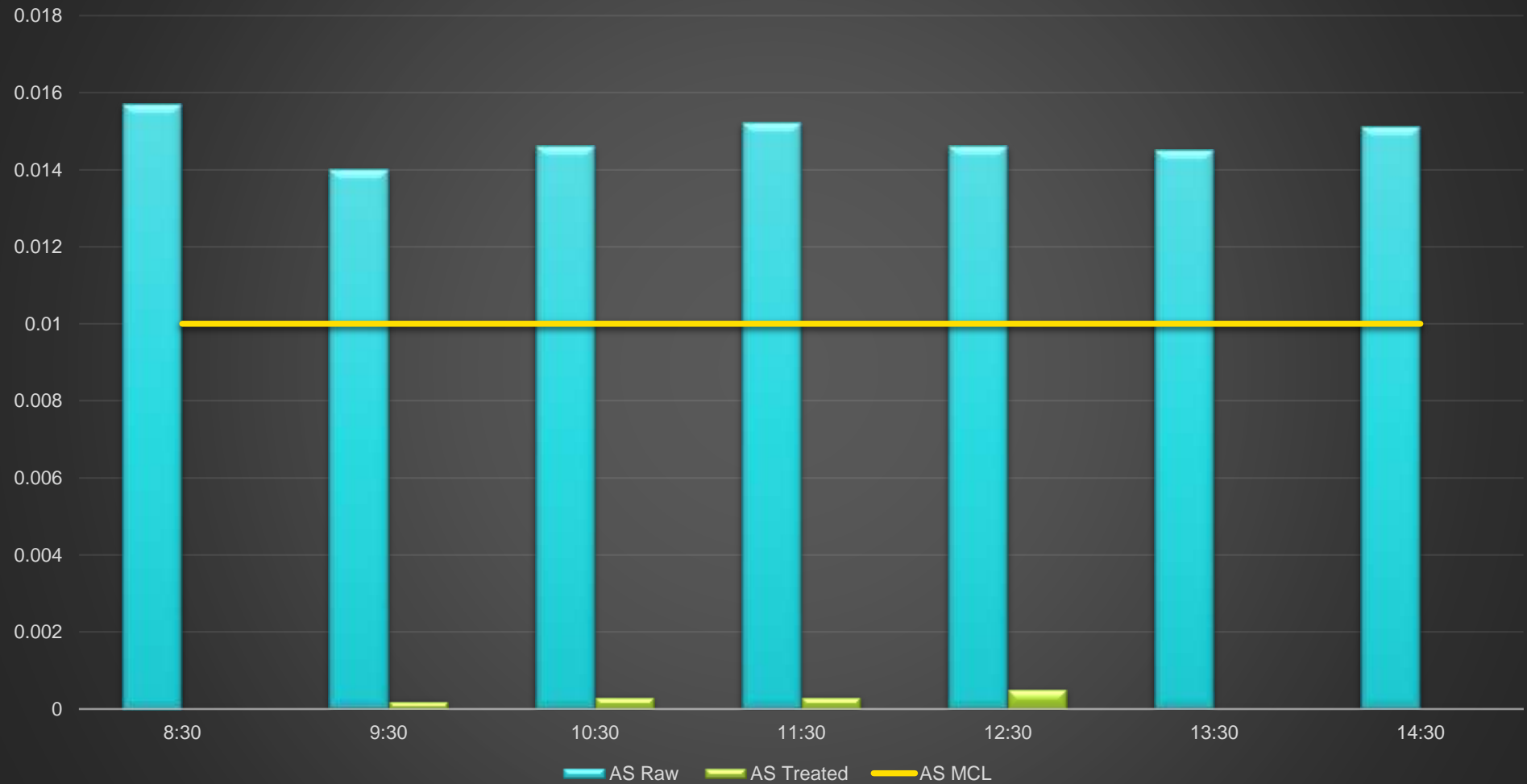
Iron Concentrations



Manganese Concentrations



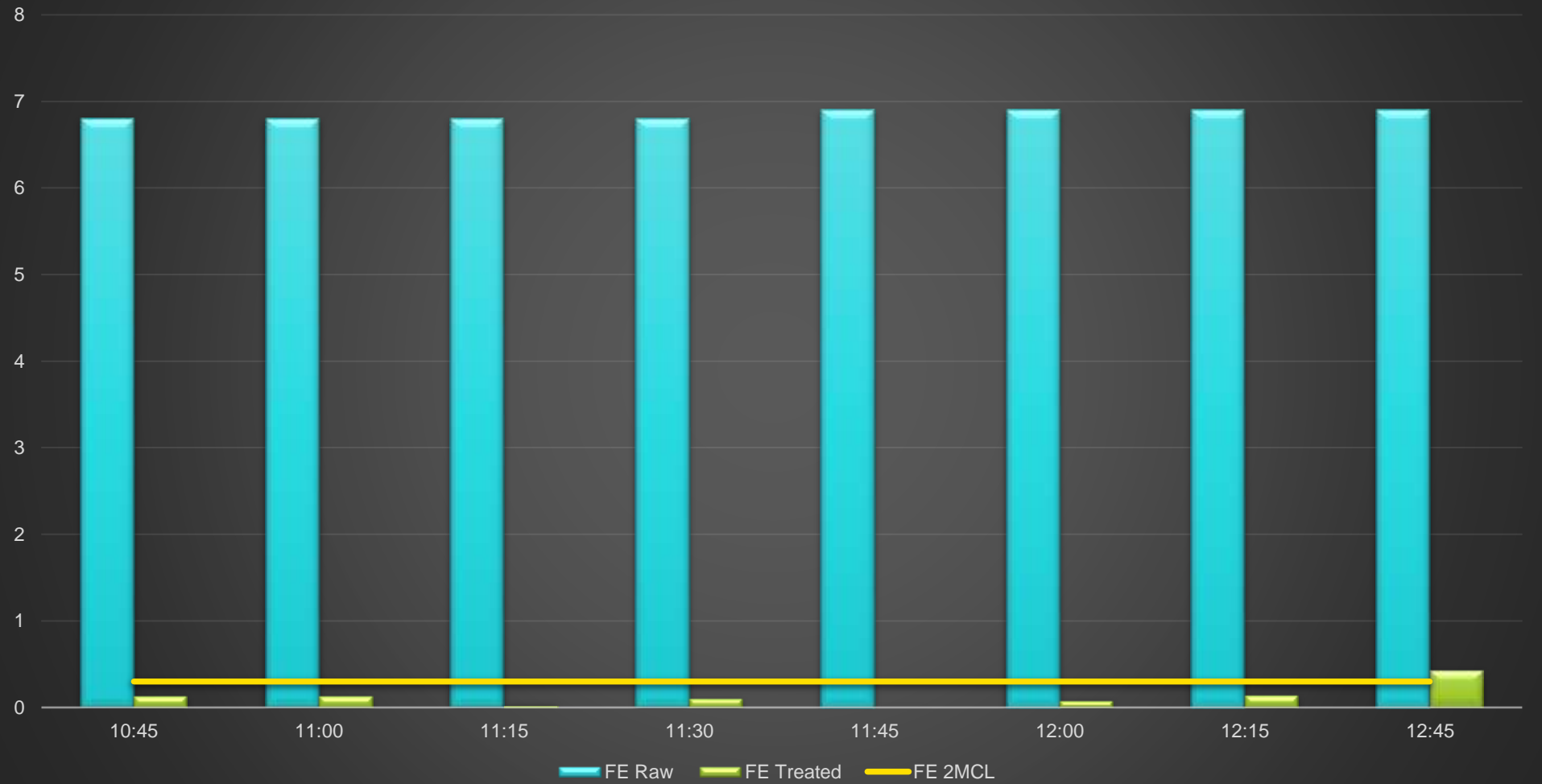
Arsenic Concentrations



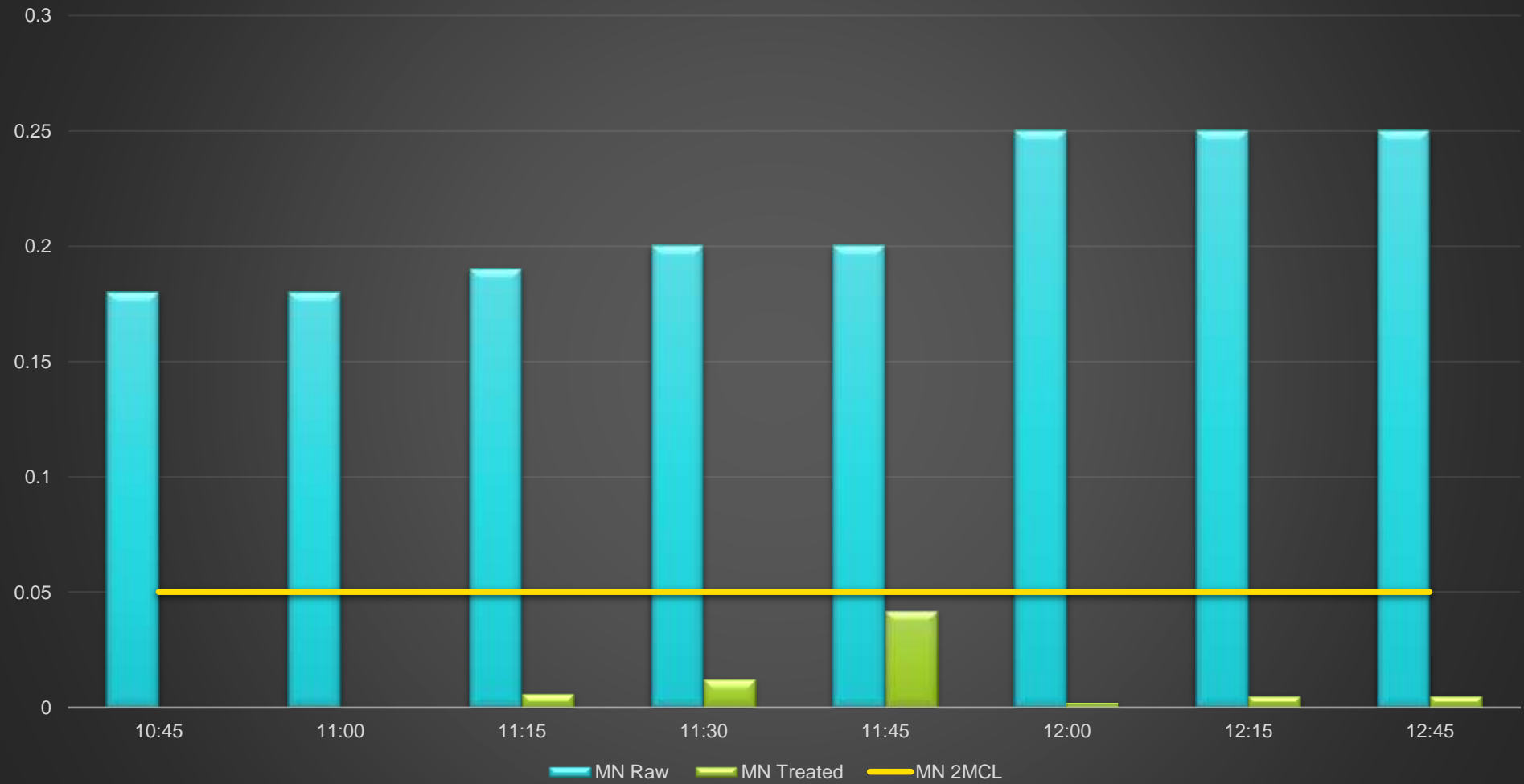
The next step was a full scale demonstration



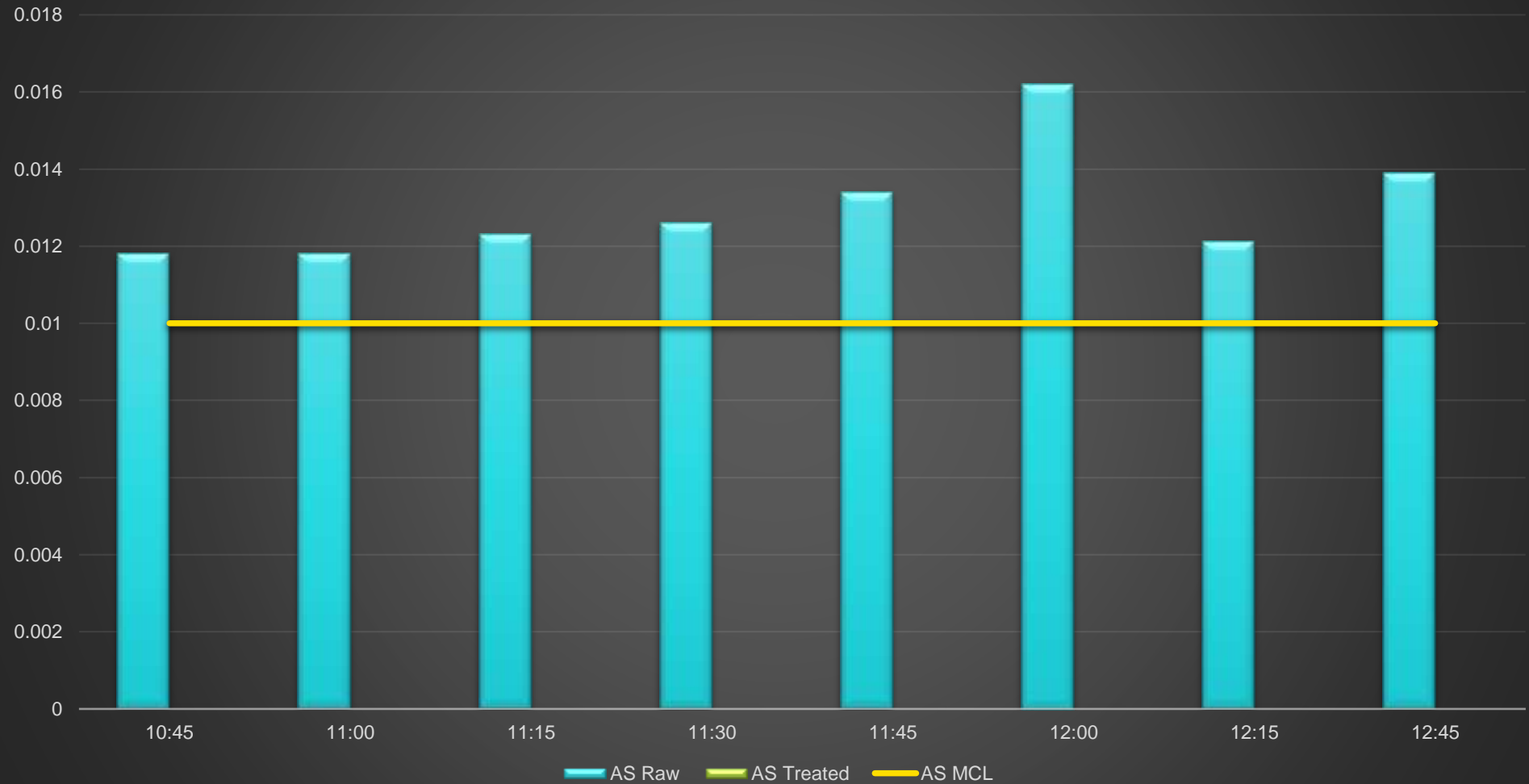
Iron Concentrations



Manganese Concentrations



Arsenic Concentrations



Findings - Results

Start small and do not be afraid to try a different approach

Questions?