Water Advisory Board

May 10,2016

Water Treatment Plant Overview

- Three water treatment plants
- North plant built in 1920’s, 10MGD
- Middle plant expanded in 1950’s, 20MGD
- South plant built in 1980’s, 12MGD
- Filtration plant built in 1920’s, 42MGD
- Conventional Water Treatment, 42MGD

Aerial View


Lone Wolf
Raw
Intake
Clearwell
Filter Plant
North
Plant
Middle Plant
South
Plant

Conventional Water Treatment

- Chemical (coagulant) addition
- Coagulation and Flocculation
- Sedimentation
- Filtration
- Disinfection

Coagulation

- Turbidity in water has a negative charge which prevents it from settling out
- Positive charged metallic coagulant is added, such as aluminum sulfate
- A rapid mix ensures quick and efficient mixing of the chemical coagulant
- Coagulant neutralizes the negative charges on particles so they can coagulate

Flocculation

- Coagulants have been added and have neutralized the negative charged particles
- The water is slowly mixed to allow particles to collide and grow in mass
- Flocculated water then flows to a clarifier for settling

Clarification

- Water enters at the center of the clarifier
- As water makes it’s way to the outer weir, large floc particles fall out as a sludge
- Sludge is raked off the bottom and pumped to waste
- The clear supernatant flows over the weirs and is transferred to the filters

Clarifier Repair (May 2016)

Filtration Process

- 15 Gravity filters – media consists of three feet of anthracite coal and one foot of sand
- Must filter remaining particulate matter to below 0.3 ntu's (TCEQ requirement)
- Necessary for removal of Cryptosporidium and Giardia (chlorine resistant protozoans)
- Filtered water is transferred to the Clearwell for disinfection

Filtration Building

Filter Rebuild (4 May 2016)

Disinfection

- Water is then disinfected with a 2-5 mg/L mixture of chlorine gas and liquid ammonium sulfate (LAS)
- Monochloramine is created by the mix of chlorine gas and LAS
- Monochloramine is used to prevent the creation of trihalomethanes (THM's), known carcinogens
- THM's are monitored quarterly in our distribution system by TCEQ contractors

Disinfection Facility

Disinfection Facility (chlorination)

Distribution (High Service Pumps)

Comparison of Treatment Technologies

	Conventional	Microfiltration	MF / Reverse Osmosis
Minerals	0	0	5
Suspended Solids	5	5	5
Organics	2	2	5
Heavy Metals	1	1	5
Pesticides/Herbicides	1	1	5
Turbidity	3	5	5
THM's	2	2	5

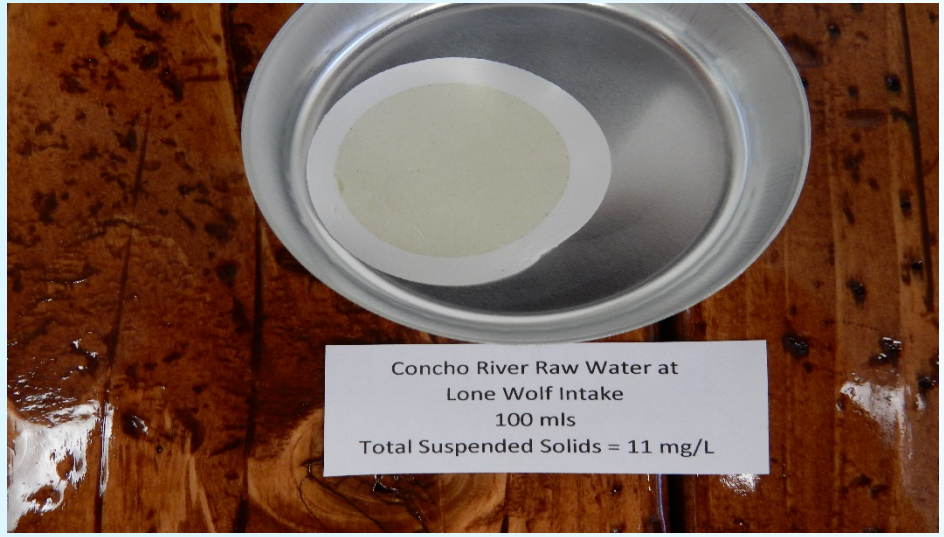
Treatment Ability

0 = none
1 = poor
2 = fair
3 = good
4 = above average
5 = excellent

Evaluating New Water Sources

- Mineral content (< 500 TDS)
- Suspended solids (jar testing)
- Organic content (THM potential)
- Known pollutants (radium, nitrate, arsenic)
- Unknown pollutants (stormwater runoff)
- Corrosivity (lead control in distribution pipes)
- Meet current and future EPA standards
- TCEQ will require characterization
- Can we meet these with our existing plant?

Source Water Suspended Solids



Red Arroyo Source - Positives

- Total dissolved solids 50-300, very good
- Supplemental source to our portfolio
- Organics, metals, and pollutants would be trapped in the reservoir, thus improving the quality of the river downstream

Red Arroyo Source - Negatives

- Cannot be considered as a potable water source until a source water characterization study is conducted and approved by TCEQ
- Must sample the beginning, middle, and end of every rain runoff event for a minimum of one year
- Because of known pollutants in stormwater, TCEQ will treat this water the same as wastewater. Testing must include the same constituents required at the RO-Reuse pilot study (estimated at $0.25 M)
- After TCEQ reviews the source water characterization, they will recommend treatment options which will then require a pilot study

Red Arroyo Treatment Concerns

- Current plant does not have the ability to remove organics or heavy metals
- Direct introduction of unknown pollutants into our drinking water system
- Coagulant and treatability studies have never been conducted
- Turbidity of 50-3000 ntu would overload existing gravity filters
- TCEQ requires us to meet 0.3 ntu in finished water
- Current staff believes we could not meet TCEQ turbidity requirements with this water

Red Arroyo Diversion Canal (1970's)

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