

Minimum Monitoring and Reporting of Water Qualities and Flow Rates

Water quality monitoring for chemical and microbiological constituents and frequencies are listed and marked with a check (✓) in Table A below. These monitoring parameters have been selected so that the TCEQ can verify the continuous protection of public health by the removal or inactivation of chemical and microbiological contaminants through the different proposed treatment processes at the tested flow rates and operating parameters. The PWS should customize the sampling plan for the treatment provided and the raw water quality expected.

Continuous (5-minute, 15-minute, and 4-hour) and daily monitoring are to be conducted onsite.

Samples collected at weekly (once every 7 days) and at longer frequencies should be submitted to an offsite NELAP accredited laboratory for drinking water analysis. Analyses marked for both onsite and offsite monitoring are required for quality control to verify the accuracy of the onsite monitoring equipment.

Table A

	Continuous, every			Once per day	Once per 7-days	Twice per week	Startup & End	Startup, every 30 days, & End
	5-min.	15-min.	4-hrs.					
WWTP Effluent (prior to DZ-injection point)								
Flow rate (gpm)		✓						
Turbidity (NTU)		✓						
Temperature (°C)		✓						
<i>Escherichia coli</i> (<i>E. coli</i>) enumeration	Frequency to be based on hydraulic detention time between WWTP effluent and selected 2010 SWTP filter effluent							✓
<i>Giardia</i> (cysts/L)	Frequency to be based on hydraulic detention time between WWTP effluent and selected 2010 SWTP filter effluent							✓
<i>Cryptosporidium</i> (oocysts/L)	Frequency to be based on hydraulic detention time between WWTP effluent and selected 2010 SWTP filter effluent							✓
Total dissolved solids (TDS, mg/L)					✓			
Total suspended solids (TSS, mg/L)				✓				
Daily flow rate (gpd)		✓						
Nitrate (mg/L)				✓				✓

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	Continuous, every			Once per day	Once per 7-days	Twice per week	Startup & End	Startup, every 30 days, & End
	5-min.	15-min.	4-hrs.					
Alkalinity (mg/L)					✓			
Total organic carbon (TOC, mg/L)					✓			
Dissolved organic carbon (DOC, mg/L)					✓			
5-day Carbonaceous biochemical oxygen demand (CBOD ₅ , mg/L)				✓				
Full metal scan (mg/L, arsenic, barium, cadmium, chromium, copper, lead, manganese, mercury, nickel, selenium, silver, zinc)					✓			
Algae counts (CFU/L)								✓
Chemicals listed in §290.106(b) Inorganics Chemicals								✓
Chemicals listed in §290.107(b) Organic Chemicals								✓
Chemicals listed in §290.108(b)(1) (radium 226, radium 228, uranium, gross alpha activity)								✓
Chemicals listed in §290.108(b)(2) & 40 CFR §141.66(d) (gross beta particle and photon radioactivity, tritium, strontium 90)								✓
Chemicals listed in §290.118(b) Secondary Chemicals								✓
Lead (ug/L)								✓
Total trihalomethanes (TTHM, chloroform, dichlorobromomethane, dibromochloromethane, bromoform) (ug/L)								✓
Haloacetic acids (group of 5) (HAA ₅ , monochloroacetic acid, dichloroacetic acid, trichloroacetic acid, monobromoacetic acid, dibromoacetic acid) (ug/L)								✓
Bromide								✓
Begin WWTP Effluent Breakpoint Chlorination Disinfection Zone (DZ)								
Flow rate (gpm)		✓						
Free ammonia residual before ammonia injection(mg/L)		✓						
Oxidation reduction potential (ORP)			✓					
Free chlorine dosage (mg/L)			✓					
Free chlorine residual, after chlorine injection and before ammonia injection (mg/L)			✓					
pH level at free chlorine residual monitoring tap			✓					
Water temperature at free chlorine residual monitoring tap(°C)			✓					
End WWTP Effluent Breakpoint Chlorination Disinfection Zone (DZ)								
Flow rate (gpm)		✓						
Free chlorine residual (mg/L)		✓						
Total chlorine residual, (mg/L)			✓					

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	Continuous, every			Once per day	Once per 7-days	Twice per week	Startup & End	Startup, every 30 days, & End
	5-min.	15-min.	4-hrs.					
Monochloramine residual(mg/L)			✓					
Free ammonia level (mg/L)		✓						
pH level		✓						
Water temperature (°C)		✓						
Begin WWTP Effluent Transmission Line Disinfection Zone (DZ)								
Ammonia feed pump dosage rate (mg/L)			✓					
Total chlorine residual, (mg/L)			✓					
Monochloramine residual, after ammonia injection (mg/L)			✓					
Free chlorine residual, after ammonia injection (mg/L)			✓					
Free ammonia level, after ammonia injection (mg/L)			✓					
pH level at monochloramine residual monitoring tap			✓					
Water temperature at for monochloramine residual monitoring tap(°C)			✓					
Total trihalomethanes (TTHM, chloroform, dichlorobromomethane, dibromochloromethane, bromoform) (ug/L)					✓			
Haloacetic acids (group of 5) (HAA5, monochloroacetic acid, dichloroacetic acid, trichloroacetic acid, monobromoacetic acid, dibromoacetic acid) (ug/L)					✓			
Bromide					✓			
Quantity of chlorine used (pounds per day, ppd)				✓				
Quantity of ammonia used (ppd)				✓				
End of WWTP Effluent Transmission Line DZ								
Total chlorine residual (mg/L)		✓						
Monochloramine residual (mg/L)		✓						
Free chlorine residual (mg/L)		✓						
Free ammonia level (mg/L)		✓						
pH level		✓						
Water temperature (°C)		✓						
Begin MF/RO Clarifier DZ								
Flow rate (gpm)		✓						
Free chlorine feed pump dosage rate (mg/L)			✓					
Ammonia feed pump dosage rate (mg/L)			✓					
Total chlorine residual, after ammonia injection (mg/L)			✓					

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	Continuous, every			Once per day	Once per 7- days	Twice per week	Startup & End	Startup, every 30 days, & End
	5- min.	15- min.	4- hrs.					
Monochloramine residual, after ammonia injection (mg/L)			✓					
Free chlorine residual, after ammonia injection (mg/L)			✓					
Free ammonia level, after ammonia injection (mg/L)			✓					
pH level at monchloramine residual monitoring tap			✓					
Water temperature at monochloramine residual monitoring tap(°C)			✓					
Quantity of chlorine used (gpd)				✓				
Quantity of ammonia used (gpd)				✓				
MF/RO Membrane Coagulation, Flocculation & Clarification								
Flow rate (gpm)		✓						
pH level			✓					
Alkalinity level (mg/L)			✓					
Influent water temperature (°C)			✓					
Coagulant dosage (mg/L)			✓					
Calculated flocculator hydraulic detention time (mins.)			✓					
Calculated surface overflow rate (gpm/sf)			✓					
Effluent turbidity level (NTU)	Frequency based on hydraulic detention time of MF/RO Clarifier							
Quantity of coagulant used (gpd)				✓				
Effluent TOC (mg/L)					✓			
Effluent DOC (mg/L)					✓			
End of MF/RO Clarifier DZ								
Total chlorine residual (mg/L)		✓						
Monochloramine residual (mg/L)		✓						
Free chlorine residual (mg/L)		✓						
Free ammonia level (mg/L)		✓						
pH level		✓						
Water temperature (°C)		✓						
Begin MF Membrane DZ								
Free chlorine feed pump dosage rate (mg/L)			✓					
Ammonia feed pump dosage rate (mg/L)			✓					
Total chlorine residual, after ammonia injection (mg/L)		✓						

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	Continuous, every			Once per day	Once per 7- days	Twice per week	Startup & End	Startup, every 30 days, & End
	5- min.	15- min.	4- hrs.					
Monochloramine residual, after ammonia injection (mg/L)		✓						
Free chlorine residual, after ammonia injection (mg/L)		✓						
Free ammonia level, after ammonia injection (mg/L)		✓						
pH level at monochloramine residual monitoring tap		✓						
Water temperature at monochloramine residual monitoring tap (°C)		✓						
Selected Microfiltration Prefilter								
Flow rate (gpm)		✓						
Calculated hydraulic loading rate (gpm/sf)			✓					
Selected MF Membrane Unit Feed Water								
Flow rate (gpm)		✓						
Turbidity (NTU)		✓						
Pressure (psi)		✓						
Silt density index (SDI)				✓				
Selected MF Membrane Unit Filtrate								
Turbidity (mNTU)	✓							
Pressure (psi)		✓						
Flow rate (gpm)		✓						
Calculated transmembrane pressure (TMP, psi)			✓					
Calculated flux rate (gallons per square-foot per day, gfd)			✓					
Calculated specific flux rate (gfd/psi) at measured temperature			✓					
Calculated specific flux (gfd/psi) normalized to 20° C			✓					
<i>Escherichia coli</i> (<i>E. coli</i>) enumeration	Frequency based on hydraulic detention time between WWTP effluent and selected MF membrane unit effluent							✓
<i>Giardia</i> (cysts/L)	Frequency based on hydraulic detention time between WWTP effluent and selected MF membrane unit effluent							✓

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	Continuous, every			Once per day	Once per 7-days	Twice per week	Startup & End	Startup, every 30 days, & End
	5-min.	15-min.	4-hrs.					
<i>Cryptosporidium</i> (oocysts/L)	Frequency based on hydraulic detention time between WWTP effluent and selected MF membrane unit effluent							✓
pH level				✓				
SDI				✓				
Alkalinity (mg/L)					✓			
TOC (mg/L)					✓			
DOC (mg/L)					✓			
End of MF Membrane DZ								
Flow rate (gpm)		✓						
Total chlorine residual (mg/L)		✓						
Monochloramine residual (mg/L)		✓						
Free chlorine residual (mg/L)		✓						
Free ammonia level (mg/L)		✓						
pH level		✓						
Water temperature (°C)		✓						
Sodium Bisulfite Feed								
Sodium bisulfite feed pump dosage rate (mg/L)			✓					
Quantity of sodium bisulfite used (ppd)				✓				
Break Tank (RO membrane feed tank)								
Flow rate (gpm)		✓						
Water level (feet)			✓					
Calculated hydraulic detention time (mins.)			✓					
Effluent free chlorine residual (mg/L)			✓					
Effluent total chlorine residual (mg/L)			✓					
Sulfuric Acid Feed								
Sulfuric acid feed pump dosage rate (mg/L)			✓					
pH level after injection			✓					
Quantity of sulfuric acid used (gpd)				✓				

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	Continuous, every			Once per day	Once per 7- days	Twice per week	Startup & End	Startup, every 30 days, & End
	5- min.	15- min.	4- hrs.					
Antiscalant Feed								
Antiscalant feed pump dosage rate (mg/L)			✓					
Quantity of antiscalant used (gpd)				✓				
Selected RO Membrane Prefilter								
Flow rate (gpm)		✓						
Hydraulic loading rate (gpm/sf)			✓					
Selected RO Membrane Unit Feed Water								
Flow rate (gpm)		✓						
Turbidity (NTU)		✓						
Inlet pressure (psi)			✓					
Temperature (° C)			✓					
Nitrate (mg/L)			✓					✓
TDS (mg/L)			✓					
TSS (mg/L)			✓					
SDI				✓				
pH level				✓				
Hardness as calcium carbonate (mg/L)				✓				
Alkalinity (mg/L)				✓				
TOC (mg/L)					✓			
DOC (mg/L)					✓			
Nitrite (mg/L)								✓
Silica (mg/L)								✓
Selected RO Membrane Unit Reject								
Flow rate (gpm)		✓						
Pressure (psi)		✓						
Temperature (°C)						✓		
TDS (mg/L)				✓				
pH level						✓		
Turbidity (NTU)						✓		
Free ammonia (mg/L)				✓				
Nitrate (mg/L)				✓				

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	Continuous, every			Once per day	Once per 7-days	Twice per week	Startup & End	Startup, every 30 days, & End
	5-min.	15-min.	4-hrs.					
CBOD ₅ (mg/L)						✓		
Full metal scan (mg/L, arsenic, barium, cadmium, chromium, copper, lead, manganese, mercury, nickel, selenium, silver, zinc)						✓		
Selected RO Membrane Unit Permeate								
Total flow rate per unit (gpm)		✓						
TDS (mg/L)		✓						
Effluent pressure (psi)		✓						
Temperature (°C)			✓					
Calculated net driving pressure (psi)			✓					
pH level			✓					
Maximum daily TDS (mg/L)				✓				
Calculated average flux rate (gfd) at measured temperature				✓				
Calculated average specific flux rate (gfd/psi) normalized to 20° C				✓				
Nitrate (mg/L)				✓				✓
Nitrite (mg/L) <i>if nitrite is detected in RO membrane feed water</i>				✓				✓
Alkalinity (mg/L)					✓			
TOC (mg/L)					✓			
DOC (mg/L)					✓			
Chemicals listed in §290.106(b) Inorganics Chemicals								✓
Chemicals listed in §290.107(b) Organic Chemicals								✓
Chemicals listed in §290.108(b)(1) and §290.108(b)(2) & 40 CFR §141.66(d)								✓
Chemicals listed in §290.118(b) Secondary Chemicals								✓
TTHM (ug/L)					✓			
HAA5 (ug/L)					✓			
Bromide (mg/L)					✓			
First Stage								
Flow rate (gpm)				✓				
Calculated flux rate (gfd) at measured temperature				✓				
Calculated net driving pressure (psi)				✓				
Calculated specific flux rate (gfd/psi) normalized to 20° C				✓				

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	Continuous, every			Once per day	Once per 7- days	Twice per week	Startup & End	Startup, every 30 days, & End
	5- min.	15- min.	4- hrs.					
Second Stage								
Flow rate (gpm)				✓				
Calculated flux rate (gfd) at measured temperature				✓				
Calculated net driving pressure (psi)				✓				
Calculated specific flux rate (gfd/psi) normalized to 20° C				✓				
Calculated %-Removal Based on Reported WWTP Effluent and RO Permeate Levels								
Nitrate removal (%)				✓				
TDS removal (%)				✓				
TOC removal (%)					✓			
DOC removal (%)					✓			
Removal of inorganics (%)								✓
Removal of organics (%)								✓
Removal of all radionuclides (%)								✓
Removal of secondary chemicals (%)								✓
TTHM removal (%)								✓
HAA5s removal (%)								✓
Bromide removal (%)								✓
RO Permeate Lagoon Effluent								
Flow rate (gpm)		✓						
Turbidity (NTU)			✓					
pH level			✓					
Temperature (°C)			✓					
Nitrate (mg/L)				✓				✓
Free ammonia level (mg/L)				✓				
Alkalinity (mg/L)					✓			
TOC (mg/L)					✓			
DOC (mg/L)					✓			
Raw Secondary Reservoir Water								
Flow rate (gpm)		✓						
Turbidity (NTU)		✓						
Temperature (°C)		✓						

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	Continuous, every			Once per day	Once per 7-days	Twice per week	Startup & End	Startup, every 30 days, & End
	5-min.	15-min.	4-hrs.					
<i>E. coli</i> enumeration	Frequency based on hydraulic detention time between Secondary Reservoir raw water pumps and splitter box effluent							✓
<i>Giardia</i> (cysts/L)	Frequency based on hydraulic detention time between Secondary Reservoir raw water pumps and splitter box effluent							✓
<i>Cryptosporidium</i> (oocysts/L)	Frequency based on hydraulic detention time between Secondary Reservoir raw water pumps and splitter box							✓
TDS (mg/L)				✓				
TSS (mg/L)				✓				
Daily flow rate (gpd)				✓				
Nitrate (mg/L)				✓				✓
Alkalinity (mg/L)					✓			
TOC (mg/L)					✓			
DOC (mg/L)					✓			
Chemical listed in §290.106(b) Inorganics Chemicals								✓
Chemicals listed in §290.107(b) Organic Chemicals								✓
Chemicals listed in §290.108(b)(1) and §290.108(b)(2) & 40 CFR §141.66(d)								✓
Chemicals listed in §290.118(b), Secondary Chemicals								✓
TTHM (mg/L)					✓			
HAA5 (mg/L)					✓			
Bromide (mg/L)					✓			
Begin Raw Secondary Reservoir Transmission Pipe: First DZ								
Flow rate (gpm)		✓						
Chlorine dioxide dosage (mg/L)			✓					
pH level			✓					

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	Continuous, every			Once per day	Once per 7-days	Twice per week	Startup & End	Startup, every 30 days, & End
	5-min.	15-min.	4-hrs.					
Temperature (°C)			✓					
Quantity of chlorine dioxide used (ppd)				✓				
Raw Secondary Reservoir Transmission Pipe: First DZ Monitoring Point								
Flow rate (gpm)		✓						
Chlorine dioxide residual (mg/L)			✓					
pH level			✓					
Temperature (°C)			✓					
Raw Secondary Reservoir Transmission Pipe: Second DZ Monitoring Point								
Flow rate (gpm)		✓						
Chlorine dioxide residual (mg/L)			✓					
pH level			✓					
Temperature (°C)			✓					
Raw Secondary Reservoir Transmission Pipe: Third DZ Monitoring Point								
Flow rate (gpm)		✓						
Chlorine dioxide residual (mg/L)			✓					
pH level			✓					
Temperature (°C)			✓					
Raw Secondary Reservoir Influent to Splitter Box								
Flow rate (gpm)		✓						
Turbidity (NTU)			✓					
Alkalinity (mg/L)				✓				
Nitrate (mg/L)				✓				✓
Splitter Box Effluent (blended RO Permeate & Secondary Reservoir Raw Water)								
Combined flow rate (gpm)			✓					
pH level			✓					
Turbidity (NTU)			✓					
<i>E. coli</i> enumeration	Frequency based on hydraulic detention time between Splitter box effluent and selected 2010 SWTP filter effluent							✓

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	Continuous, every			Once per day	Once per 7- days	Twice per week	Startup & End	Startup, every 30 days, & End
	5- min.	15- min.	4- hrs.					
<i>Giardia</i> (cysts/L)	Frequency based on hydraulic detention time between Splitter box effluent and selected 2010 SWTP filter effluent							✓
<i>Cryptosporidium</i> (oocysts/L)	Frequency based on hydraulic detention time between Splitter box effluent and selected 2010 SWTP filter effluent							✓
Nitrate				✓				✓
Water color				✓				
Odor (threshold odor number)				✓				
TOC (mg/L)					✓			
DOC (mg/L)					✓			
TTHM (mg/L)								✓
HAA5 (mg/L)								✓
Bromide (mg/L)								✓
Chemical listed in §290.106(b) Inorganics Chemicals								✓
Chemicals listed in §290.107(b) Organic Chemicals								✓
Chemicals listed in §290.108(b)(1) radionuclides								✓
Chemicals listed in §290.108(b)(2) & 40 CFR §141.66(d) manmade radionuclides								✓
Chemicals listed in §290.118(b) Secondary Chemicals								✓
Calculated % Change Based on Reported RO Permeate Effluent Levels								
Nitrate change as % reduction (-) or % increase (+)				✓				✓
TOC change as % reduction (-) or % increase (+)					✓			
TTHM change as % reduction (-) or % increase (+)								✓
HAA5 change as % reduction (-) or % increase (+)								✓
Bromide change as % reduction (-) or % increase (+)								✓
Begin Conventional 2010 SWTP DZ								
Flow rate (gpm)		✓						
Free chlorine feed pump dosage rate (mg/L)			✓					

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	Continuous, every			Once per day	Once per 7-days	Twice per week	Startup & End	Startup, every 30 days, & End
	5-min.	15-min.	4-hrs.					
Ammonia feed pump dosage rate (mg/L)			✓					
Total chlorine residual, after ammonia injection (mg/L)			✓					
Monochloramine residual, after ammonia injection (mg/L)			✓					
Free chlorine residual, after ammonia injection (mg/L)			✓					
Free ammonia residual, after ammonia injection (mg/L)			✓					
pH level at monochloramine residual monitoring tap			✓					
Water temperature at monochloramine monitoring tap (°C)			✓					
Quantity of chlorine used (ppd)				✓				
Quantity of ammonia used (ppd)				✓				
Conventional 2010 SWTP Coagulation, Flocculation & Clarification								
Flow rate (gpm)		✓						
Influent pH level			✓					
Influent alkalinity level (mg/L)			✓					
Influent water temperature (°C)			✓					
Coagulant feed pump dosage rate (mg/L)			✓					
Free chlorine feed pump dosage rate (mg/L)			✓					
Ammonia feed pump dosage rate (mg/L)			✓					
Calculated flocculator hydraulic detention time (mins.)			✓					
Lime feed rate (ppd)			✓					
Calculated clarifier surface overflow rate (gpm/sf)			✓					
Settled water turbidity (NTU)	Frequency based on hydraulic detention time of 2010 SWTP Clarifier							✓
Quantity of coagulant used (gpd)				✓				
Quantity of lime used (ppd)				✓				
Effluent TOC (mg/L)					✓			
Effluent DOC (mg/L)					✓			
2010 SWTP Recarbonation Basin								
Flow rate (gpm)		✓						
Carbon dioxide feed pump dosage rate (mg/L)				✓				
pH level				✓				
Quantity of carbon dioxide used (ppd)				✓				

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	5- min.	15- min.	4- hrs.					
Selected 2010 SWTP Gravity Media Filter								
Filtered water turbidity level (NTU)		✓						
Flow rate (gpm)			✓					
Calculated filter hydraulic loading rate (gpm/sf)			✓					
End Conventional 2010 SWTP DZ								
Flow rate		✓						
Total chlorine residual (mg/L)		✓						
Monochloramine residual (mg/L)		✓						
Free chlorine residual (mg/L)		✓						
Free ammonia level (mg/L)		✓						
pH level		✓						
Water temperature (°C)		✓						
Begin 2010 SWTP Clearwell DZ								
Free chlorine residual, pre-injection (mg/L)		✓						
Free chlorine feed pump dosage rate (mg/L)			✓					
Free ammonia residual, pre-injection (mg/L)			✓					
Ammonia feed pump dosage rate (mg/L)			✓					
Free chlorine residual, after ammonia injection (mg/L)			✓					
Free ammonia level, after ammonia injection (mg/L)			✓					
Total chlorine residual, after ammonia injection (mg/L)			✓					
Monochloramine residual, after ammonia injection (mg/L)			✓					
pH level at monochloramine residual monitoring tap			✓					
Water temperature at monochloramine residual monitoring tap (°C)			✓					
Quantity of chlorine used (ppd)				✓				
Quantity of ammonia used (ppd)				✓				
Fluoride Adjustment								
Fluoride level, pre-fluosilicic injection (mg/L)				✓				
Fluosilicic acid feed pump dosage rate (mg/L)				✓				
Quantity of fluosilicic acid used (gpd)				✓				

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	5- min.	15- min.	4- hrs.					
Finished Water								
Flow rate (gpm)		√						
Turbidity (NTU)		√*						
Turbidity (mNTU)		√*						
Nitrate (mg/L)		√						√
TDS (mg/L)		√						√
<i>E. coli</i> enumeration	Two sample sets with frequencies based on hydraulic detention times between: 1) WWTP effluent and 2010 Clearwell effluent 2) Secondary Reservoir raw water pumps and 2010 Clearwell effluent							√
<i>Giardia</i> (cysts/L)	Two sample sets with frequencies based on hydraulic detention times between: 1) WWTP effluent and 2010 Clearwell effluent 2) Secondary Reservoir raw water pumps and 2010 Clearwell effluent							√
<i>Cryptosporidium</i> (oocysts/L)	Two sample sets with frequencies based on hydraulic detention times between: 1) WWTP effluent and 2010 Clearwell effluent 2) Secondary Reservoir raw water pumps and 2010 Clearwell effluent							√
Daily quantity of water treated (gpd)				√				
Chlorine dioxide (mg/L)				√				
Chlorite (mg/L)				√				
Color (color units)				√				
Odor (threshold odor number)				√				

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	Continuous, every			Once per day	Once per 7-days	Twice per week	Startup & End	Startup, every 30 days, & End
	5-min.	15-min.	4-hrs.					
Fluoride (mg/L)				✓				✓
Alkalinity (mg/L)					✓			
Hardness as calcium carbonate (mg/L)					✓			
Calculated Langelier saturation index (LSI)					✓			
TTHM (ug/L)					✓			
HAA5 (ug/L)					✓			
Lead (mg/L)								✓
End 2010 Clearwell DZ								
Total chlorine residual (mg/L)		✓						
Monochloramine residual (mg/L)		✓						
Free chlorine residual (mg/L)		✓						
Free ammonia level (mg/L)		✓						
pH level		✓						
Water temperature (°C)		✓						

* Either a Hach Model 1720E (or TCEQ approved equivalent) or Model 660-FilterTrak turbidimeter may be used for the 15-minute finished water turbidity level monitoring and reporting.

Monitoring and Reporting of Operating Processes

The operating processes marked with a check (✓) for monitoring and reporting in Table B below have been included by the TCEQ for the full-scale verification testing of the proposed temporary DPR WTP. This will allow the TCEQ to have a more complete understanding of operating parameters that can interfere with the DPR WTP's ability to continuously produce a safe quality of water.

Table B

Procedures	Each Event
MF/RO Clarifier	
Blowdown duration (mins.)	✓
Quantity of water wasted (gals.)	✓
MF Membrane Pre-filter	
Selected Unit No. for testing	✓
Time since last cleaning (hrs.)	✓
Cleaning duration (mins.)	✓
Cleaning flow rate (gpm)	✓
Cleaning water source	✓
Quantity of water used (gals.)	✓
MF Membranes Unit	
Selected Unit No. for Testing	✓
1) Backwash (BW)	
BW frequency (mins.)	✓
BW duration (mins.)	✓
BW flow rate (gpm)	✓
BW supply pH	✓
BW supply temperature (° C)	✓
Quantity filtrate used (gals.)	✓
2) Chemical Maintenance-Clean (MC)	
MC frequency (mins.)	✓
MC solution flow rates (gpm)	✓
MC soak duration (mins.)	✓
MC air flow rate (cfs)	✓
MC air flow duration (mins.)	✓
MC chemicals used	✓
MC chemical concentrations (mg/L)	✓
MC solution temperature (° C)	✓
MC solution pH	✓
MC flush flow rate (gpm)	✓
MC flush duration (mins.)	✓
Total CEB duration (mins.)	✓
Quantity of filtrate used (gals.)	✓
Filtrate pH after MC	✓

Procedures	Each Event
3) Clean-In-Place (CIP)	
CIP frequency (mins.)	✓
CIP solution flow rate (gpm)	✓
CIP soak duration (mins.)	✓
CIP air flow rate (cfs)	✓
CIP air flow duration (mins.)	✓
CIP chemicals used	✓
CIP chemical concentrations (mg/L)	✓
CIP solution temperature (° C)	✓
CIP solution pH	✓
CIP flush flow rate (gpm)	✓
CIP flush duration (mins.)	✓
Total CIP duration (mins.)	✓
Quantity filtrate used (gals.)	✓
Filtrate pH after CIP	✓
CIP chemicals used	✓
CIP chemical concentrations (mg/L)	✓
CIP solution temperature (° C)	✓
CIP solution pH	✓
CIP flush flow rate (gpm)	✓
CIP flush duration (mins.)	✓
Total CIP duration (mins.)	✓
Quantity filtrate used (gals.)	✓
Filtrate pH after CIP	✓
4) All Direct Integrity Tests (DIT)	
Starting test pressure (psi)	✓
Duration (mins.)	✓
Ending test pressure (psi)	✓
Deterioration rate (psi/min)	✓
Calculated log removal value (LRV _{DIT})	✓
5) Repairs & Replacements	
Module No.	✓
Type of repair or replacement	✓
Date	✓

Monitoring and Reporting of Operating Processes

Procedures	Each Event
RO Membrane Pre-filter	
Selected Unit No. for Testing	✓
Duration between cleans (hrs.)	✓
Cleaning duration (mins.)	✓
Cleaning flow rate (gpm)	✓
Cleaning water source	✓
Quantity of water used (gals.)	✓
RO Membrane Unit	
Selected Unit No. for Testing	✓
1) Clean-In-Place (CIP)	
CIP frequency (hrs.)	✓
CIP solution flow rate (gpm)	✓
CIP soak duration (mins.)	✓
CIP air flow rate (cfs)	✓
Quantity of water used (gals.)	✓
2) RO Membrane Molecular DIT (if applicable)	
Molecular indicator selected	✓
Target log removal value (LRV)	✓
Required feed solution volume (gals.)	✓
Required dosage rate (mg/L)	✓
Duration for equilibrium to occur (mins.)	✓
Sample size (liters)	✓
No. of samples collected	✓
Sample frequencies (mins.)	✓
Feed sample concentrations (mg/L)	✓
Permeate sample concentrations (mg/L)	✓
All Calculated LRV _{DIT} Values	✓
Quantity of permeate wasted (gals.)	✓
3) Repairs & Replacements	
Stage No.	✓
Pressure Vessel No.	✓
Module No.	✓
Type of repair or replacement	✓
Date	✓

Procedures	Each Event
Conventional SW/TP Clarifier	
Blowdown duration (mins.)	✓
Quantity of water wasted (gals.)	✓
Conventional Media Filters	
Selected Filter No. for Testing	✓
BW trigger (time, loss-of-head, turbidity, other)	✓
Filter run time (hrs.)	✓
BW duration (mins.)	✓
BW flow rate (gpm/sf)	✓
Quantity of filtered water used (gals.)	✓
Filter-to-waste duration (mins.)	✓
Filter ripening duration (hrs.)	✓
Unit filter run volumes (gals./day)	✓

Unregulated Contaminants of Concern

Tables D and E contain are currently unregulated chemical and microbiological contaminants of concern that the TCEQ recommends the system monitor for during the full-scale verification testing.

For monitoring of unregulated contaminants — Table D: Microbials and Table E: Chemicals—the system should identify the analytical methods that they wish to use, and propose those to the TCEQ. If you have any questions concerning this enclosure, please contact Ms. Alicia Diehl by email at Alicia.Diehl@tceq.texas.gov or by telephone at (210) 403-4053.

Table D: Microbials

MICROBIALS		Analytical Methods ¹	Regulated
Viruses²			
*Enterovirus		1615	UCMR ³
*Norovirus			
Rotavirus		1	No ²
Poliovirus		1	No ²
Echoviruses		1	No ²
Coxsackie viruses group A and B		1	No ²
Adenovirus		1	No ²
Hepatitis A		1	No ²
Protozoans			
Naegleria fowleri		4	No
Cyclospora		4	No
Microsporidia (fungus)		4	No
Bacteria			
Enterococci		1600, 1106	No
Salmonella (and / or Shigella, Campylobacter, Pseudomonas ⁵)		1200	No
Aeromonas		1605	UCMR ¹
Heterotrophic plate count (indicator)		9215	No

* Highly recommended for sampling

1 Method listed is an EPA method unless otherwise noted. List of methods is not exhaustive, but is included for reference only. If a method is not listed, the City will need to research and propose a method to TCEQ.

2 Viruses are regulated as a group through treatment technique requirements at treatment plants for the EPA's Surface Water Treatment Rules and Ground Water Rule

3 Unregulated Contaminant Monitoring Rule (UCMR) 3. Regulations cover distribution levels and removal requirements. Regulatory monitoring required, but not an individual health-based standard set.

4 Methods are in development.

Unregulated Contaminants of Concern

Table E: Chemicals

CHEMICALS		Method ¹	Regulated
Disinfection byproducts			
*Nitroso-dimethylamine (NDMA)		521	UCMR3 ³
*Nitroso-pyrolidine (NPYR)			
Organic chemicals			
* Pharmaceutical indicators: 17- α -ethynylestradiol (ethinyl estradiol), 16- α -hydroxyestradiol (estrinol), equilin, estrone, testosterone, 4-androstene-3,17-dione		539	UCMR3 ³
* Chemicals of human origin: Perfluorooctanesulfonic sulfonate (PFOS), perfluorooctanoic acid (PFOA) perfluorononanoic acid (PFNA) perfluorohexanesulfonic acid (PFHxS) perfluoroheptanoic acid (PFHpA) perfluorobutanesulfonic acid (PFBS)		537	UCMR3 ³
*Sucralose		2	No
1,4 dioxane		522	No
Caffeine		1694	No
N,N-Diethyl-meta-toluamide (DEET)		633	No
Gemfibrozil		1694	No
Iopromide		1694	No
Inorganic chemicals			
Perchlorate ⁴		314	UCMR2 ³

* Highly recommended for sampling.

- 1 Method listed is an EPA method unless otherwise noted. List of methods is not exhaustive, but is included for reference only.
- 2 Acceptable methods exist but have not yet been approved by the EPA. A PWS should propose the method they plan to use.
- 3 Regulatory monitoring required, but not a health-based standard set.
- 4 The EPA has indicated that a maximum contaminant level will be promulgated for perchlorate. EPA will be working with stakeholders to develop a maximum contaminant level.