

City of Wichita Falls - DPR Verification Protocol
Cypress Water Treatment Plant MF/RO Lab Analysis

Date: 1-26-14

			12 M	1 AM	2 AM	3 AM	4 AM	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 N	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM
TCEQ-4J	RO Flow Control Vault	Total Alk			127				122				118				120				121				124	
		Temperature			15.6				16.2				9.7				6.7				6.8				2.2	
TCEQ-5J	RO Clarifier Mix Zone	Total Cl ₂			1.84				1.16				1.2				1.2				1.2				1.2	
		Mono-Cl ₂			.86				.64				.67				.60				.64				.82	
		Free Cl ₂			0				0				0				0				0				0	
		Free NH ₃			4.7				4.2				5.0				1.8				2.7				3.1	
		pH			6.7				6.7				6.8				6.9				6.9				6.8	
		Temperature			14.6				11.4				10.4				10.9				12.7				10.7	
TCEQ-6J	RO Settled Water	Turbidity	1.7		1.7		1.7		1.8		1.5		1.5		1.3		1.4		1.5		1.5		1.6		1.8	
		pH			6.8				6.8				6.7				6.6				6.8				7.1	
TCEQ-8J	MF Feed Trough	Total Cl ₂			1.3				1.1				1.2				1.0				1.0				1.6	
		Mono-Cl ₂			.65				.56				.69				.40				.56				.47	
		Free Cl ₂			0				0				0				0				0				0	
		Free NH ₃			3.3				4.8				5.7				2.8				2.7				4.5	
		pH			7.1				7.1				6.9				7.0				6.9				6.9	
		Temperature			14.4				12.4				9.9				11.3				12.8				13.5	
TCEQ-10J	MF Filtrate	SDI													122											
		Total Alk													121											
		SDI													123											
TCEQ-13J	RO SDI Sample Tap	Mono-Cl ₂			.70								.63								.47					
		Total Cl ₂			0				0				0				0				0				0	
		Free Cl ₂			0				0				0				0				0				0	
		SDI			1.5																					

Operator Initials:

Morning Shift:

ELV/WD

Day Shift:

CC

Evening Shift:

MM/RK

City of Wichita Falls - DPR Verification Protocol Cypress Water Treatment Plant 2010 Lab Analysis

Date: 1-26-14

			12 M	1 AM	2 AM	3 AM	4 AM	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 N	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM
TCEQ-37J	Filter Effluent	Fluoride																			.41					
TCEQ-38J	2010 Clearwell	Total Cl ₂		3.9				3.5				3.3				3.5				3.4				3.5		
		Mono Cl ₂		3.4				3.2				3.3				3.3				1.4				3.2		
		Free Cl ₂		0				0				0				0				0				0		
		Free NH ₃		.31				.03				.19				.11				.11				.16		
		pH		9.4				9.3				9.1				9.0				9.1				9.0		
		Temperature		11.4				6.9				8.9				8.3				9.9				10.6		
TCEQ-39J	2010 Clearwell Effluent	Fluoride		.80																						
		Total Alk		52																						
		Total Hard.		61																						
		ClO ₂		.20																						
		Mono Cl ₂		3.7								3.2								2.7						
TCEQ-40J	2010 Simulated CT	Mono Cl ₂		3.6								3.3								3.3						
		pH		8.8								9.0								8.9						
		Temperature		12.0								12.1								13.9						

2010 Clearwell Effluent sample is to be collected in 1 or 2 L container. It will be stored in a water bath for 215 minutes and then tested for monochloramine residual, pH and temperature. This will be your "2010 Simulated CT".

→ Simulated detention time

Comments:

Operator Initials:

Morning Shift:

BO

Day Shift:

TW/CC

Evening Shift:

mm/RK

City of Wichita Falls - DPR Verification Protocol
Cypress Water Treatment Plant 2010 Lab Analysis

Date: 1-26-14

			12 M	1 AM	2 AM	3 AM	4 AM	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 N	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM
TCEQ-23J	Secondary Reservoir	Total Alk														236										
		pH														8.6										
		Temperature														8.5										
TCEQ-25J	ClO ₂ D1	ClO ₂		.57				.46				.49				.45				.50				.51		
		pH		8.5				8.5				8.5				8.5				8.5				8.6		
		Temperature		8.5				9.5				8.9				7.3				8.4				4.8		
TCEQ-26J	ClO ₂ D2	ClO ₂		.52				.42				.46				.59				.42				.28		
		pH		8.6				8.7				8.6				8.6				8.6				8.6		
		Temperature		8.6				9.1				8.7				8.2				7.4				5.2		
TCEQ-27J	ClO ₂ D3	ClO ₂		.17				.29				.23				.19				.13				.26		
		pH		8.7				8.4				8.6				8.8				8.5				8.7		
		Temperature		9.8				6.9				6.0				6.2				6.7				8.4		
		Turbidity		13.8				13.7				13.6				13.4				14.5				16.6		
		Total Alk																								
TCEQ-28J & TCEQ 30J	Splitter Box	Turbidity		7.7				8.7				9.1				9.4				10.2				9.5		
		pH		—				—				8.6				8.6				8.6				8.6		
		Temperature		—				—				8.6				8.5				—				—		
		Total Cl ₂		3.5				2.2				2.5				2.9				2.8				3.2		
		Mono-Cl ₂		3.1				2.0				2.1				2.8				2.8				2.8		
		Free Cl ₂		0				0				0				0				0				0		
		Free NH ₃		.18				.35				.27				.16				.01				.07		
		pH		7.5				8.0				8.4				8.1				7.9				8.0		
		Temperature		12.1				7.7				8.9				9.6				8.6				7.6		
TCEQ-31J	2010 Flume	Total Alk		102				102				139			99				94.1				91			
TCEQ-32J	2010 Settled	Turbidity		.75		.72		1.2		1.1		1.0		1.1	1.0		1.0		1.0		1.0		.50		1.62	
TCEQ-33J	2010 Filter	pH																					8.9			

Operator Initials:

Morning Shift:

ERV CD WD

Day Shift:

TW/CL

Evening Shift:

MM/RK

City of Wichita Falls - DPR Verification Protocol
Cypress Water Treatment Plant MF/RO Lab Analysis

Date: 1-26-14

		12 M	1 AM	2 AM	3 AM	4 AM	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 N	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM
TCEQ-16J	RO Feed	pH		6.8				6.8				6.4				6.3				7.0				6.9	
		Temperature		14.5				13.6				15.0				13.4				14.1				13.1	
		Conductivity		146				1450				1521				1539				1543				1540	
		Nitrate		✓				✓				✓				✓				✓				✓	
		pH		7.0																					
		Total Alk		127																					
		Total Hard		13.3				10.2																	
		SDI		.83																					
TCEQ-17J	RO 1st St.	Temperature		14.0																					
TCEQ-18J	RO 2nd St.	Temperature		14.0																					
TCEQ-19J	RO Total Conc.	Free NH ₃																				27.5			
		pH																				7.5			
		Turbidity																				2.8			
		Conductivity																				809			
		Temperature																				13.8			
TCEQ-20J	RO Total Permeate	pH		5.8				5.8				5.6				5.4				5.6				5.4	
		Temperature		13.9				14.0				13.3				13.1				13.6				13.2	
		Total Alk																		14					
TCEQ-22J	Lagoon Effluent	Turbidity		8.3				2.0				2.8				8.3				5.9				2.8	
		pH		6.9				6.6				7.1				6.7				6.6				6.8	
		Temperature		16.6				8.8				9.7				10.2				11.7				9.6	
		Free NH ₃														.07									

Comments: _____

Operator Initials: _____

Morning Shift: ERV

Day Shift: W

Evening Shift: mm/rk

City of Wichita Falls
Water Purification Laboratory
DAILY ANALYSIS

Date: 01/17/14

	Raw Water	Head-quarters	Cypress Tap	Jasper Tap
Physical Properties				
pH	8.43	8.27	8.97	8.77
Temperature (°C)			12.8	8.1
TDS (ppm)	432	424	441	452
TSS (ppm)	14.0	14.0	0.3	0.3
Conductivity (LLS/cm)	851	1053	816	835
Color				
TON				

Hardness/Alkalinity				
Total Hardness (ppm)	175	206	111	123
Ca Hardness (ppm)	178	125	100	59
Mg Hardness (ppm)	237	845	51	64
Langelier Index				
Total Alkalinity (ppm)	182	83	88	96
Phenol Alkalinity (ppm)	1	2	0	0
Carbonates (ppm)	3	4	0	0
Bicarbonates (ppm)	179	78	88	96

Cations (ppm)				
Ammonia - N				
Ammonium - N				
Sodium				
Potassium				
Magnesium				
Calcium				
Iron				
Copper				
Manganese				
Silica				
Anions (ppm)				
Fluoride				
Chloride				
Bromide				
Nitrite - N				
Nitrate - N				
OrthoPhosphate				
Sulfate				
Sulfide				

Disinfectant Residuals (ppm)				
Total Chlorine		2.93	3.90	
Free Chlorine				
Microbiological (cfu/mL)				
HPC				
Actinomycetes				

TTHM's (ppb)				
Chloroform				
Bromodichloromethane				
Dibromochloromethane				
Bromoform				
Total THM's				
Disinfection By-Products				
DOC (ppm)				mg/L
TOC (ppm)	8.88	11.43	7.05	6.705
UV254 Absorb (per cm)				
UV254 Transm (%)				
SUVA				
Chlorate (ppm)				
Chlorite (ppm)				

Radiologicals (pCi/L)				
Gross α/β emitters				

* Cypress is off.

12-3-13
Site Visit

4. d

Cypress WTP Reverse Osmosis Report

Date on bottom

RESET
PRINT
Test

Microfiltration System										0.000	0.000	0.000	0.000	0.000
Cell A	Cell B	Cell C	Cell D	Cell E	Cell F	Cell G	Cell H	Cell I	Cell J	0.000	0.000	0.000	0.000	0.000
State	100	100	100	100	100	100	100	100	100	0.000	0.000	0.000	0.000	0.000
Run Time	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	0.000	0.000	0.000	0.000	0.000
Max Laser NTU	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Post PDT NTU	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Start PSI	17.62	17.96	17.70	17.70	18.09	18.12	18.12	18.12	18.12	0.000	0.000	0.000	0.000	0.000
PSI Drop	0.56	0.46	0.58	0.58	0.46	0.42	0.42	0.42	0.42	0.000	0.000	0.000	0.000	0.000
PDT Time	23:22	23:22	23:22	23:22	23:22	23:22	23:22	23:22	23:22	0.000	0.000	0.000	0.000	0.000
PDT Date	01/26/14	01/26/14	01/26/14	01/26/14	01/26/14	01/26/14	01/26/14	01/26/14	01/26/14	0.000	0.000	0.000	0.000	0.000
Production	0	0	769534	362534	1265171	165000	14.15	14.15	14.15	0.000	0.000	0.000	0.000	0.000
Backwash	0	0	118800	46200	165000	14.15	14.15	14.15	14.15	0.000	0.000	0.000	0.000	0.000
Flux (gpd)	0.00	0.00	14.11	14.42	14.42	14.15	14.15	14.15	14.15	0.000	0.000	0.000	0.000	0.000
TMP (psi)	0.00	0.00	9.61	1.14	1.14	2.79	2.79	2.79	2.79	0.000	0.000	0.000	0.000	0.000

0.116

0.162

gld

Feed Water Temp	14.82
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Reverse Osmosis System										Skid #1	Skid #2	Skid #3	Skid #4	Skid #5	Skid #6
State	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Run Time	16:52	00:00	00:00	04:52	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00
Stage 1 DP	57.5	0.0	0.0	27.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Stage 2 DP	30.8	0.0	0.0	51.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Permeate Flow	1.63	0.00	0.00	2.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Concentrate Flow	0.55	0.00	0.00	1.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Winters

HQRPS Level	10.31	RO Raw Total	0.000
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Brine Discharge	0.945
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RO Chemicals	Ferric	Sodium Hydroxide	Scale Inhibitor	Sulfuric Acid
Gallons	8535	6558	498	650
Pounds	38437	72200	4984	9952

Totalizers	287 East	North Beverly	287 West
MGD	3.54605	38.63548	35.84287

Reset

452.94	937.41	528.60
669.92	1137.99	1113.11
58.333	1165.01	1523.94
55875	204.167	208.333
197402	197402	188325

Kickapoo Totalizer	49.566
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Cypress WTP Reverse Osmosis Report

Silevisit
2a.

Date: 1/26/2014

Microfiltration Daily Max NTU Report

	Cell # 1	Cell # 2	Cell # 3	Cell # 4	Cell # 5
Max Value	0	0	0.061	0.306	0.035
"Confirmation" Value	0	0	0	0	0.019
2nd Max Value	0	0	0.024	0.09	0.03
"Confirmation" Value	0	0	0.023	0	0.02
3rd Max Value	0	0	0.024	0.054	0.029
"Confirmation" Value	0	0	0.023	0.031	0.02
4th Max Value	0	0	0.024	0.039	0.029
"Confirmation" Value	0	0	0.023	0	0.02
5th Max Value	0	0	0.024	0.039	0.028
Confirmation Value	0	0	0.023	0	0.02

Data extracted from: C:\Program Files\National Instruments\Lookout 5.1\2014\jan\26\allcells.csv

Enclosure F1: CT STUDY

FOR PUBLIC WATER SYSTEMS THAT ARE USING SURFACE WATER SOURCES
OR GROUND WATER SOURCES UNDER THE INFLUENCE OF SURFACE WATER (cont.)
CT Calculator Worksheet

PUBLIC WATER
SYSTEM NAME:

City of Wichita Falls

PLANT NAME
OR NUMBER:

Temporary CT for DPR Full-Scale
Verification Test - RR WWTP Source

PWS ID No.:

2430001

Date:

August 29, 2013

1-28-14

DISINFECTION PROCESS PARAMETERS									
APPROVED CT STUDY PARAMETERS					PERFORMANCE STANDARDS				
Parameters	Disinfection Zones					Log Inactivations			
	D1	D2	D3	D4	D5	Giardia lamblia Cysts		Viruses	
Flow Rate (MGD)	7.500	7.500	3.308	10.000	10.000	1.0		5.0	
T ₁₀ (minutes)	357.0	223.2	5.6	67.1	7.9				

DISINFECTION PROCESS DATA									
INDIVIDUAL DISINFECTION ZONES									
Disinfectant	C (mg/L)	Flow (MGD)	Temp (°C)	pH	CT _{CALC}	Giardia CT _{REQD}	Virus CT _{REQD}	Giardia Log	Inact Ratio
CLA D1	1.3	2.800	11.2	6.8	1243.0	572.4	1696.0	2.17	3.66
CLA D2	0.9	2.800	10.4	6.5	520.2	590.8	1792.7	0.88	1.45
CLA D3	0.7	2.800	11.7	6.0	4.6	560.9	1638.2	0.01	0.01
CLA D4	3.0	4.000	8.1	9.1	503.4	643.7	2102.5	0.78	1.20
CLA D5	3.3	4.000	10.5	8.7	64.8	588.5	1780.3	0.11	0.18
Certificate No. and Grade:								6.97	11.50
								2.30	

SUBMITTED BY:

Date:

TCEQ - (05-01-13)

DISINFECTION PROCESS PARAMETERS									
APPROVED CT STUDY PARAMETERS					PERFORMANCE STANDARDS				
Parameters	Disinfection Zones					Log Inactivations			
	D6	D7	D8	D9	D10	Giardia lamblia Cysts		Viruses	
Flow Rate (MGD)	10.000					1.0		5.0	
T ₁₀ (minutes)	215.4								

CT STUDY

DISINFECTION PROCESS DATA									
INDIVIDUAL DISINFECTION ZONES									
Disinfectant	C (mg/L)	Flow (MGD)	Temp (°C)	pH	CT _{CALC}	Giardia CT _{REQD}	Virus CT _{REQD}	Giardia Log	Inact Ratio
CLA D6	3.3	4.000	10.5	8.7	1777.4	588.5	1780.3	3.02	4.99
CLA D7									
CLA D8									
CLA D9									
CLA D10									

SUBMITTED BY:

Date:

TCEQ - (05-01-13)

CT STUDY

Enclosure F2: Temporary CT STUDY

FOR PUBLIC WATER SYSTEMS THAT ARE USING SURFACE WATER SOURCES
OR GROUND WATER SOURCES UNDER THE INFLUENCE OF SURFACE WATER (cont.)
CT Calculator Worksheet

PUBLIC WATER
SYSTEM NAME:

City of Wichita Falls

PLANT NAME
OR NUMBER:

Temporary CT for DPR Full-Scale Verification
Test - Secondary Reservoir Raw Surface Water

PWS ID No.:

2430001

Date:

Approved: 1-28-14

DISINFECTION PROCESS PARAMETERS									
APPROVED CT STUDY PARAMETERS					PERFORMANCE STANDARDS				
Parameters	Disinfection Zones					Log Inactivations			
	D1	D2	D3	D4	D5	Giardia lamblia Cysts			
Flow Rate (MGD)	5.000	5.000	5.000	10.000	10.000	0.5			
T ₁₀ (minutes)	8.3	10.4	116.1	67.1	7.9	2.0			

DISINFECTION PROCESS DATA													
INDIVIDUAL DISINFECTION ZONES													
Disinfectant	C (mg/L)	Flow (MGD)	Temp (°C)	pH	CT _{calc}	Giardia CT _{reqd}	Virus CT _{reqd}	Giardia Log	Virus Log	Giardia Log	Virus Log	Inact. Ratio	
CLO2 D1	0.5	2.000	8.7	8.3	10.4	4.0	4.4	1.31	4.68				
CLO2 D2	0.4	2.000	8.3	8.6	10.4	4.0	4.6	1.29	4.56				
CLO2 D3	0.4	2.000	6.9	8.3	116.1	4.2	5.0	13.81	46.30	20.32	63.29	31.65	
CLA D4	3.0	4.000	8.1	9.1	503.4	321.9	591.3	0.78	1.46				
CLA D5	3.3	4.000	10.5	8.7	64.8	294.3	585.3	0.11	0.22				

Certificate No.
and Grade:

SUBMITTED BY:

Date:

TCEQ - (06-01-09)

CT STUDY

DISINFECTION PROCESS PARAMETERS									
APPROVED CT STUDY PARAMETERS					PERFORMANCE STANDARDS				
Parameters	Disinfection Zones					Log Inactivations			
	D6	D7	D8	D9	D10	Giardia lamblia Cysts			
Flow Rate (MGD)	10.000					0.5			
T ₁₀ (minutes)	215.4					2.0			

DISINFECTION PROCESS DATA													
INDIVIDUAL DISINFECTION ZONES													
Disinfectant	C (mg/L)	Flow (MGD)	Temp (°C)	pH	CT _{calc}	Giardia CT _{reqd}	Virus CT _{reqd}	Giardia Log	Virus Log	Giardia Log	Virus Log	Inact. Ratio	
CLA D6	3.3	4.000	10.5	8.7	1777.4	294.3	585.3	3.02	6.07				
CLA D7													
CLA D8													
CLA D9													
CLA D10													
										SEE	PAGE	1	

Certificate No.
and Grade:

SUBMITTED BY:

Date:

TCEQ - (06-01-09)

CT STUDY