TCEQ – 42J

End Temporary Blended DZ 6

Site Description:

This sample is collected at the Conventional 2010 SWTP Clearwell's transfer pumps, and a simulated detention time for the 10 MG GST is performed. The analysis that was performed at this site is used for the calculation of CT credit using Monochloramines and transfer pump flow. Data was collected every 8 hours and a CT value was calculated every 8 hours.

Protocol:

TCEQ – 42J: End Temporary Blended DZ 6 (at Cypress high service pump's discharge header)									
	5-min	15-min	2-hr	8-hr	1/day	1/day or Δ	2/week	1/week	S/30/E
Temperature				X					
pH level				X					
Monochloramine residual				X					

Summary Table:

TCEQ – 42J: End Temporary Blended DZ 6

	Monochloramine Res.	pH	Temperature
Units	ppm		˚C
Min	2.50	7.3	9.1
Max	3.90	9.4	16.4
Avg	3.28	8.4	12.4
95th %	3.80	9.0	15.9
n	131	131	131

Conclusions:

The TCEQ was of the opinion that the log removal for Giardia and Cryptosporidium by CT calculation could not be attained without the addition of the credit that would have been obtained had the 10 MG Ground Storage Tank been used in the Full Scale Verification test. Therefore, a 10 MG GST simulation was constructed.

Analysis of Monochloramine at the end of the 10 MG GST simulator indicated that the water was stable and capable of retaining a Monochloramine residual for CT calculation.

All of the 8-hour calculations of log removal (found in Appendix J), showed that the DPR was fully capable of attaining the required log removal credit for Viruses, Giardia and Cryptosporidium.

TCEQ-42J: End Temporary Blended DZ 6

(at Cypress high service pumps' discharge header)

8 hour data

		TCEQ-42J		
Date	Time	Monochloramine Res. (ppm)	pH	Temperature (°C)
1/27/2014	1:00	3.6	8.8	12
	9:00	3.3	9	12.1
	17:00	3.3	8.9	13.9
1/28/2014	1:00	3.3	8.8	11.7
	9:00	3.3	8.7	10.5
	17:00	3.3	8.4	12.3
1/29/2014	1:00	3.2	8.2	13
	9:00	3.4	8.6	12.4
	17:00	3.1	8.1	15.3
1/30/2014	1:00	3.4	8.2	14.4
	9:00	3.3	8.1	11.9
	17:00	3.3	8	12.2
1/31/2014	1:00	3.6	7.7	12.2
	9:00	3.2	7.8	12.4
	17:00	3.3	7.9	15.4
2/1/2014	1:00	3.1	7.6	11.7
	9:00	3.2	7.7	11.1
	17:00	3.1	7.9	13
2/2/2014	1:00	2.8	7.9	9.9
	9:00	3.3	8	11.4
	17:00	3	7.7	14.2
2/3/2014	1:00	3.2	7.9	10.7
	9:00	3.1	7.8	11.6
	17:00	2.9	7.9	10.7
2/4/2014	1:00	3.1	7.8	10.5
	9:00	3	8	11
	17:00	3.1	7.9	13.1
2/5/2014	1:00	3.2	8.1	10.1
	9:00	3	8	10.3
	17:00	2.9	7.5	12.7
2/6/2014	1:00	2.9	7.3	9.9
	9:00	3.2	7.5	10.2
	17:00	3.2	7.4	14.1
2/7/2014	1:00	3.2	7.8	10.9

TCEQ-42J: End Temporary Blended DZ 6

(at Cypress high service pumps' discharge header)

8 hour data

		TCEQ-42J		
Date	Time	Monochloramine Res. (ppm)	pH	Temperature (°C)
	9:00	3.4	7.5	10.9
	17:00	3.1	7.4	14.1
2/8/2014	1:00	2.9	7.6	11.4
	9:00	2.9	8.1	10.3
	17:00	2.9	7.7	13.4
2/9/2014	1:00	2.9	7.6	10.7
	9:00	2.9	7.8	10.5
	17:00	3	7.9	13.6
2/10/2014	1:00	3.1	8	10.1
	9:00	2.9	8.1	10.1
	17:00	2.9	8.1	10.1
2/11/2014	1:00	3	9	10.6
	9:00	3.2	8.9	9.7
	17:00	3	8	12.2
2/12/2014	1:00	3	8.2	10.2
	9:00	3.3	7.9	9.1
	17:00	3	7.9	13
2/13/2014	1:00	3	8.2	10.2
	9:00	3.3	7.9	9.1
	17:00	3	7.9	13
2/14/2014	1:00	2.9	8.3	10.5
	9:00	2.8	8.2	11.1
	17:00	2.9	8.5	15.6
2/15/2014	1:00	2.9	8.1	11
	9:00	2.8	8.3	10.4
	17:00	2.9	8.4	15.3
2/16/2014	1:00	2.8	7.8	15.9
	9:00	2.8	8.3	11.4
	17:00	2.8	8.5	16
2/17/2014	1:00	2.7	9.1	13
	9:00	2.5	9	11.2
	17:00	2.7	8.9	11.6
2/18/2014	1:00	2.7	8	10.7
	9:00	2.9	8.8	10.1

TCEQ-42J: End Temporary Blended DZ 6

(at Cypress high service pumps' discharge header)

8 hour data

		TCEQ-42J		
Date	Time	Monochloramine Res. (ppm)	pH	Temperature (°C)
	17:00	3.1	8.9	12.5
2/19/2014	1:00	3	8.8	10.8
	9:00	2.9	8.8	10.5
	17:00	3.2	8.8	14.9
2/20/2014	1:00	2.9	8.8	11.2
	9:00	2.8	8.9	10.8
	17:00	2.8	8.8	15.8
2/21/2014	1:00	2.8	8.9	12.3
	9:00	2.8	9	11.4
	17:00	2.8	8.9	15.6
2/22/2014	1:00	3.5	8.9	15.1
	9:00	3.7	8.8	11.9
	17:00	3.8	9.4	16.2
2/23/2014	1:00	3.7	8.9	12.8
	9:00	3.5	8.8	12
	17:00	3.6	8.7	15.5
2/24/2014	1:00	3.8	8.7	12.7
	9:00	3.8	8.6	12.8
	17:00	3.8	8.6	16
2/25/2014	1:00	3.9	8.6	12.7
	9:00	3.7	8.9	13.1
	17:00	3.7	8.7	12.9
2/26/2014	1:00	3.6	8.6	12.2
	9:00	3.6	8.6	11.7
	17:00	3.9	7.7	15.4
2/27/2014	1:00	3.8	7.9	12.3
	9:00	3.8	8.2	12.6
	17:00	3.9	7.9	16.4
2/28/2014	1:00	3.9	8.2	12.4
	9:00	3.8	8.3	11.5
	17:00	3.4	8.3	14.3
3/1/2014	1:00	3.9	8.3	16.1
	9:00	3.7	8.5	12.9
	17:00	3.6	8.7	13

TCEQ-42J: End Temporary Blended DZ 6

(at Cypress high service pumps' discharge header)

8 hour data

		TCEQ-42J		
Date	Time	Monochloramine Res. (ppm)	pH	Temperature (°C)
3/2/2014	1:00	3.4	9	12.7
	9:00	3.4	8.8	12.6
	17:00	3.6	8.6	13.8
3/3/2014	1:00	3.7	8.5	14.3
	9:00	3.8	8.8	12.1
	17:00	3.7	8.7	12.6
3/4/2014	1:00	3.6	8.6	12.3
	9:00	3.6	8.4	12.7
	17:00	3.5	8.5	13.2
3/5/2014	1:00	3.7	8.5	13.8
	9:00	3.6	8.6	12
	17:00	3.6	8.7	12.8
3/6/2014	1:00	3.6	9	11.7
	9:00	3.4	8.8	12.7
	17:00	3.4	8.5	14.6
3/7/2014	1:00	3.5	8.9	11.8
	9:00	3.6	9	11.7
	17:00	3.4	8.9	15.7
3/8/2014	1:00	3.4	9.1	11.8
	9:00	3.4	9.1	12
	17:00	3.5	8.8	13.3
3/9/2014	1:00	3.6	9	11.6
	9:00	3.5	8.8	12
	17:00	3.5	8.8	15.9
3/10/2014	1:00	3.4	8.7	12.5
	9:00	3.5	8.9	12.3
	17:00	3.4	8.9	12.7
3/11/2014	1:00	3.6	8.8	11.8
	9:00	3.6	8.9	15.7

Secondary Reservoir CT Forms

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: ~~August 28, 2013~~ 1-27-14 6-30-7

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	9.5	8.5	9.5	3.9	4.2	1.24	4.55			
CLO2 *D2*	0.4	2.000	9.1	8.7	10.9	3.9	4.3	1.39	5.06			
CLO2 *D3*	0.2	2.000	9.8	8.7	49.3	3.8	4.1	6.46	24.06	13.50	42.65	21.32
CLA *D4*	3.2	4.000	6.9	9.3	537.0	335.7	751.3	0.80	1.43			RV
CLA *D5*	3.7	4.000	7.3	8.9	72.7	331.1	730.7	0.11	0.20			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.6	4.000	12.0	8.8	1939.0	277.0	527.5	3.50	7.35			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: BO ERV Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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: [redacted] 3:45 PM
1-27-14

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	7.3	8.5	9.3	4.2	4.9	1.12	3.83			
CLO2 *D2*	0.5	2.000	8.7	8.6	11.9	4.0	4.4	1.50	5.39			
CLO2 *D3*	0.2	2.000	6.2	8.8	55.1	4.3	5.3	6.42	20.95	13.23	38.76	19.38
CLA *D4*	3.3	4.000	8.3	9.0	553.8	319.6	681.8	0.87	1.62			(M)
CLA *D5*	3.2	4.000	8.3	9.0	62.8	319.6	681.8	0.10	0.18			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	12.1	9.0	1777.4	275.9	523.9	3.22	6.79			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: TAW Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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: [redacted] 1-27-14 9:15pm

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	1.950	8.4	8.5	10.6	4.0	4.5	1.33	4.70			
CLO2 *D2*	0.3	1.950	5.2	8.6	7.4	4.4	5.6	0.84	2.64			
CLO2 *D3*	0.1	1.950	6.7	8.5	38.7	4.2	5.1	4.57	15.22	10.70	31.19	15.60
CLA *D4*	1.4	4.000	9.9	9.1	234.9	301.2	610.2	0.39	0.77			
CLA *D5*	2.7	4.000	9.8	9.1	53.0	302.3	614.4	0.09	0.17			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	13.9	8.9	1777.4	255.2	462.4	3.48	7.69			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: mm/RK Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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: ~~August 29, 2013~~ 1-28-14 7.°UU A

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	6.4	8.5	11.2	4.3	5.2	1.31	4.31			
CLO2 *D2*	0.6	2.000	6.7	8.6	15.8	4.2	5.1	1.87	6.22			
CLO2 *D3*	0.2	2.000	4.2	8.5	63.8	5.6	6.3	5.67	20.29	12.87	38.95	19.48
CLA *D4*	3.0	4.000	6.9	9.1	503.4	335.7	751.3	0.75	1.34			
CLA *D5*	3.3	4.000	7.9	8.7	64.8	324.2	700.9	0.10	0.18			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	11.7	8.8	1777.4	280.5	538.6	3.17	6.60			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: BO ERV ID Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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: ~~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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	691.3	0.78	1.46			
CLA *D5*	3.3	4.000	10.5	8.7	64.8	294.3	585.3	0.11	0.22			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: TW/ED Certificate No. and Grade: _____ Date: _____

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: ~~August 29, 2013~~ 1-28-14 9:15pm

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	6.1	8.5	10.2	4.3	5.3	1.18	3.83			
CLO2 *D2*	0.4	2.000	5.6	8.6	10.4	4.4	5.5	1.18	3.78			
CLO2 *D3*	0.1	2.000	7.3	8.6	40.6	4.2	4.9	4.90	16.66	11.47	32.99	16.50
CLA *D4*	3.2	4.000	9.0	9.0	537.0	311.5	649.5	0.86	1.65			
CLA *D5*	3.1	4.000	9.1	9.0	60.9	310.4	645.0	0.10	0.19			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	12.3	8.4	1777.4	273.6	516.7	3.25	6.88			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: mm/TJ Certificate No. and Grade: _____ Date: _____

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: ~~August 29, 2013~~ 1-29-14 6-10-14

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.4	2.000	7.4	8.5	7.9	4.1	4.8	0.95	3.25			
CLO2 *D2*	0.5	2.000	5.9	8.6	11.9	4.3	5.4	1.37	4.44			
CLO2 *D3*	0.3	2.000	5.9	8.6	81.3	4.3	5.4	9.37	30.24	15.79	46.49	23.25
CLA *D4*	2.9	4.000	7.9	9.1	486.7	324.2	700.9	0.75	1.39			(V)
CLA *D5*	3.3	4.000	6.7	8.7	64.8	338.0	761.7	0.10	0.17			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.2	4.000	13.0	8.2	1723.5	265.5	492.2	3.25	7.00			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: BD SD SY Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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: ~~August 29, 2013~~ 1-29-14

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	8.5	8.4	11.0	4.0	4.5	1.38	4.90			
CLO2 *D2*	0.4	2.000	9.6	8.5	9.8	3.8	4.2	1.28	4.74			
CLO2 *D3*	0.5	2.000	7.7	8.4	145.1	4.1	4.7	17.71	61.18	24.67	79.74	39.87
CLA *D4*	3.1	4.000	8.3	8.7	520.2	319.6	681.8	0.81	1.53			(M)
CLA *D5*	3.5	4.000	12.4	8.6	68.7	272.4	513.1	0.13	0.27			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.4	4.000	12.4	8.6	1831.2	272.4	513.1	3.36	7.14			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: TW Certificate No. and Grade: _____ Date: _____

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: ~~August 29, 2013~~ 1-29-14 9:20am

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.4	2.000	7.3	8.4	8.5	4.2	4.9	1.02	3.49			
CLO2 *D2*	0.5	2.000	8.5	8.4 ~~6.4~~	12.2	4.0	4.5	1.53	5.43			
CLO2 *D3*	0.2	2.000	8.5	8.0	55.1	4.0	4.5	6.91	24.57	13.94	43.42	21.71
CLA *D4*	3.1	4.000	10.3	8.9	520.2	296.6	593.5	0.88	1.75			
CLA *D5*	3.4	4.000	10.3	8.9	66.8	296.6	593.5	0.11	0.22			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.1	4.000	15.3	8.1	1669.7	239.1	419.7	3.49	7.96			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: my/TD/CV Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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: ~~August 29, 2013~~ 1-30-14 6:30 M

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.6	2.000	9.1	8.5	12.6	3.9	4.3	1.62	5.87			
CLO2 *D2*	0.6	2.000	8.1	8.5	14.3	4.0	4.6	1.76	6.18			
CLO2 *D3*	0.2	2.000	8.1	8.6	55.1	4.0	4.6	6.82	23.90	14.83	46.00	23.00
CLA *D4*	3.2	4.000	9.0	8.6	537.0	311.5	649.5	0.86	1.65			
CLA *D5*	3.2	4.000	9.3	8.6	62.8	308.1	636.1	0.10	0.20			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.4	4.000	14.4	8.2	1831.2	249.4	446.7	3.67	8.20			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: JY BL Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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: 1/30/14 ~~August 29, 2013~~

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.4	2.000	9.3	8.4	8.9	3.9	4.2	1.15	4.20			
CLO2 *D2*	0.4	2.000	11.2	8.4	10.1	3.6	3.7	1.39	5.43			
CLO2 *D3*	0.5	2.000	8.2	8.5	148.0	4.0	4.6	18.36	64.60	25.04	82.74	41.37
CLA *D4*	3.1	4.000	8.7	8.5	520.2	315.0	663.1	0.83	1.57			(M)
CLA *D5*	3.3	4.000	11.9	8.1	64.8	278.2	531.2	0.12	0.24			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	11.9	8.1	1777.4	278.2	531.2	3.20	6.69			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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: ~~August 29, 2013~~ 1-30-14 9:15am

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.4	2.000	9.3	8.5	8.5	3.9	4.2	1.09	4.00			
CLO2 *D2*	0.3	2.000	8.7	8.5	8.8	4.0	4.4	1.11	3.98			
CLO2 *D3*	0.2	2.000	9.4	8.4	46.4	3.9	4.2	6.00	22.03	12.61	39.37	19.68
CLA *D4*	3.3	4.000	13.1	8.3	553.8	264.4	488.8	1.05	2.27			
CLA *D5*	3.2	4.000	13.1	8.3	62.8	264.4	488.8	0.12	0.26			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	12.2	8.0	1777.4	274.7	520.3	3.24	6.83			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: MM/TJ/CD Certificate No. and Grade: _____ Date: _____

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: 1/31/14 ~~August 29, 2013~~ 6:15 am

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	8.1	8.5	10.8	4.0	4.6	1.33	4.67			
CLO2 *D2*	0.4	2.000	7.5	8.5	11.4	4.1	4.8	1.38	4.74			
CLO2 *D3*	0.2	2.000	9.1	8.4	55.1	3.9	4.3	7.05	25.62	14.34	44.50	22.25
CLA *D4*	3.4	4.000	9.1	8.6	570.6	310.4	645.0	0.92	1.77			
CLA *D5*	3.5	4.000	11.5	8.4	68.7	282.8	546.1	0.12	0.25			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.6	4.000	12.2	7.7	1939.0	274.7	520.3	3.53	7.45			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: JO JY BD Certificate No. and Grade: _____ Date: 1/31/14

TCEQ - (06-01-09) 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

PWS ID No.: 2430001

PLANT NAME OR NUMBER: Temporary CT for DPR Full-Scale Verification Test - Secondary Reservoir Raw Surface Water

Date: JANUARY 31, 2014 2:02 PM ~~August 29, 2013~~

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.8	2.000	8.8	8.5	15.8	4.0	4.4	1.99	7.17			
CLO2 *D2*	0.8	2.000	7.6	8.6	21.2	4.1	4.8	2.58	8.90			
CLO2 *D3*	0.2	2.000	7.1	8.5	58.0	4.2	4.9	6.95	23.47	15.70	48.26	24.13
CLA *D4*	3.2	4.000	10.2	8.6	537.0	297.7	597.6	0.90	1.80			(M)
CLA *D5*	3.2	4.000	10.2	8.6	62.8	297.7	597.6	0.11	0.21			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.2	4.000	12.4	7.8	1723.5	272.4	513.1	3.16	6.72			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: ID/TN/CC Certificate No. and Grade: _____ Date: _____

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: 1-31-14 ~~August 29, 2013~~ 9:15 pm

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	8.8	8.4	10.4	4.0	4.4	1.31	4.72			
CLO2 *D2*	0.4	2.000	8.0	8.4	10.4	4.1	4.6	1.28	4.46			
CLO2 *D3*	0.2	2.000	8.1	8.4	52.2	4.0	4.6	6.46	22.64	13.75	42.25	21.13
CLA *D4*	3.1	4.000	9.8	7.4	520.2	302.3	614.4	0.86	1.69			(M)
CLA *D5*	3.3	4.000	9.8	7.4	64.8	302.3	614.4	0.11	0.21			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	15.4	7.9	1777.4	237.9	416.8	3.74	8.53			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: CD / MM / WR Certificate No. and Grade: _____ Date: 1-31-14

TCEQ - (06-01-09) 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: ~~August 29, 2013~~ 2-1-14 7:15 AM

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.4	2.000	8.2	8.4	8.5	4.0	4.6	1.05	3.71			
CLO2 *D2*	0.4	2.000	7.9	8.5	11.1	4.1	4.7	1.37	4.76			
CLO2 *D3*	0.1	2.000	9.4	8.4	37.7	3.9	4.2	4.87	17.90	10.86	33.75	16.87
CLA *D4*	1.7	4.000	10.4	8.0	285.3	295.4	589.4	0.48	0.97			(V)
CLA *D5*	3.0	4.000	11.1	8.1	58.9	287.4	561.5	0.10	0.21			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.1	4.000	11.7	7.6	1669.7	280.5	538.6	2.98	6.20			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: JJ/JD Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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

3:15 pm

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: ~~August 29, 2013~~ 2/1/14

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.4	2.000	8.5	8.3	7.3	4.0	4.5	0.91	3.23			
CLO2 *D2*	0.3	2.000	8.3	8.5	8.8	4.0	4.6	1.10	3.87			
CLO2 *D3*	0.4	2.000	6.7	8.3	116.1	4.2	5.1	13.72	45.67	19.62	60.73	30.36
CLA *D4*	3.0	4.000	11.1	7.7	503.4	287.4	561.5	0.88	1.79			(M)
CLA *D5*	3.1	4.000	11.1	7.7	60.9	287.4	561.5	0.11	0.22			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.1	4.000	11.1	7.7	1669.7	287.4	561.5	2.91	5.95			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: TAW Certificate No. and Grade: _____ Date: _____

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: FEBRUARY 1st, 2014 9:33PM ~~August 29, 2013~~

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	6.8	8.4	10.6	4.2	5.0	1.25	4.19			
CLO2 *D2*	0.4	2.000	9.1	8.6	10.6	3.9	4.3	1.36	4.94			
CLO2 *D3*	0.2	2.000	7.3	8.8	60.9	4.2	4.9	7.34	24.99	14.02	42.69	21.34
CLA *D4*	3.0	4.000	9.3	8.4	503.4	308.1	636.1	0.82	1.58			(M)
CLA *D5*	3.3	4.000	9.3	8.4	64.8	308.1	636.1	0.11	0.20			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.1	4.000	13.0	7.9	1669.7	265.5	492.2	3.14	6.78			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: TN/WR/CD Certificate No. and Grade: _____ Date: _____

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: ~~August 29, 2013~~ 2-2-14 6:00 AM

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	7.7	8.5	10.4	4.1	4.7	1.27	4.37			
CLO2 *D2*	0.4	2.000	7.3	8.5	11.1	4.2	4.9	1.34	4.57			
CLO2 *D3*	0.2	2.000	5.7	8.5	49.3	4.4	5.4	5.65	18.11	11.66	33.58	16.79
CLA *D4*	3.2	4.000	6.6	8.9	537.0	339.1	767.0	0.79	1.40			(M)
CLA *D5*	3.1	4.000	9.4	8.0	60.9	306.9	631.7	0.10	0.19			

SUBMITTED BY: JY/JD/KQ

Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	2.8	4.000	9.9	7.9	1508.1	301.2	610.2	2.50	4.94			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: JY/JD/KQ

Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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: ~~August 29, 2013~~ 2-2-14 3:05 PM

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	8.0	8.6	10.4	4.1	4.6	1.28	4.46			
CLO2 *D2*	0.5	2.000	8.0	8.5	12.7	4.1	4.6	1.56	5.47			
CLO2 *D3*	0.3	2.000	5.6	8.4	90.0	4.4	5.5	10.28	32.79	17.22	51.04	25.52
CLA *D4*	3.2	4.000	8.7	8.5	537.0	315.0	663.1	0.85	1.62			
CLA *D5*	3.3	4.000	11.4	8.0	64.8	283.9	549.9	0.11	0.24			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	11.4	8.0	1777.4	283.9	549.9	3.13	6.46			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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: 2-2-14 ~~August 29, 2013~~

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.6	2.000	7.7	8.5	13.3	4.1	4.7	1.62	5.59			
CLO2 *D2*	0.4	2.000	6.8	8.5	9.8	4.2	5.0	1.17	3.90			
CLO2 *D3*	0.2	2.000	6.4	8.5	49.3	4.3	5.2	5.78	19.01	12.69	37.35	18.67
CLA *D4*	3.1	4.000	8.3	9.2	520.2	319.6	681.8	0.81	1.53			(6)
CLA *D5*	3.2	4.000	8.3	9.2	62.8	319.6	681.8	0.10	0.18			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.0	4.000	14.2	7.7	1615.8	251.7	452.9	3.21	7.13			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: WR / CD / SWI Certificate No. and Grade: _____ Date: 2-2-14

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: ~~August 29, 2013~~ 2-3-14 6-30-14

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	8.8	8.5	11.2	4.0	4.4	1.42	5.09			
CLO2 *D2*	0.4	2.000	6.7	8.6	11.4	4.2	5.1	1.35	4.48			
CLO2 *D3*	0.2	2.000	5.3	8.5	43.5	4.4	5.6	4.93	15.54	11.50	32.64	16.32
CLA *D4*	3.0	4.000	7.2	8.9	503.4	332.2	735.8	0.76	1.37			
CLA *D5*	3.0	4.000	9.2	8.2	58.9	309.2	640.5	0.10	0.18			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.2	4.000	10.7	7.9	1723.5	292.0	577.3	2.95	5.97			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: BD KQ ERV Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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: ~~August 29, 2013~~ 2-3-14 3:30PM

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.6	2.000	7.5	8.4	11.6	4.1	4.8	1.41	4.83			
CLO2 *D2*	0.5	2.000	6.4	8.5	12.2	4.3	5.2	1.43	4.69			
CLO2 *D3*	0.3	2.000	5.4	8.4	72.6	4.4	5.6	8.24	26.08	14.98	43.55	21.77
CLA *D4*	3.2	4.000	10.1	8.5	537.0	298.9	601.8	0.90	1.78			(M)
CLA *D5*	3.1	4.000	11.1	7.8	60.9	287.4	561.5	0.11	0.22			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.1	4.000	11.1	7.8	1669.7	287.4	561.5	2.91	5.95			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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: ~~August 29, 2013~~ 2-3-14 9:30am

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	7.6	8.5	10.4	4.1	4.8	1.26	4.34			
CLO2 *D2*	0.5	2.000	6.4	8.5	11.7	4.3	5.2	1.37	4.49			
CLO2 *D3*	0.2	2.000	7.3	8.4	55.1	4.2	4.9	6.64	22.61	12.85	38.58	19.29
CLA *D4*	3.0	4.000	8.9	8.9	503.4	312.7	654.0	0.81	1.54			(V)
CLA *D5*	3.1	4.000	8.9	8.9	60.9	312.7	654.0	0.10	0.19			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	2.9	4.000	10.7	7.9	1561.9	292.0	577.3	2.68	5.41			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: mm/TW/RK Certificate No. and Grade: _____ Date: _____

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: ~~August 29, 2013~~ 2-4-14 6:10Am

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	7.3	8.5	10.0	4.2	4.9	1.20	4.08			
CLO2 *D2*	0.4	2.000	7.0	8.5	9.6	4.2	5.0	1.14	3.85			
CLO2 *D3*	0.2	2.000	5.0	8.4	46.4	4.5	5.7	5.21	16.24	11.22	31.40	15.70
CLA *D4*	2.9	4.000	7.3	8.1	486.7	331.1	730.7	0.74	1.33			
CLA *D5*	2.9	4.000	10.4	8.1	57.0	295.4	589.4	0.10	0.19			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.1	4.000	10.5	7.8	1669.7	294.3	585.3	2.84	5.70			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: KQ / ERV / BD Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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: ~~August 29, 2013~~ 2-4-14 3:30PM

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	6.9	8.4	10.4	4.2	5.0	1.23	4.13			
CLO2 *D2*	0.4	2.000	6.9	8.5	10.4	4.2	5.0	1.23	4.13			
CLO2 *D3*	0.6	2.000	6.7	8.5	174.1	4.2	5.1	20.58	68.50	26.72	84.10	42.05
CLA *D4*	3.0	4.000	8.0	8.1	503.4	323.0	696.1	0.78	1.45			(V)
CLA *D5*	3.0	4.000	8.0	8.1	58.9	323.0	696.1	0.09	0.17			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.0	4.000	11.0	8.0	1615.8	288.5	565.4	2.80	5.72			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: R A/ ID Certificate No. and Grade: _____ Date: _____

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: ~~August 29, 2013~~ 9-4-14 9:30 pm

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	9.3	8.6	9.3	3.9	4.2	1.20	4.39			
CLO2 *D2*	0.4	2.000	8.5	8.6	11.1	4.0	4.5	1.40	4.97			
CLO2 *D3*	0.1	2.000	7.1	8.4	34.8	4.2	4.9	4.17	14.08	10.82	31.99	16.00
CLA *D4*	3.0	4.000	8.9	8.3	503.4	312.7	654.0	0.81	1.54			(V)
CLA *D5*	3.0	4.000	8.7	8.5	58.9	315.0	663.1	0.09	0.18			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.1	4.000	13.1	7.9	1669.7	264.4	488.8	3.16	6.83			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: MM/TW/ID/JO Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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: ~~August 29, 2013~~ 2-5-14 6:30 AM

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	6.6	8.5	11.2	4.2	5.1	1.32	4.37			
CLO2 *D2*	0.5	2.000	7.9	8.5	12.2	4.1	4.7	1.50	5.21			
CLO2 *D3*	0.2	2.000	5.4	8.2	58.0	4.4	5.6	6.59	20.87	13.13	37.63	18.81
CLA *D4*	3.1	4.000	5.9	8.4	520.2	347.2	805.2	0.75	1.29			(M)
CLA *D5*	3.2	4.000	6.5	8.5	62.8	340.3	772.4	0.09	0.16			

SUBMITTED BY: JY / JD / BD

Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.2	4.000	10.1	8.1	1723.5	298.9	601.8	2.88	5.73			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: JY / JD / BD

Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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: ~~August 29, 2013~~ 2-5-14 7:20 PM

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.4	2.000	7.0	8.4	7.5	4.2	5.0	0.89	3.00			
CLO2 *D2*	0.6	2.000	6.4	8.5	16.1	4.3	5.2	1.88	6.19			
CLO2 *D3*	0.2	2.000	6.0	8.4	46.4	4.3	5.3	5.37	17.40	11.68	33.49	16.75
CLA *D4*	2.9	4.000	6.9	8.6	486.7	335.7	751.3	0.72	1.30			(V)
CLA *D5*	3.1	4.000	6.9	8.6	60.9	335.7	751.3	0.09	0.16			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.0	4.000	10.3	8.0	1615.8	296.6	593.5	2.72	5.44			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: [signature] Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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: 2-5-14 ~~August 29, 2013~~ 8:45 PM

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	4.8	8.5	10.2	4.7	5.9	1.07	3.46			
CLO2 *D2*	0.4	2.000	5.7	8.5	11.4	4.4	5.4	1.31	4.18			
CLO2 *D3*	0.2	2.000	3.2	8.5	43.5	7.1	7.0	3.05	12.43	9.09	27.58	13.79
CLA *D4*	2.8	4.000	5.5	7.6	469.9	351.8	827.8	0.67	1.14			(6)
CLA *D5*	3.3	4.000	5.5	7.6	64.8	351.8	827.8	0.09	0.16			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	2.9	4.000	12.7	7.5	1561.9	269.0	502.6	2.90	6.22			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: mm / CW / JY Certificate No. and Grade: _____ Date: 2-5-14

TCEQ - (06-01-09) 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: 2/6/14 ~~August 29, 2013~~ 6:26am

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	5.6	8.5	10.4	4.4	5.5	1.18	3.78			
CLO2 *D2*	0.5	2.000	5.9	8.6	12.7	4.3	5.4	1.46	4.73			
CLO2 *D3*	0.2	2.000	5.4	8.6	55.1	4.4	5.6	6.26	19.82	12.29	34.79	17.39
CLA *D4*	2.9	4.000	5.7	8.1	486.7	349.5	816.4	0.70	1.19			(M)
CLA *D5*	3.2	4.000	5.6	7.4	62.8	350.6	822.1	0.09	0.15			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	2.9	4.000	9.9	7.3	1561.9	301.2	610.2	2.59	5.12			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: JO Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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: 2-6-14 ~~August 29, 2013~~ 3:20 PM

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.7	2.000	5.9	8.4	13.9	4.3	5.4	1.60	5.17			
CLO2 *D2*	0.6	2.000	5.5	8.5	16.6	4.4	5.5	1.89	6.00			
CLO2 *D3*	0.1	2.000	5.8	8.4	37.7	4.3	5.4	4.34	13.94	11.53	32.30	16.15
CLA *D4*	2.9	4.000	6.5	7.9	486.7	340.3	772.4	0.72	1.26			
CLA *D5*	3.1	4.000	6.5	7.9	60.9	340.3	772.4	0.09	0.16			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.2	4.000	10.2	7.5	1723.5	297.7	597.6	2.89	5.77			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: AA/ID Certificate No. and Grade: _____ Date: _____

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: 2-6-14 August 29, 2013 9:12 PM

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	5.2	8.4	10.4	4.4	5.6	1.17	3.67			
CLO2 *D2*	0.4	2.000	4.2	8.5	11.4	5.6	6.3	1.01	3.62			
CLO2 *D3*	0.2	2.000	3.9	8.6	63.8	6.1	6.5	5.25	19.63	11.68	36.02	18.01
CLA *D4*	2.9	4.000	7.6	6.1	486.7	327.6	715.7	0.74	1.36			(M)
CLA *D5*	3.3	4.000	7.6	6.1	64.8	327.6	715.7	0.10	0.18			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.2	4.000	14.1	7.4	1723.5	252.9	456.1	3.41	7.56			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: mm / cd / 54 Certificate No. and Grade: _____ Date: 2-6-14

TCEQ - (06-01-09) 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: 2/7/14 ~~August 29, 2013~~ 5:45 AM

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	6.9	8.5	10.0	4.2	5.0	1.18	3.97			
CLO2 *D2*	0.5	2.000	7.0	8.5	14.0	4.2	5.0	1.67	5.62			
CLO2 *D3*	0.2	2.000	4.6	8.4	58.0	5.0	6.0	5.77	19.33	12.42	36.37	18.18
CLA *D4*	3.2	4.000	4.8	8.0	537.0	370.9	877.2	0.72	1.22			
CLA *D5*	3.2	4.000	7.4	8.7	62.8	329.9	725.7	0.10	0.17			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.2	4.000	10.9	7.8	1723.5	289.7	569.3	2.98	6.05			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: JD BD Certificate No. and Grade: _____ Date: _____

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: ~~August 29, 2013~~ 2/7/14

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.4	2.000	6.1	8.5	8.3	4.3	5.3	0.96	3.13			
CLO2 *D2*	0.4	2.000	6.4	8.6	10.4	4.3	5.2	1.21	3.99			
CLO2 *D3*	0.2	2.000	4.8	8.4	66.8	4.7	5.9	7.06	22.77	12.96	37.22	18.61
CLA *D4*	2.8	4.000	5.3	7.8	469.9	354.1	839.4	0.66	1.12			(M)
CLA *D5*	3.2	4.000	5.3	7.8	62.8	354.1	839.4	0.09	0.15			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.2	4.000	10.9	7.5	1723.5	289.7	569.3	2.98	6.05			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: TW CC ID Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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: 2-7-14 ~~August 29, 2013~~ 9:03 PM

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.6	2.000	5.6	8.4	11.8	4.4	5.5	1.35	4.31			
CLO2 *D2*	0.5	2.000	4.6	8.5	12.2	5.0	6.0	1.21	4.06			
CLO2 *D3*	0.2	2.000	5.8	8.4	55.1	4.3	5.4	6.34	20.38	13.03	37.57	18.79
CLA *D4*	2.9	4.000	7.4	8.0	486.7	329.9	725.7	0.74	1.34			(M)
CLA *D5*	3.1	4.000	7.4	8.0	60.9	329.9	725.7	0.09	0.17			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.1	4.000	14.1	7.4	1669.7	252.9	456.1	3.30	7.32			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: MM / CD Certificate No. and Grade: _____ Date: 2-7-14

TCEQ - (06-01-09) 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: 2/8/14 ~~August 29, 2013~~ 5:23 pm

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.4	2.000	7.3	8.5	9.1	4.2	4.9	1.10	3.74			
CLO2 *D2*	0.5	2.000	6.5	8.5	11.7	4.3	5.2	1.37	4.52			
CLO2 *D3*	0.2	2.000	5.2	8.4	66.8	4.4	5.6	7.53	23.66	13.53	38.98	19.49
CLA *D4*	2.8	4.000	6.3	8.0	469.9	342.6	783.2	0.69	1.20			
CLA *D5*	2.8	4.000	8.8	7.7	55.0	313.8	658.6	0.09	0.17			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	2.9	4.000	11.4	7.6	1561.9	283.9	549.9	2.75	5.68			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: JD BD Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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: 2/8/14 ~~August 29, 2013~~

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	7.0	8.5	10.0	4.2	5.0	1.19	4.00			
CLO2 *D2*	0.4	2.000	7.3	8.4	9.3	4.2	4.9	1.12	3.83			
CLO2 *D3*	0.4	2.000	5.7	8.4	101.6	4.4	5.4	11.64	37.28	17.35	51.76	25.88
CLA *D4*	2.7	4.000	7.3	8.1	453.1	331.1	730.7	0.68	1.24			(V)
CLA *D5*	2.8	4.000	7.3	8.1	55.0	331.1	730.7	0.08	0.15			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	2.9	4.000	10.3	7.6	1561.9	296.6	593.5	2.63	5.26			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: TW - TD Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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: 2-8-14 ~~August 29, 2013~~ 9:22 PM

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	7.9	8.4	9.3	4.1	4.7	1.15	3.99			
CLO2 *D2*	0.5	2.000	6.9	8.5	12.7	4.2	5.0	1.51	5.06			
CLO2 *D3*	0.1	2.000	9.3	8.4	31.9	3.9	4.2	4.11	15.04	10.73	32.50	16.25
CLA *D4*	3.2	4.000	9.3	7.9	537.0	308.1	636.1	0.87	1.69			(A)
CLA *D5*	3.2	4.000	9.3	7.9	62.8	308.1	636.1	0.10	0.20			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	2.9	4.000	13.4	7.7	1561.9	260.9	478.8	2.99	6.52			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: WR/cd Certificate No. and Grade: _____ Date: 2-8-13

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: ~~August 29, 2013~~ 2-9-14 6:00 AM

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.6	2.000	7.1	8.4	11.4	4.2	4.9	1.36	4.61			
CLO2 *D2*	0.5	2.000	6.3	8.5	11.9	4.3	5.2	1.39	4.56			
CLO2 *D3*	0.2	2.000	3.9	8.4	69.7	6.1	6.5	5.72	21.41	11.91	37.33	18.66
CLA *D4*	2.7	4.000	6.6	8.3	453.1	339.1	767.0	0.67	1.18			
CLA *D5*	2.8	4.000	7.8	8.0	55.0	325.3	705.8	0.08	0.16			

SUBMITTED BY: JY/JP/KQ

Certificate No. and Grade: _____ Date: _____

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					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	2.9	4.000	10.7	7.6	1561.9	292.0	577.3	2.68	5.41			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: JY/JD/KQ

Certificate No. and Grade: _____ Date: _____

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: 2-9-14 ~~August 29, 2013~~ 3:20 PM

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.4	2.700	9.8	8.5	6.3	3.8	4.1	0.82	3.07			
CLO2 *D2*	0.5	2.700	6.9	8.6	9.0	4.2	5.0	1.07	3.60			
CLO2 *D3*	0.3	2.700	5.1	8.4	60.2	4.4	5.7	6.77	21.19	12.14	34.68	17.34
CLA *D4*	2.9	4.000	7.2	8.3	486.7	332.2	735.8	0.73	1.32			60
CLA *D5*	2.9	4.000	7.2	8.3	57.0	332.2	735.8	0.09	0.15			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	2.9	4.000	10.5	7.8	1561.9	294.3	585.3	2.65	5.34			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: [signature] Certificate No. and Grade: _____ Date: _____

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: ~~August 29, 2013~~ 2-9-14 3:20 PM

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	1.2	2.000	8.0	6.8	24.9	4.1	4.6	3.07	10.71			
CLO2 *D2*	1.0	2.000	11.3	6.9	25.9	3.6	3.7	3.58	14.02			
CLO2 *D3*	0.9	2.000	11.7	7.0	261.2	3.6	3.6	36.64	145.31	46.76	176.85	88.42
CLA *D4*	2.9	4.000	7.2	8.3	486.7	332.2	735.8	0.73	1.32			(M)
CLA *D5*	2.9	4.000	7.2	8.3	57.0	332.2	735.8	0.09	0.15			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	2.9	4.000	10.5	7.8	1561.9	294.3	585.3	2.65	5.34			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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: 2-9-14 ~~August 29, 2013~~ 9:35 PM

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	7.3	8.5	10.2	4.2	4.9	1.22	4.17			
CLO2 *D2*	0.4	2.000	7.0	8.6	11.4	4.2	5.0	1.36	4.58			
CLO2 *D3*	0.1	2.000	6.5	8.4	31.9	4.3	5.2	3.75	12.39	10.35	29.63	14.82
CLA *D4*	3.1	4.000	7.9	8.4	520.2	324.2	700.9	0.80	1.48			(W)
CLA *D5*	3.1	4.000	7.9	8.4	60.9	324.2	700.9	0.09	0.17			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.0	4.000	13.6	7.9	1615.8	258.6	472.2	3.12	6.84			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: WR / CD Certificate No. and Grade: _____ Date: 2-9-14

TCEQ - (06-01-09) 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: ~~August 29, 2013~~ 2-10-14 6:30 A

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	6.9	8.8	9.7	4.2	5.0	1.16	3.89			
CLO2 *D2*	0.4	2.000	6.7	8.5	11.1	4.2	5.1	1.32	4.38			
CLO2 *D3*	0.2	2.000	3.8	8.5	69.7	6.2	6.6	5.58	21.18	11.61	36.31	18.15
CLA *D4*	3.1	4.000	4.5	8.3	520.2	390.9	906.2	0.67	1.15			
CLA *D5*	2.8	4.000	8.7	8.5	55.0	315.0	663.1	0.09	0.17			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.1	4.000	10.1	8.0	1669.7	298.9	601.8	2.79	5.55			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: BD ERV KQ Certificate No. and Grade: _____ Date: _____

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: ~~August 29, 2013~~ 2-10-14 3:30 PM

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.6	2.000	5.6	8.4	12.0	4.4	5.5	1.37	4.38			
CLO2 *D2*	0.6	2.000	6.7	8.5	14.5	4.2	5.1	1.72	5.71			
CLO2 *D3*	0.2	2.000	3.3	8.5	69.7	7.0	6.9	4.98	20.09	11.53	36.90	18.45
CLA *D4*	3.0	4.000	7.3	8.5	503.4	331.1	730.7	0.76	1.38			
CLA *D5*	2.9	4.000	7.3	8.5	57.0	331.1	730.7	0.09	0.16			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	2.9	4.000	10.1	8.1	1561.9	298.9	601.8	2.61	5.19			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: [signature] Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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: ~~August 29, 2013~~ 9:26pm 2.10-14

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	6.1	8.5	10.2	4.3	5.3	1.18	3.83			
CLO2 *D2*	0.5	2.000	5.3	8.5	13.0	4.4	5.6	1.47	4.63			
CLO2 *D3*	0.3	2.000	6.4	8.4	95.8	4.3	5.2	11.22	36.90	17.31	52.10	26.05
CLA *D4*	2.9	4.000	7.9	8.7	486.7	324.2	700.9	0.75	1.39			(M)
CLA *D5*	2.9	4.000	7.6	8.7	57.0	327.6	715.7	0.09	0.16			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	2.9	4.000	10.1	8.1	1561.9	298.9	601.8	2.61	5.19			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: MM/JW/RK Certificate No. and Grade: _____ Date: _____

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

PWS ID No.: 2430001

PLANT NAME OR NUMBER: Temporary CT for DPR Full-Scale Verification Test - Secondary Reservoir Raw Surface Water

Date: 2-11-14 ~~August 29, 2013~~ 6:05 pm

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	6.4	8.5	10.0	4.3	5.2	1.17	3.83			
CLO2 *D2*	0.5	2.000	6.3	8.5	11.9	4.3	5.2	1.39	4.56			
CLO2 *D3*	0.2	2.000	5.7	8.4	69.7	4.4	5.4	7.98	25.56	14.08	40.85	20.43
CLA *D4*	2.9	4.000	5.3	8.3	486.7	354.1	839.4	0.69	1.16			(W)
CLA *D5*	3.0	4.000	8.4	8.6	58.9	318.4	677.1	0.09	0.17			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.0	4.000	10.6	9.0	1615.8	293.1	581.3	2.76	5.56			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: ERV BD KQ Certificate No. and Grade: _____ Date: 2-11-14

TCEQ - (06-01-09) 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: ~~August 29, 2013~~ 2-11-14 3:35 PM

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	0.6	2.000	5.4	8.5	13.3	4.4	5.6	1.51	4.77			
CLO2 D2	0.5	2.000	4.2	8.5	13.7	5.6	6.3	1.22	4.37			
CLO2 D3	0.2	2.000	5.7	8.3	52.2	4.4	5.4	5.99	19.17	12.37	35.38	17.69
CLA D4	2.8	4.000	7.8	8.4	469.9	325.3	705.8	0.72	1.33			(6)
CLA D5	3.0	4.000	7.8	8.4	58.9	325.3	705.8	0.09	0.17			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	3.2	4.000	9.7	8.9	1723.5	303.5	618.7	2.84	5.57			
CLA D7												
CLA D8										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: GG FD Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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: 2-11-14 ~~August 29, 2013~~

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	5.5	8.5	10.0	4.4	5.5	1.13	3.60			
CLO2 *D2*	0.5	2.000	5.7	8.5	13.0	4.4	5.4	1.48	4.76			
CLO2 *D3*	0.4	2.000	6.0	8.4	116.1	4.3	5.3	13.43	43.50	19.79	59.55	29.77
CLA *D4*	2.8	4.000	6.8	8.4	469.9	336.8	756.5	0.70	1.24			(M)
CLA *D5*	3.1	4.000	12.2	8.0	60.9	274.7	520.3	0.11	0.23			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.0	4.000	12.2	8.0	1615.8	274.7	520.3	2.94	6.21			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: TAW Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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: 2/12/14 ~~August 29, 2013~~ 5:25 pm

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	7.4	8.5	9.5	4.1	4.8	1.15	3.94			
CLO2 *D2*	0.4	2.000	7.4	8.5	11.1	4.1	4.8	1.35	4.60			
CLO2 *D3*	0.3	2.000	3.8	8.3	92.9	6.2	6.6	7.45	28.24	13.44	43.59	21.79
CLA *D4*	2.8	4.000	6.6	8.3	469.9	339.1	767.0	0.69	1.23			(M)
CLA *D5*	2.8	4.000	10.0	7.8	55.0	300.0	606.0	0.09	0.18			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.0	4.000	10.2	8.2	1615.8	297.7	597.6	2.71	5.41			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: JD BV Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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: ~~August 29, 2013~~ 2-12-14 3:15 PM

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.6	2.000	6.0	8.4	11.4	4.3	5.3	1.32	4.27			
CLO2 *D2*	0.6	2.000	4.8	8.5	16.6	4.7	5.9	1.75	5.66			
CLO2 *D3*	1.2	2.000	6.5	7.9	348.3	4.3	5.2	40.91	135.11	47.38	151.45	75.73
CLA *D4*	2.9	4.000	6.5	8.3	486.7	340.3	772.4	0.72	1.26			(V)
CLA *D5*	2.8	4.000	6.5	8.3	55.0	340.3	772.4	0.08	0.14			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.0	4.000	9.1	7.9	1615.8	310.4	645.0	2.60	5.01			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: LGJ/ID Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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

PWS ID No.: 2430001

PLANT NAME OR NUMBER: Temporary CT for DPR Full-Scale Verification Test - Secondary Reservoir Raw Surface Water

Date: ~~August 29, 2013~~ 2/12/14 10:00PM

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	7.2	8.5	10.4	4.2	4.9	1.24	4.22			
CLO2 *D2*	0.5	2.000	6.3	8.5	11.9	4.3	5.2	1.39	4.56			
CLO2 *D3*	0.2	2.000	5.8	8.6	60.9	4.3	5.4	7.01	22.52	13.51	39.40	19.70
CLA *D4*	2.8	4.000	8.0	8.1	469.9	323.0	696.1	0.73	1.35			(V)
CLA *D5*	3.1	4.000	8.0	8.1	60.9	323.0	696.1	0.09	0.17			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.0	4.000	13.0	7.9	1615.8	265.5	492.2	3.04	6.57			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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: August 29, 2013 10:00pm 9/12/14

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.3	2.000	9.4	8.5	6.4	3.9	4.2	0.83	3.05			
CLO2 *D2*	0.6	2.000	6.9	8.5	14.3	4.2	5.0	1.70	5.68			
CLO2 *D3*	0.3	2.000	6.9	8.4	81.3	4.2	5.0	9.67	32.41	16.16	49.49	24.74
CLA *D4*	3.1	4.000	8.9	8.3	520.2	312.7	654.0	0.83	1.59			(M)
CLA *D5*	3.1	4.000	8.9	8.3	60.9	312.7	654.0	0.10	0.19			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.0	4.000	13.0	7.9	1615.8	265.5	492.2	3.04	6.57			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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: 2/13/14 ~~August 29, 2013~~ 6:20 AM

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	6.5	8.5	10.0	4.3	5.2	1.17	3.86			
CLO2 *D2*	0.5	2.000	6.9	8.5	12.2	4.2	5.0	1.45	4.86			
CLO2 *D3*	0.2	2.000	5.2	8.3	66.8	4.4	5.6	7.53	23.66	13.63	39.23	19.62
CLA *D4*	2.9	4.000	7.3	8.3	486.7	331.1	730.7	0.74	1.33			(M)
CLA *D5*	2.9	4.000	9.6	7.8	57.0	304.6	623.0	0.09	0.18			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	2.9	4.000	10.5	8.1	1561.9	294.3	585.3	2.65	5.34			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: JD / JY Certificate No. and Grade: _____ Date: _____

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: ~~August 29, 2013~~ 2-13-14 7:25 PM

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.4	2.000	6.1	8.4	8.3	4.3	5.3	0.96	3.13			
CLO2 *D2*	0.5	2.000	5.5	8.5	11.9	4.4	5.5	1.36	4.31			
CLO2 *D3*	0.3	2.000	7.2	8.4	78.4	4.2	4.9	9.41	31.91	15.57	47.10	23.55
CLA *D4*	3.1	4.000	8.1	8.5	520.2	321.9	691.3	0.81	1.51			
CLA *D5*	3.0	4.000	8.1	8.5	58.9	321.9	691.3	0.09	0.17			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.1	4.000	11.4	7.8	1669.7	283.9	549.9	2.94	6.07			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: KH/JD Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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: 2-13-14 ~~August 29, 2013~~ 9:14 PM

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.4	2.000	9.2	8.4	8.7	3.9	4.3	1.12	4.07			
CLO2 *D2*	0.4	2.000	8.4	8.5	10.4	4.0	4.5	1.29	4.59			
CLO2 *D3*	0.2	2.000	8.3	8.5	58.0	4.0	4.6	7.23	25.51	13.77	43.24	21.62
CLA *D4*	2.9	4.000	8.0	8.3	486.7	323.0	696.1	0.75	1.40			(M)
CLA *D5*	3.1	4.000	8.0	8.3	60.9	323.0	696.1	0.09	0.17			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	2.9	4.000	15.4	7.8	1561.9	237.9	416.8	3.28	7.50			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: MM/CD Certificate No. and Grade: _____ Date: 2-13-14

TCEQ - (06-01-09) 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: 2/14/14 ~~August 29, 2013~~ 6:15am

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	0.4	2.000	7.9	8.5	8.1	4.1	4.7	0.99	3.46			
CLO2 D2	0.4	2.000	7.1	8.5	10.1	4.2	4.9	1.21	4.09			
CLO2 D3	0.7	2.000	7.0	8.4	191.5	4.2	5.0	22.86	76.93	28.57	91.47	45.73
CLA D4	2.8	4.000	9.1	8.9	469.9	310.4	645.0	0.76	1.46			(M)
CLA D5	2.9	4.000	10.9	8.3	57.0	289.7	569.3	0.10	0.20			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	2.9	4.000	10.5	8.3	1561.9	294.3	585.3	2.65	5.34			
CLA D7												
CLA D8										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: JD / JY / BD Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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: 2-14-14 ~~August 29, 2013~~

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.6	2.000	6.9	8.5	13.1	4.2	5.0	1.55	5.21			
CLO2 *D2*	0.5	2.000	6.8	8.5	12.2	4.2	5.0	1.44	4.82			
CLO2 *D3*	0.3	2.000	8.7	8.7	87.1	4.0	4.4	10.98	39.34	17.51	56.53	28.26
CLA *D4*	2.9	4.000	9.9	8.8	486.7	301.2	610.2	0.81	1.60			(V)
CLA *D5*	2.9	4.000	9.9	8.8	57.0	301.2	610.2	0.09	0.19			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	2.8	4.000	11.1	8.2	1508.1	287.4	561.5	2.62	5.37			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: TW ID CC Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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: 2-14-14 ~~August 29, 2013~~ 9:16 PM

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	0.6	2.000	9.1	8.4	11.4	3.9	4.3	1.46	5.30			
CLO2 D2	0.4	2.000	7.9	8.5	10.6	4.1	4.7	1.31	4.54			
CLO2 D3	0.3	2.000	9.3	8.5	75.5	3.9	4.2	9.71	35.54	16.78	55.06	27.53
CLA D4	2.9	4.000	12.1	8.6	486.7	275.9	523.9	0.88	1.86			(M)
CLA D5	3.0	4.000	12.1	8.6	58.9	275.9	523.9	0.11	0.22			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	2.9	4.000	15.6	8.5	1561.9	235.6	411.0	3.31	7.60			
CLA D7												
CLA D8										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: MM / CD Certificate No. and Grade: _____ Date: 2-14-14

TCEQ - (06-01-09) 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: 2/15/14 ~~August 29, 2013~~ 6:10 AM

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	8.2	8.4	10.2	4.0	4.6	1.26	4.43			
CLO2 *D2*	0.5	2.000	7.8	8.5	13.5	4.1	4.7	1.65	5.72			
CLO2 *D3*	0.3	2.000	7.3	8.4	95.8	4.2	4.9	11.54	39.27	18.05	56.70	28.35
CLA *D4*	2.9	4.000	9.4	8.7	486.7	306.9	631.7	0.79	1.54			(M)
CLA *D5*	2.8	4.000	12.0	8.3	55.0	277.0	527.5	0.10	0.21			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	2.9	4.000	11.0	8.1	1561.9	288.5	565.4	2.71	5.52			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: JS 1/31/14 BD Certificate No. and Grade: _____ Date: _____

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: 2/15/14 ~~August 29, 2013~~

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.6	2.000	7.7	8.3	12.4	4.1	4.7	1.52	5.24			
CLO2 *D2*	0.2	2.000	7.5	8.4	4.4	4.1	4.8	0.53	1.83			
CLO2 *D3*	0.2	2.000	9.1	8.4	49.3	3.9	4.3	6.31	22.92	11.75	36.76	18.38
CLA *D4*	2.7	4.000	9.7	8.7	453.1	303.5	618.7	0.75	1.46			(M)
CLA *D5*	2.8	4.000	9.7	8.7	55.0	303.5	618.7	0.09	0.18			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	2.8	4.000	10.4	8.3	1508.1	295.4	589.4	2.55	5.12			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: TW ID MS Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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: 2-15-14 ~~August 29, 2013~~ 9:10 PM

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.4	2.000	7.9	8.4	9.1	4.1	4.7	1.12	3.90			
CLO2 *D2*	0.5	2.000	9.3	8.4	12.2	3.9	4.2	1.57	5.74			
CLO2 *D3*	0.2	2.000	10.9	8.4	46.4	3.7	3.8	6.33	24.44	13.24	43.54	21.77
CLA *D4*	2.8	4.000	12.1	8.5	469.9	275.9	523.9	0.85	1.79			(W)
CLA *D5*	3.0	4.000	12.1	8.5	58.9	275.9	523.9	0.11	0.22			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	2.9	4.000	15.3	8.4	1561.9	239.1	419.7	3.27	7.44			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: TN / CO / WR Certificate No. and Grade: _____ Date: 2-15-14

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: 2/16/14 ~~August 29, 2013~~ 5:58 am

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	10.0	8.4	9.7	3.8	4.0	1.29	4.82			
CLO2 *D2*	0.4	2.000	9.4	8.5	10.6	3.9	4.2	1.37	5.04			
CLO2 *D3*	0.2	2.000	8.9	8.5	69.7	3.9	4.4	8.85	31.91	15.70	51.27	25.63
CLA *D4*	2.8	4.000	11.9	8.5	469.9	278.2	531.2	0.84	1.77			
CLA *D5*	2.9	4.000	13.3	8.8	57.0	262.1	482.1	0.11	0.24			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	2.8	4.000	15.9	7.8	1508.1	232.2	402.6	3.25	7.49			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: JD / JY Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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: ~~August 29, 2013~~ 2-16-14 2:25 PM

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.6	2.000	10.5	8.3	12.4	3.7	3.9	1.67	6.37			
CLO2 *D2*	0.5	2.000	9.4	8.3	11.7	3.9	4.2	1.51	5.53			
CLO2 *D3*	0.2	2.000	10.3	8.3	52.2	3.8	4.0	6.96	26.37	13.72	45.66	22.83
CLA *D4*	2.8	4.000	11.3	9.0	469.9	285.1	553.8	0.82	1.70			(V)
CLA *D5*	2.9	4.000	11.3	9.0	57.0	285.1	553.8	0.10	0.21			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	2.8	4.000	11.4	8.3	1508.1	283.9	549.9	2.66	5.48			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: ZAI NM Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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: 2-16-14 ~~August 29, 2013~~ 10:30 PM

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	11.6	8.4	10.2	3.6	3.6	1.42	5.61			
CLO2 *D2*	0.4	2.000	11.6	8.4	11.1	3.6	3.6	1.56	6.16			
CLO2 *D3*	0.2	2.000	12.2	8.2	52.2	3.5	3.5	7.47	30.09	14.75	51.66	25.83
CLA *D4*	2.9	4.000	13.3	8.8	486.7	262.1	482.1	0.93	2.02			(M)
CLA *D5*	3.0	4.000	13.3	8.8	58.9	262.1	482.1	0.11	0.24			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	2.8	4.000	16.0	8.5	1508.1	231.0	399.8	3.26	7.54			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: WR/CD Certificate No. and Grade: _____ Date: 2-16-14

TCEQ - (06-01-09) 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: ~~August 29, 2013~~ 2-7-14 6-30-14

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.3	2 ~~4.000~~	10.8	8.5	3.1	3.7	3.8	0.42	1.63			
CLO2 *D2*	0.3	2 ~~4.000~~	11.1	8.5	3.5	3.6	3.7	0.48	1.87			
CLO2 *D3*	0.4	2 ~~4.000~~	10.2	8.4	59.5	3.8	4.0	7.90	29.83	12.63	41.66	20.83
CLA *D4*	2.9	4.000	14.6	9.3	486.7	247.1	440.5	0.98	2.21			(M)
CLA *D5*	2.8	4.000	13.0	9.1	55.0	265.5	492.2	0.10	0.22			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	2.7	4.000	13.0	9.1	1454.2	265.5	492.2	2.74	5.91			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: BD Certificate No. and Grade: _____ Date: _____

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: ~~August 29, 2013~~ 2-12-14 7:25 PM

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.4	2.000	9.5	8.3	7.3	3.9	4.2	0.94	3.47			
CLO2 *D2*	0.5	2.000	8.5	8.4	13.2	4.0	4.5	1.66	5.89			
CLO2 *D3*	0.2	2.000	10.5	8.4	58.0	3.7	3.9	7.79	29.71	13.70	45.89	22.94
CLA *D4*	2.9	4.000	11.7	9.1	486.7	280.5	538.6	0.87	1.81			(M)
CLA *D5*	2.5	4.000	11.7	9.1	49.1	280.5	538.6	0.09	0.18			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	2.5	4.000	11.2	9.0	1346.5	286.2	557.6	2.35	4.83			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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: ~~August 29, 2013~~ 2-17-14 9:30 pm

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	10.6	8.3	10.8	3.7	3.9	1.45	5.56			
CLO2 *D2*	0.5	2.000	11.2	8.4	13.0	3.6	3.7	1.78	6.96			
CLO2 *D3*	0.3	2.000	10.8	8.4	75.5	3.7	3.8	10.24	39.44	17.13	59.69	29.84
CLA *D4*	2.9	4.000	14.2	9.1	486.7	251.7	452.9	0.97	2.15			(M)
CLA *D5*	2.9	4.000	12.1	9.0	57.0	275.9	523.9	0.10	0.22			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	2.7	4.000	11.6	8.9	1454.2	281.6	542.4	2.58	5.36			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: MM/TW/RK Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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: ~~August 29, 2013~~ 2-18-14 6:00 AM

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	10.5	8.4	10.2	3.7	3.9	1.36	5.20			
CLO2 *D2*	0.4	2.000	9.8	8.5	11.4	3.8	4.1	1.49	5.56			
CLO2 *D3*	0.1	2.000	9.3	8.5	40.6	3.9	4.2	5.23	19.14	11.54	36.95	18.47
CLA *D4*	2.9	4.000	11.5	9.2	486.7	282.8	546.1	0.86	1.78			(M)
CLA *D5*	2.8	4.000	13.4	9.0	55.0	260.9	478.8	0.11	0.23			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	2.7	4.000	10.7	8.0	1454.2	292.0	577.3	2.49	5.04			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: JY/EV Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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: ~~August 29, 2013~~ 2-18-14 3:25 PM

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.4	2.000	9.7	8.4	7.7	3.8	4.1	1.00	3.71			
CLO2 *D2*	0.5	2.000	8.9	8.5	11.7	3.9	4.4	1.48	5.34			
CLO2 *D3*	0.2	2.000	10.4	8.6	43.5	3.7	3.9	5.82	22.13	11.84	38.30	19.15
CLA *D4*	2.7	4.000	11.9	9.1	453.1	278.2	531.2	0.81	1.71			
CLA *D5*	2.9	4.000	11.9	9.1	57.0	278.2	531.2	0.10	0.21			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	2.9	4.000	10.1	9.1	1561.9	298.9	601.8	2.61	5.19			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: GB ID CC Certificate No. and Grade: _____ Date: 2/18/14

TCEQ - (06-01-09) 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: ~~August 29, 2013~~ 2-18-14 10:15 pm

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	12.7	8.4	10.6	3.4	3.4	1.54	6.30			
CLO2 *D2*	0.5	2.000	12.4	8.4	11.9	3.5	3.4	1.72	6.96			
CLO2 *D3*	0.4	2.000	12.4	8.5	121.9	3.5	3.4	17.56	71.18	25.36	94.53	47.27
CLA *D4*	3.2	4.000	18.4	9.1	537.0	203.4	338.5	1.32	3.17			(M)
CLA *D5*	3.1	4.000	18.4	9.1	60.9	203.4	338.5	0.15	0.36			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.1	4.000	12.5	8.9	1669.7	271.3	509.6	3.08	6.55			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: MM/TW/TJ Certificate No. and Grade: _____ Date: 2-18-14

TCEQ - (06-01-09) 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: ~~August 29, 2013~~ 2-19-14 6:30 AM

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	11.3	8.4	11.2	3.6	3.7	1.55	6.06			
CLO2 *D2*	0.5	2.000	11.1	8.5	12.2	3.6	3.7	1.67	6.50			
CLO2 *D3*	0.3	2.000	10.6	8.1	78.4	3.7	3.9	10.56	40.39	17.72	61.13	30.56
CLA *D4*	3.2	4.000	13.4	9.2	537.0	260.9	478.8	1.03	2.24			(M)
CLA *D5*	3.3	4.000	14.9	9.0	64.8	243.7	431.5	0.13	0.30			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.0	4.000	10.8	8.8	1615.8	290.8	573.3	2.78	5.64			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: JY/JD/EV Certificate No. and Grade: _____ Date: _____

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: 2-19-14 ~~August 29, 2013~~ 7:35 PM

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	11.7	8.4	10.0	3.6	3.6	1.40	5.54			
CLO2 *D2*	0.6	2.000	10.1	8.5	16.1	3.8	4.0	2.13	8.00			
CLO2 *D3*	0.2	2.000	12.7	8.3	60.9	3.4	3.4	8.88	36.34	16.16	57.65	28.83
CLA *D4*	3.0	4.000	13.9	9.1	503.4	255.2	462.4	0.99	2.18			(M)
CLA *D5*	3.1	4.000	13.9	9.1	60.9	255.2	462.4	0.12	0.26			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	2.9	4.000	10.5	8.8	1561.9	294.3	585.3	2.65	5.34			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: GB ID CC Certificate No. and Grade: _____ Date: 2/19/14

TCEQ - (06-01-09) 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: 2-19-14 9:08 PM ~~August 29, 2013~~

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	12.7	8.4	11.0	3.4	3.4	1.60	6.55			
CLO2 *D2*	0.4	2.000	11.8	8.4	10.6	3.6	3.6	1.50	5.95			
CLO2 *D3*	0.1	2.000	12.5	8.3	34.8	3.5	3.4	5.04	20.48	12.80	43.45	21.73
CLA *D4*	3.1	4.000	14.6	9.0	520.2	247.1	440.5	1.05	2.36			60
CLA *D5*	3.2	4.000	14.6	9.0	62.8	247.1	440.5	0.13	0.29			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.2	4.000	14.6	8.8	1723.5	247.1	440.5	3.49	7.82			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: MM/CA/TJ Certificate No. and Grade: _____ Date: 2-19-14

TCEQ - (06-01-09) 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: 2/2-12-14 ~~August 29, 2013~~ 6:09 AM

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.4	2.000	13.6	8.5	8.5	3.3	3.2	1.28	5.39			
CLO2 *D2*	0.3	2.000	13.5	8.5	8.6	3.3	3.2	1.29	5.39			
CLO2 *D3*	0.3	2.000	11.9	8.3	75.5	3.5	3.5	10.66	42.56	17.08	61.50	30.75
CLA *D4*	2.8	4.000	15.5	9.1	469.9	236.8	413.9	0.99	2.27			(a)
CLA *D5*	2.9	4.000	15.9	8.9	57.0	232.2	402.6	0.12	0.28			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	2.9	4.000	11.2	8.8	1561.9	286.2	557.6	2.73	5.60			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: JD / JY / BD Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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: 2-20-14 ~~August 29, 2013~~ 3:05pm

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.2	2.000	12.0	8.4	5.0	3.5	3.5	0.71	2.83			
CLO2 *D2*	0.2	2.000	12.8	8.5	6.0	3.4	3.3	0.87	3.58			
CLO2 *D3*	0.1	2.000	11.4	8.4	40.6	3.6	3.7	5.64	22.14	10.82	35.98	17.99
CLA *D4*	2.9	4.000	12.9	9.3	486.7	266.7	495.6	0.91	1.96			
CLA *D5*	2.7	4.000	12.9	9.3	53.0	266.7	495.6	0.10	0.21			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	2.8	4.000	10.8	8.9	1508.1	290.8	573.3	2.59	5.26			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: GB / CC Certificate No. and Grade: _____ Date: _____

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: 2-20-14 ~~August 29, 2013~~ 9:21 pm

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.3	2.000	11.6	8.3	7.0	3.6	3.6	0.99	3.89			
CLO2 *D2*	0.2	2.000	11.6	8.4	5.4	3.6	3.6	0.76	3.01			
CLO2 *D3*	0.3	2.000	12.8	8.4	84.2	3.4	3.3	12.31	50.53	17.97	66.39	33.19
CLA *D4*	1.7	4.000	14.1	9.1	285.3	252.9	456.1	0.56	1.25			(M)
CLA *D5*	3.1	4.000	14.1	9.1	60.9	252.9	456.1	0.12	0.27			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	2.8	4.000	15.8	8.8	1508.1	233.3	405.4	3.23	7.44			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: MM / CO / TS Certificate No. and Grade: _____ Date: 2-20-14

TCEQ - (06-01-09) 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: 2/21/14 ~~August 29, 2013~~ 5:31am

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	11.7	8.5	9.5	3.6	3.6	1.34	5.30			
CLO2 *D2*	0.4	2.000	11.2	8.4	10.1	3.6	3.7	1.39	5.43			
CLO2 *D3*	0.1	2.000	9.1	8.4	20.3	3.9	4.3	2.60	9.44	9.03	28.00	14.00
CLA *D4*	2.8	4.000	11.7	9.3	469.9	280.5	538.6	0.84	1.74			(M)
CLA *D5*	2.7	4.000	14.9	9.1	53.0	243.7	431.5	0.11	0.25			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	2.8	4.000	12.3	8.9	1508.1	273.6	516.7	2.76	5.84			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: JD / JY / BJ Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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: 2-21-14 ~~August 29, 2013~~ 3:50 PM CC

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.3	2.000	10.5	8.2	6.4	3.7	3.9	0.86	3.29			
CLO2 *D2*	0.4	2.000	10.3	8.4	9.3	3.8	4.0	1.24	4.71			
CLO2 *D3*	0.1	2.000	10.1	8.4	31.9	3.8	4.0	4.23	15.90	10.01	31.59	15.79
CLA *D4*	2.9	4.000	13.0	9.1	486.7	265.5	492.2	0.92	1.98			(A)
CLA *D5*	2.9	4.000	13.0	9.1	57.0	265.5	492.2	0.11	0.23			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	2.8	4.000	11.4	9.0	1508.1	283.9	549.9	2.66	5.48			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: CC Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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: 2-21-14 ~~August 29, 2013~~ 9:20 am

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.3	2.000	12.1	8.5	6.8	3.5	3.5	0.97	3.91			
CLO2 *D2*	0.4	2.000	11.3	8.5	10.6	3.6	3.7	1.47	5.75			
CLO2 *D3*	0.1	2.000	12.8	8.4	29.0	3.4	3.3	4.25	17.42	11.15	37.22	18.61
CLA *D4*	3.4	4.000	14.3	9.2	570.6	250.6	449.8	1.14	2.54			(M)
CLA *D5*	3.0	4.000	14.3	9.2	58.9	250.6	449.8	0.12	0.26			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	2.8	4.000	15.6	8.9	1508.1	235.6	411.0	3.20	7.34			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: MM / CO / TJ Certificate No. and Grade: _____ Date: 2-21-14

TCEQ - (06-01-09) 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: ~~August 20, 2013~~ 2-22-14 6:00 AM

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.4	2.000	11.9	8.4	8.5	3.5	3.5	1.20	4.79			
CLO2 *D2*	0.2	2.000	11.3	8.4	5.4	3.6	3.7	0.75	2.94			
CLO2 *D3*	0.1	2.000	10.4	8.3	14.5	3.7	3.9	1.94	7.38	9.14	26.88	13.44
CLA *D4*	3.8	4.000	12.8	9.1	637.7	267.8	499.1	1.19	2.56			(M)
CLA *D5*	3.8	4.000	14.9	9.1	74.6	243.7	431.5	0.15	0.35			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.5	4.000	15.1	8.9	1885.1	241.4	425.5	3.91	8.86			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: JY/BD. Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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: 2-22-14 ~~August 29, 2013~~

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.3	2.000	13.9	8.5	6.2	3.3	3.1	0.95	4.03			
CLO2 *D2*	0.2	2.000	12.1	8.5	5.4	3.5	3.5	0.77	3.11			
CLO2 *D3*	0.1	2.000	13.1	8.4	34.8	3.4	3.3	5.16	21.35	11.84	39.02	19.51
CLA *D4*	3.8	4.000	13.9	9.1	637.7	255.2	462.4	1.25	2.76			(V)
CLA *D5*	3.7	4.000	11.9	8.8	72.7	278.2	531.2	0.13	0.27			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.7	4.000	11.9	8.8	1992.8	278.2	531.2	3.58	7.50			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: TAW/ID Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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: 2-22-14 ~~August 29, 2013~~ 9:10 PM

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.4	2.000	12.1	8.5	7.5	3.5	3.5	1.06	4.27			
CLO2 *D2*	0.3	2.000	13.3	8.4	7.5	3.4	3.2	1.12	4.67			
CLO2 *D3*	0.1	2.000	13.8	8.4	31.9	3.3	3.1	4.86	20.54	12.95	43.07	21.54
CLA *D4*	3.8	4.000	14.5	9.2	637.7	248.3	443.6	1.28	2.87			(M)
CLA *D5*	3.8	4.000	14.5	9.2	74.6	248.3	443.6	0.15	0.34			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.8	4.000	16.2	9.4	2046.7	228.7	394.3	4.47	10.38			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: TN / CD / WR Certificate No. and Grade: _____ Date: 2-22-14

TCEQ - (06-01-09) 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: 2/23/2014 ~~August 29, 2013~~ 5:30 am

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.4	2.000	13.7	8.4	8.7	3.3	3.1	1.32	5.56			
CLO2 *D2*	0.4	2.000	11.4	8.4	10.4	3.6	3.7	1.44	5.65			
CLO2 *D3*	0.1	2.000	11.5	8.4	31.9	3.6	3.6	4.45	17.52	12.26	39.65	19.82
CLA *D4*	3.7	4.000	13.4	9.2	620.9	260.9	478.8	1.19	2.59			(V)
CLA *D5*	3.7	4.000	15.2	9.1	72.7	240.2	422.6	0.15	0.34			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.7	4.000	12.8	8.9	1992.8	267.8	499.1	3.72	7.99			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: JD / JY Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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: 2-23-14 ~~August 29, 2013~~ 2:20 PM

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.3	2.000	13.5	8.3	7.0	3.3	3.2	1.06	4.44			
CLO2 *D2*	0.3	2.000	12.4	8.4	8.3	3.5	3.4	1.19	4.84			
CLO2 *D3*	0.2	2.000	12.0	8.5	43.5	3.5	3.5	6.18	24.73	13.08	43.82	21.91
CLA *D4*	3.6	4.000	12.6	9.2	604.1	270.1	506.1	1.12	2.39			(A)
CLA *D5*	3.6	4.000	12.6	9.2	70.7	270.1	506.1	0.13	0.28			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.5	4.000	12.0	8.8	1885.1	277.0	527.5	3.40	7.15			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: LB/NM Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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: 2-23-14 ~~August 29, 2013~~ 9:31 Pm

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.4	2.000	12.3	8.4	8.5	3.5	3.4	1.22	4.93			
CLO2 *D2*	0.4	2.000	12.4	8.4	9.8	3.5	3.4	1.42	5.75			
CLO2 *D3*	0.1	2.000	12.9	8.4	26.1	3.4	3.3	3.84	15.79	11.88	38.71	19.36
CLA *D4*	3.6	4.000	13.6	9.1	604.1	258.6	472.2	1.17	2.56			(M)
CLA *D5*	3.8	4.000	13.6	9.1	74.6	258.6	472.2	0.14	0.32			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.6	4.000	15.5	8.7	1939.0	236.8	413.9	4.09	9.37			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: WR / TW / CD Certificate No. and Grade: _____ Date: 2-23-14

TCEQ - (06-01-09) 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: ~~August 29, 2013~~ 2-24-14 6:30

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.4	2.000	11.7	8.5	8.5	3.6	3.6	1.19	4.73			
CLO2 *D2*	0.4	2.000	12.1	8.4	9.6	3.5	3.5	1.37	5.48			
CLO2 *D3*	0.1	2.000	10.8	8.5	29.0	3.7	3.8	3.94	15.17	11.50	36.01	18.01
CLA *D4*	3.6	4.000	11.2	9.2	604.1	286.2	557.6	1.06	2.17			(M)
CLA *D5*	3.8	4.000	13.8	8.9	74.6	256.3	465.7	0.15	0.32			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.8	4.000	12.7	8.7	2046.7	269.0	502.6	3.80	8.15			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: TSD Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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: ~~August 29, 2013~~ 2-24-14 3:15 PM

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	10.6	8.4	9.3	3.7	3.9	1.26	4.81			
CLO2 *D2*	0.4	2.000	10.4	8.4	10.9	3.7	3.9	1.46	5.53			
CLO2 *D3*	0.1	2.000	10.3	8.3	29.0	3.8	4.0	3.87	14.65	11.64	35.81	17.91
CLA *D4*	3.6	4.000	12.3	9.1	604.1	273.6	516.7	1.10	2.34			
CLA *D5*	3.7	4.000	12.3	9.1	72.7	273.6	516.7	0.13	0.28			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.8	4.000	12.8	8.6	2046.7	267.8	499.1	3.82	8.20			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: NM CC Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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: ~~August 29, 2013~~ 2-24-14 10:40pm

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.4	2.000	13.0	8.4	9.1	3.4	3.3	1.34	5.55			
CLO2 *D2*	0.5	2.000	11.3	8.4	13.0	3.6	3.7	1.79	7.01			
CLO2 *D3*	0.1	2.000	11.3	8.4	34.8	3.6	3.7	4.81	18.84	13.72	44.56	22.28
CLA *D4*	3.7	4.000	13.5	9.1	620.9	259.8	475.5	1.20	2.61			(J)
CLA *D5*	3.8	4.000	13.1	9.0	74.6	264.4	488.8	0.14	0.31			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.8	4.000	16.0	8.6	2046.7	231.0	399.8	4.43	10.24			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: mm/TW/RK Certificate No. and Grade: _____ Date: 2-24-14

TCEQ - (06-01-09) 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: ~~August 29, 2013~~ 2-25-14 6:30A

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.4	2.000	11.9	8.5	8.5	3.5	3.5	1.20	4.79			
CLO2 *D2*	0.4	2.000	11.7	8.5	9.8	3.6	3.6	1.38	5.48			
CLO2 *D3*	0.1	2.000	10.2	8.3	40.6	3.8	4.0	5.40	20.37	13.10	41.49	20.74
CLA *D4*	3.7	4.000	10.9	9.1	620.9	289.7	569.3	1.07	2.18			
CLA *D5*	3.7	4.000	13.5	9.2	72.7	259.8	475.5	0.14	0.31			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.9	4.000	12.7	8.6	2100.5	269.0	502.6	3.91	8.36			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: BO Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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: 2-25-14 ~~August 29, 2013~~ 3:05 PM

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	10.7	8.4	9.5	3.7	3.9	1.29	4.95			
CLO2 *D2*	0.4	2.000	9.9	8.4	9.1	3.8	4.1	1.19	4.45			
CLO2 *D3*	0.1	2.000	10.7	8.3	34.8	3.7	3.9	4.71	18.08	12.18	38.21	19.10
CLA *D4*	3.6	4.000	12.1	8.9	604.1	275.9	523.9	1.10	2.31			(M)
CLA *D5*	3.6	4.000	12.1	8.9	70.7	275.9	523.9	0.13	0.27			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.7	4.000	13.1	8.9	1992.8	264.4	488.8	3.77	8.15			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: GR CL Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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: Feb. 25, 2014 ~~August 28, 2013~~ 10:05 PM

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.6	2.000	11.6	8.5	12.6	3.6	3.6	1.77	6.99			
CLO2 *D2*	0.4	2.000	10.8	8.5	9.8	3.7	3.8	1.34	5.15			
CLO2 *D3*	0.1	2.000	9.7	8.4	31.9	3.8	4.1	4.17	15.46	12.28	38.33	19.16
CLA *D4*	3.7	4.000	12.3	9.0	620.9	273.6	516.7	1.13	2.40			(M)
CLA *D5*	3.8	4.000	12.3	9.0	74.6	273.6	516.7	0.14	0.29			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.7	4.000	12.9	8.7	1992.8	266.7	495.6	3.74	8.04			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: MM/TAW/TN Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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: 2/26/2014 ~~August 29, 2013~~ 6:20 AM

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.4	2.000	9.9	8.5	8.3	3.8	4.1	1.09	4.07			
CLO2 *D2*	0.4	2.000	9.3	8.6	9.8	3.9	4.2	1.27	4.64			
CLO2 *D3*	0.1	2.000	7.7	8.3	26.1	4.1	4.7	3.19	11.01	10.11	29.08	14.54
CLA *D4*	3.6	4.000	7.2	9.0	604.1	332.2	735.8	0.91	1.64			(M)
CLA *D5*	3.6	4.000	11.9	8.9	70.7	278.2	531.2	0.13	0.27			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.6	4.000	12.2	8.6	1939.0	274.7	520.3	3.53	7.45			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: JD/JY/BD Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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: ~~August 29, 2013~~ 2-26-14 3:40 PM

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.4	2.000	9.6	8.4	7.7	3.8	4.2	1.00	3.69			
CLO2 *D2*	0.4	2.000	8.9	8.4	9.6	3.9	4.4	1.22	4.39			
CLO2 *D3*	0.1	2.000	9.7	8.4	34.8	3.8	4.1	4.55	16.87	11.34	34.37	17.19
CLA *D4*	3.6	4.000	10.0	8.9	604.1	300.0	606.0	1.01	1.99			
CLA *D5*	3.6	4.000	10.0	8.9	70.7	300.0	606.0	0.12	0.23			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.6	4.000	11.7	8.6	1939.0	280.5	538.6	3.46	7.20			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: GA/CC Certificate No. and Grade: _____ Date: _____

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: 2-26-14 ~~August 29, 2013~~ 9:21 PM

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.4	2.000	9.3	8.4	7.5	3.9	4.2	0.96	3.52			
CLO2 *D2*	0.4	2.000	10.1	8.4	10.1	3.8	4.0	1.34	5.03			
CLO2 *D3*	0.1	2.000	9.1	8.5	23.2	3.9	4.3	2.97	10.79	10.86	31.84	15.92
CLA *D4*	3.6	4.000	11.3	8.8	604.1	285.1	553.8	1.06	2.18			(V)
CLA *D5*	3.5	4.000	11.3	8.8	68.7	285.1	553.8	0.12	0.25			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.9	4.000	15.4	7.7	2100.5	237.9	416.8	4.41	10.08			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: TN/CD/JY Certificate No. and Grade: _____ Date: 2-26-14

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: 2/27/14 ~~August 29, 2018~~ 6:26 pm

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.4	2.000	9.5	8.4	7.9	3.9	4.2	1.02	3.76			
CLO2 *D2*	0.4	2.000	9.0	8.5	10.4	3.9	4.3	1.32	4.78			
CLO2 *D3*	0.1	2.000	8.3	8.3	29.0	4.0	4.6	3.61	12.76	10.87	31.49	15.74
CLA *D4*	3.9	4.000	8.9	9.0	654.5	312.7	654.0	1.05	2.00			(V)
CLA *D5*	3.8	4.000	10.9	8.5	74.6	289.7	569.3	0.13	0.26			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.8	4.000	12.3	7.9	2046.7	273.6	516.7	3.74	7.92			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: JD / JY / BD Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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: ~~August 29, 2013~~ 2-27-14 3:25 PM

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.4	2.000	9.4	8.4	7.7	3.9	4.2	0.99	3.64			
CLO2 *D2*	0.3	2.000	9.1	8.4	6.5	3.9	4.3	0.83	3.01			
CLO2 *D3*	0.2	2.000	8.7	8.4	52.2	4.0	4.4	6.59	23.60	13.34	40.57	20.29
CLA *D4*	3.7	4.000	9.6	8.9	620.9	304.6	623.0	1.02	1.99			(M)
CLA *D5*	3.8	4.000	9.6	8.9	74.6	304.6	623.0	0.12	0.24			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.8	4.000	12.6	8.2	2046.7	270.1	506.1	3.79	8.09			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: [signature] Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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: ~~2-26-~~ ~~August 29, 2013~~ 2-27-14 9:00 PM

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.4	2.000	10.4	8.4	8.1	3.7	3.9	1.08	4.11			
CLO2 *D2*	0.2	2.000	10.5	8.5	5.4	3.7	3.9	0.73	2.79			
CLO2 *D3*	0.1	2.000	10.4	8.5	31.9	3.7	3.9	4.27	16.23	12.02	36.66	18.33
CLA *D4*	3.8	4.000	12.2	8.8	637.7	274.7	520.3	1.16	2.45			
CLA *D5*	3.7	4.000	12.2	8.8	72.7	274.7	520.3	0.13	0.28			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.9	4.000	16.4	7.9	2100.5	226.4	388.9	4.64	10.80			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: MM / CP / TW Certificate No. and Grade: _____ Date: 2-27-14

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: 2/28/2014 ~~August 29, 2013~~ 6:08 am

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.4	2.000	10.5	8.5	7.9	3.7	3.9	1.06	4.03			
CLO2 *D2*	0.4	2.000	10.1	8.4	10.6	3.8	4.0	1.41	5.29			
CLO2 *D3*	0.1	2.000	9.6	8.4	26.1	3.8	4.2	3.40	12.56	10.93	32.49	16.25
CLA *D4*	3.8	4.000	10.2	9.0	637.7	297.7	597.6	1.07	2.13			(V)
CLA *D5*	4.0	4.000	11.5	9.0	78.6	282.8	546.1	0.14	0.29			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.9	4.000	12.4	8.2	2100.5	272.4	513.1	3.86	8.19			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: JD / JY / BD Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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: 2-28-14 ~~August 29, 2013~~ 3:20

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.4	2.000	10.9	8.5	9.1	3.7	3.8	1.24	4.80			
CLO2 *D2*	0.4	2.000	10.0	8.4	10.6	3.8	4.0	1.40	5.25			
CLO2 *D3*	0.1	2.000	11.2	8.3	31.9	3.6	3.7	4.40	17.15	11.97	37.48	18.74
CLA *D4*	3.8	4.000	12.4	9.1	637.7	272.4	513.1	1.17	2.49			
CLA *D5*	3.8	4.000	12.4	9.1	74.6	272.4	513.1	0.14	0.29			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.8	4.000	11.5	8.3	2046.7	282.8	546.1	3.62	7.49			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: TW/ID/cc Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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: 2-28-14 ~~August 29, 2013~~ 8:50 PM

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.4	2.000	11.7	8.4	8.1	3.6	3.6	1.13	4.50			
CLO2 *D2*	0.3	2.000	12.3	8.5	7.3	3.5	3.4	1.04	4.21			
CLO2 *D3*	0.1	2.000	12.4	8.3	31.9	3.5	3.4	4.60	18.64	11.72	38.28	19.14
CLA *D4*	3.6	4.000	13.1	8.9	604.1	264.4	488.8	1.14	2.47			(V)
CLA *D5*	3.9	4.000	13.1	8.9	76.6	264.4	488.8	0.14	0.31			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.4	4.000	14.3	8.3	1831.2	250.6	449.8	3.65	8.14			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: MM / CAO /TN Certificate No. and Grade: _____ Date: 2-28-14

TCEQ - (06-01-09) 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: ~~August 29, 2013~~ 3-1-14 6:15 AM

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	11.6	8.4	9.3	3.6	3.6	1.30	5.15			
CLO2 *D2*	0.4	2.000	11.4	8.4	10.6	3.6	3.7	1.47	5.79			
CLO2 *D3*	0.1	2.000	10.8	8.2	23.2	3.7	3.8	3.15	12.13	11.77	36.36	18.18
CLA *D4*	3.7	4.000	12.2	9.1	620.9	274.7	520.3	1.13	2.39			M
CLA *D5*	3.8	4.000	13.7	8.9	74.6	257.5	468.9	0.14	0.32			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.9	4.000	16.1	8.3	2100.5	229.9	397.0	4.57	10.58			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: JJ/BD. Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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: ~~August 29, 2013~~ 3/1/14

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	13.1	8.4	10.0	3.4	3.3	1.47	6.10			
CLO2 *D2*	0.3	2.000	13.3	8.4	8.6	3.4	3.2	1.28	5.31			
CLO2 *D3*	0.1	2.000	13.2	8.3	20.3	3.4	3.2	3.02	12.54	10.93	35.25	17.62
CLA *D4*	3.6	4.000	15.7	9.0	604.1	234.5	408.2	1.29	2.96			(W)
CLA *D5*	3.7	4.000	12.9	8.5	72.7	266.7	495.6	0.14	0.29			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.7	4.000	12.9	8.5	1992.8	266.7	495.6	3.74	8.04			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: TAW Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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: 3-1-14 August 29, 2013 8:50 pm

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.4	2.000	12.2	8.4	7.7	3.5	3.5	1.10	4.42			
CLO2 *D2*	0.3	2.000	11.4	8.4	8.8	3.6	3.7	1.22	4.80			
CLO2 *D3*	0.1	2.000	10.7	8.3	26.1	3.7	3.9	3.53	13.56	10.83	33.45	16.72
CLA *D4*	3.9	4.000	12.2	9.1	654.5	274.7	520.3	1.19	2.52			(M)
CLA *D5*	3.7	4.000	12.2	9.1	72.7	274.7	520.3	0.13	0.28			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.6	4.000	13.0	8.7	1939.0	265.5	492.2	3.65	7.88			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: JD / CD Certificate No. and Grade: _____ Date: 3-1-14

TCEQ - (06-01-09) 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: 3/2/2014 ~~August 29, 2013~~ 5:34 am

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.4	2.000	10.7	8.4	7.9	3.7	3.9	1.07	4.09			
CLO2 *D2*	0.4	2.000	10.7	8.4	10.1	3.7	3.9	1.37	5.25			
CLO2 *D3*	0.1	2.000	7.3	8.4	20.3	4.2	4.9	2.45	8.33	9.33	27.00	13.50
CLA *D4*	3.4	4.000	9.3	9.3	570.6	308.1	636.1	0.93	1.79			(M)
CLA *D5*	3.4	4.000	12.1	8.9	66.8	275.9	523.9	0.12	0.25			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.4	4.000	12.7	9.0	1831.2	269.0	502.6	3.40	7.29			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: JD / JY Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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: 7-2-14 ~~August 29, 2013~~ 7:00 PM

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.4	2.700	9.0	8.5	6.1	3.9	4.3	0.78	2.83			
CLO2 *D2*	0.3	2.700	9.1	8.4	6.5	3.9	4.3	0.83	3.03			
CLO2 *D3*	0.2	2.700	6.5	8.6	34.4	4.3	5.2	4.04	13.34	10.19	28.69	14.35
CLA *D4*	3.7	4.000	9.7	9.2	620.9	303.5	618.7	1.02	2.01			(V)
CLA *D5*	3.6	4.000	10.4	9.2	70.7	295.4	589.4	0.12	0.24			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.4	4.000	12.6	8.8	1831.2	270.1	506.1	3.39	7.24			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: Phil Nm Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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: 3-2-14 ~~August 29, 2013~~ 9:40 am

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.4	2.000	9.4	8.3	7.5	3.9	4.2	0.96	3.54			
CLO2 *D2*	0.3	2.000	9.1	8.5	8.3	3.9	4.3	1.06	3.85			
CLO2 *D3*	0.1	2.000	6.7	8.4	20.3	4.2	5.1	2.40	7.99	9.21	25.51	12.75
CLA *D4*	3.6	4.000	6.9	9.0	604.1	335.7	751.3	0.90	1.61			(V)
CLA *D5*	3.6	4.000	6.9	9.0	70.7	335.7	751.3	0.11	0.19			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.6	4.000	13.8	8.6	1939.0	256.3	465.7	3.78	8.33			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: WR/CO Certificate No. and Grade: _____ Date: 3-2-14

TCEQ - (06-01-09) 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: August 29, 2013 3-3-14 6.105.4

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.4	2.000	7.5	8.5	8.7	4.1	4.8	1.06	3.62			
CLO2 *D2*	0.2	2.000	9.5	8.5	4.1	3.9	4.2	0.54	1.98			
CLO2 *D3*	0.1	2.000	8.2	8.4	26.1	4.0	4.6	3.24	11.40	9.97	28.17	14.09
CLA *D4*	3.7	4.000	10.1	9.2	620.9	298.9	601.8	1.04	2.06			
CLA *D5*	3.8	4.000	10.1	8.9	74.6	298.9	601.8	0.12	0.25			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.7	4.000	14.3	8.5	1992.8	250.6	449.8	3.98	8.86			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: BD KQ Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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: 3-3-14 ~~August 29, 2013~~ 2:55pm

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.2	2.000	8.3	8.4	3.7	4.0	4.6	0.46	1.64			
CLO2 *D2*	0.3	2.000	8.3	8.5	7.5	4.0	4.6	0.94	3.30			
CLO2 *D3*	0.2	2.000	6.7	8.4	49.3	4.2	5.1	5.83	19.41	11.97	34.04	17.02
CLA *D4*	3.6	4.000	7.5	9.1	604.1	328.8	720.6	0.92	1.68			(M)
CLA *D5*	3.7	4.000	7.5	9.1	72.7	328.8	720.6	0.11	0.20			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.8	4.000	12.1	8.8	2046.7	275.9	523.9	3.71	7.81			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: [signature] cc Certificate No. and Grade: _____ Date: _____

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: ~~August 29, 2013~~ 3.3.14 9:45pm

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.4	2.000	9.6	8.4	8.3	3.8	4.2	1.08	3.99			
CLO2 *D2*	0.4	2.000	8.2	8.5	9.8	4.0	4.6	1.22	4.30			
CLO2 *D3*	0.1	2.000	11.2	8.4	29.0	3.6	3.7	4.00	15.60	11.07	33.82	16.91
CLA *D4*	3.6	4.000	8.9	9.0	604.1	312.7	654.0	0.97	1.85			(V)
CLA *D5*	3.8	4.000	8.2	9.0	74.6	320.7	686.5	0.12	0.22			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.7	4.000	12.6	8.7	1992.8	270.1	506.1	3.69	7.88			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: MW/TW/RK Certificate No. and Grade: _____ Date: 3-3-14

TCEQ - (06-01-09) 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: ~~August 29, 2013~~ 3-4-14 5-30-14

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.3	2.000	9.6	8.3	7.0	3.8	4.2	0.92	3.39			
CLO2 *D2*	0.4	2.000	8.4	8.5	9.8	4.0	4.5	1.23	4.36			
CLO2 *D3*	0.1	2.000	8.4	8.5	31.9	4.0	4.5	3.99	14.13	10.80	31.59	15.80
CLA *D4*	3.6	4.000	9.8	8.9	604.1	302.3	614.4	1.00	1.97			
CLA *D5*	3.8	4.000	9.9	8.8	74.6	301.2	610.2	0.12	0.24			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.6	4.000	12.3	8.6	1939.0	273.6	516.7	3.54	7.51			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: BD KQ Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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: 3-4-14 ~~August 29, 2013~~ 3:25 PM

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.4	2.000	8.3	8.4	8.1	4.0	4.6	1.01	3.55			
CLO2 *D2*	0.3	2.000	9.5	8.4	8.8	3.9	4.2	1.14	4.21			
CLO2 *D3*	0.1	2.000	7.1	8.4	37.7	4.2	4.9	4.52	15.26	11.28	32.61	16.31
CLA *D4*	3.5	4.000	7.9	8.8	587.3	324.2	700.9	0.91	1.68			
CLA *D5*	3.6	4.000	7.9	8.8	70.7	324.2	700.9	0.11	0.20			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.6	4.000	12.7	8.4	1939.0	269.0	502.6	3.60	7.72			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: ZA / CC Certificate No. and Grade: _____ Date: _____

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: MARCH 4, 2014 ~~August 29, 2013~~ 10:04 PM

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	10.3	8.5	10.4	3.8	4.0	1.38	5.23			
CLO2 *D2*	0.4	2.000	12.4	8.4	11.1	3.5	3.4	1.61	6.51			
CLO2 *D3*	0.1	2.000	9.3	8.4	26.1	3.9	4.2	3.36	12.30	11.04	33.99	17.00
CLA *D4*	3.6	4.000	9.7	9.0	604.1	303.5	618.7	1.00	1.95			(M)
CLA *D5*	3.6	4.000	9.7	9.0	70.7	303.5	618.7	0.12	0.23			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.5	4.000	13.2	8.5	1885.1	263.2	485.4	3.58	7.77			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: MM/TAW/TN Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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: ~~August 29, 2013~~ 3-5-14 6.104

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	9.0	8.7	9.5	3.9	4.3	1.22	4.40			
CLO2 *D2*	0.4	2.000	9.1	8.5	9.3	3.9	4.3	1.19	4.33			
CLO2 *D3*	0.1	2.000	9.1	8.4	23.2	3.9	4.3	2.97	10.79	10.42	30.37	15.19
CLA *D4*	3.7	4.000	10.0	9.2	620.9	300.0	606.0	1.03	2.05			(M)
CLA *D5*	3.5	4.000	11.0	8.6	68.7	288.5	565.4	0.12	0.24			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.7	4.000	13.8	8.5	1992.8	256.3	465.7	3.89	8.56			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: BD JY Certificate No. and Grade: _____ Date: _____

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: 3-5-14 ~~August 29, 2013~~ 3:20PM

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.4	2.000	9.5	8.0	8.3	3.9	4.2	1.07	3.96			
CLO2 *D2*	0.4	2.000	9.3	8.3	9.1	3.9	4.2	1.17	4.27			
CLO2 *D3*	0.2	2.000	7.8	8.4	46.4	4.1	4.7	5.69	19.71	12.50	37.34	18.67
CLA *D4*	3.6	4.000	8.7	9.1	604.1	315.0	663.1	0.96	1.82			
CLA *D5*	3.7	4.000	8.7	9.1	72.7	315.0	663.1	0.12	0.22			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.6	4.000	12.0	8.6	1939.0	277.0	527.5	3.50	7.35			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: SAJ cc Certificate No. and Grade: _____ Date: _____

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: 3-5-14 ~~August 29, 2013~~ 9:02 PM

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	9.3	8.4	10.4	3.9	4.2	1.33	4.88			
CLO2 *D2*	0.4	2.000	9.4	8.4	10.4	3.9	4.2	1.34	4.92			
CLO2 *D3*	0.1	2.000	9.1	8.3	26.1	3.9	4.3	3.34	12.13	10.82	32.15	16.08
CLA *D4*	3.6	4.000	11.3	9.2	604.1	285.1	553.8	1.06	2.18			(V)
CLA *D5*	3.8	4.000	11.3	9.2	74.6	285.1	553.8	0.13	0.27			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.6	4.000	12.8	8.7	1939.0	267.8	499.1	3.62	7.77			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: mm/CD/TJ Certificate No. and Grade: _____ Date: 3-5-14

TCEQ - (06-01-09) 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: 3/6/14 ~~August 29, 2013~~ 5:29 pm

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.4	2.000	9.9	8.4	7.9	3.8	4.1	1.04	3.87			
CLO2 *D2*	0.4	2.000	9.1	8.5	10.6	3.9	4.3	1.36	4.94			
CLO2 *D3*	0.1	2.000	7.5	8.4	40.6	4.1	4.8	4.93	16.89	11.82	34.87	17.44
CLA *D4*	3.5	4.000	8.3	9.2	587.3	319.6	681.8	0.92	1.72			(V)
CLA *D5*	3.6	4.000	11.1	8.9	70.7	287.4	561.5	0.12	0.25			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.6	4.000	11.7	9.0	1939.0	280.5	538.6	3.46	7.20			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: JD / JY / PJ Certificate No. and Grade: _____ Date: _____

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: 3-6-14 ~~August 29, 2013~~ 3:35 PM

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.4	2.000	9.1	8.4	8.1	3.9	4.3	1.03	3.76			
CLO2 *D2*	0.2	2.000	8.1	8.4	6.2	4.0	4.6	0.77	2.70			
CLO2 *D3*	0.2	2.000	7.7	8.4	58.0	4.1	4.7	7.08	24.47	13.35	40.24	20.12
CLA *D4*	3.5	4.000	9.0	8.9	587.3	311.5	649.5	0.94	1.81			(M)
CLA *D5*	3.6	4.000	9.0	8.9	70.7	311.5	649.5	0.11	0.22			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.4	4.000	12.7	8.8	1831.2	269.0	502.6	3.40	7.29			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: [signature] cc Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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: 3-6-14 ~~August 29, 2013~~ 9:32 PM

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	10.7	8.4	11.0	3.7	3.9	1.49	5.70			
CLO2 *D2*	0.1	2.000	9.8	8.4	2.9	3.8	4.1	0.37	1.39			
CLO2 *D3*	0.2	2.000	10.4	8.4	69.7	3.7	3.9	9.32	35.41	15.11	51.29	25.65
CLA *D4*	0.3	4.000	11.9	9.0	53.7	278.2	531.2	0.10	0.20			(M)
CLA *D5*	3.7	4.000	11.9	9.0	72.7	278.2	531.2	0.13	0.27			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.4	4.000	14.6	8.5	1831.2	247.1	440.5	3.71	8.31			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: CD /TN Certificate No. and Grade: _____ Date: 3-6-14

TCEQ - (06-01-09) 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: ~~August 29, 2013~~ 3-7-14 6:00 AM

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.4	2.000	10.4	8.5	8.1	3.7	3.9	1.08	4.11			
CLO2 *D2*	0.4	2.000	10.2	8.5	10.1	3.8	4.0	1.34	5.07			
CLO2 *D3*	0.1	2.000	8.9	8.3	37.7	3.9	4.4	4.79	17.29	11.69	35.69	17.85
CLA *D4*	3.5	4.000	9.8	9.2	587.3	302.3	614.4	0.97	1.91			(M)
CLA *D5*	3.6	4.000	12.0	9.0	70.7	277.0	527.5	0.13	0.27			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.5	4.000	11.8	8.9	1885.1	279.3	534.9	3.37	7.05			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: JJ/JD/BD Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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: ~~August 29, 2013~~ 7-MARCH-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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.4	2.000	10.2	8.5	8.7	3.8	4.0	1.16	4.37			
CLO2 *D2*	0.4	2.000	9.8	8.4	9.3	3.8	4.1	1.22	4.55			
CLO2 *D3*	0.1	2.000	9.3	8.4	40.6	3.9	4.2	5.23	19.14	12.12	37.47	18.74
CLA *D4*	3.4	4.000	12.0	9.1	570.6	277.0	527.5	1.03	2.16			(W)
CLA *D5*	3.5	4.000	11.7	9.0	68.7	280.5	538.6	0.12	0.26			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.5	4.000	11.7	9.0	1885.1	280.5	538.6	3.36	7.00			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: TAW Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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: 3-7-14 ~~August 29, 2013~~ 9:22 PM

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.4	2.000	12.1	8.3	7.3	3.5	3.5	1.03	4.15			
CLO2 *D2*	0.2	2.000	11.1	8.4	5.2	3.6	3.7	0.71	2.77			
CLO2 *D3*	0.2	2.000	12.9	8.4	49.3	3.4	3.3	7.25	29.83	13.15	46.29	23.14
CLA *D4*	0.4	4.000	14.5	9.0	58.7	248.3	443.6	0.12	0.26			(V)
CLA *D5*	3.5	4.000	14.5	9.0	68.7	248.3	443.6	0.14	0.31			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.4	4.000	15.7	8.9	1831.2	234.5	408.2	3.91	8.97			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: MM / CD Certificate No. and Grade: _____ Date: 3-7-14

TCEQ - (06-01-09) 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: ~~August 29, 2013~~ 3-8-14 6:15 AM

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.4	2.000	11.8	8.4	8.7	3.6	3.6	1.23	4.88			
CLO2 *D2*	0.4	2.000	12.1	8.5	10.4	3.5	3.5	1.48	5.93			
CLO2 *D3*	0.1	2.000	12.9	8.4	26.1	3.4	3.3	3.84	15.79	11.01	36.00	18.00
CLA *D4*	3.4	4.000	12.6	9.1	570.6	270.1	506.1	1.06	2.25			(V)
CLA *D5*	3.5	4.000	14.1	9.0	68.7	252.9	456.1	0.14	0.30			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.4	4.000	11.8	9.1	1831.2	279.3	534.9	3.28	6.85			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: JY/BD Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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: 8 MARCH - 14 ~~August 29, 2013~~

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.4	2.000	13.3	8.5	8.9	3.4	3.2	1.33	5.54			
CLO2 *D2*	0.4	2.000	12.1	8.4	10.1	3.5	3.5	1.44	5.78			
CLO2 *D3*	0.1	2.000	10.6	8.4	29.0	3.7	3.9	3.91	14.96	11.11	35.54	17.77
CLA *D4*	3.4	4.000	11.3	9.2	570.6	285.1	553.8	1.00	2.06			(W)
CLA *D5*	3.4	4.000	12.0	9.1	66.8	277.0	527.5	0.12	0.25			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.4	4.000	12.0	9.1	1831.2	277.0	527.5	3.31	6.94			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: TAW Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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: 3-8-14 ~~August 29, 2013~~ 10:04 Pm

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.4	2.000	8.6	8.4	8.9	4.0	4.5	1.12	4.00			
CLO2 *D2*	0.3	2.000	8.7	8.4	8.8	4.0	4.4	1.11	3.98			
CLO2 *D3*	0.2	2.000	8.6	8.4	49.3	4.0	4.5	6.20	22.14	13.19	40.32	20.16
CLA *D4*	3.5	4.000	11.2	9.0	587.3	286.2	557.6	1.03	2.11			(M)
CLA *D5*	3.8	4.000	11.2	9.0	74.6	286.2	557.6	0.13	0.27			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.5	4.000	13.3	8.8	1885.1	262.1	482.1	3.60	7.82			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: WR / CD Certificate No. and Grade: _____ Date: 3-8-14

TCEQ - (06-01-09) 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: ~~August 29, 2013~~ 3-9-14 6:00 AM

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.4	2.000	10.2	8.5	8.5	3.8	4.0	1.13	4.26			
CLO2 *D2*	0.4	2.000	9.8	8.5	10.1	3.8	4.1	1.32	4.93			
CLO2 *D3*	0.1	2.000	8.9	8.3	40.6	3.9	4.4	5.16	18.62	12.16	37.14	18.57
CLA *D4*	3.5	4.000	9.9	9.2	587.3	301.2	610.2	0.98	1.93			(M)
CLA *D5*	3.6	4.000	11.6	9.1	70.7	281.6	542.4	0.13	0.26			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.6	4.000	11.6	9.0	1939.0	281.6	542.4	3.44	7.15			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: JR/JP/KA Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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: 3-9-14 ~~August 29, 2013~~ 2:40 PM

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.4	2.000	10.2	8.4	7.9	3.8	4.0	1.05	3.95			
CLO2 *D2*	0.4	2.000	9.5	8.4	9.6	3.9	4.2	1.24	4.58			
CLO2 *D3*	0.2	2.000	10.5	8.3	58.0	3.7	3.9	7.79	29.71	14.56	47.53	23.77
CLA *D4*	3.4	4.000	10.2	9.3	570.6	297.7	597.6	0.96	1.91			
CLA *D5*	3.6	4.000	10.2	9.3	70.7	297.7	597.6	0.12	0.24			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.5	4.000	12.0	8.8	1885.1	277.0	527.5	3.40	7.15			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: KM Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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: 3-9-14 ~~August 29, 2013~~ 9:14 PM

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.8	2.000	10.9	8.3	16.2	3.7	3.8	2.20	8.51			
CLO2 *D2*	0.6	2.000	10.5	8.4	15.3	3.7	3.9	2.05	7.83			
CLO2 *D3*	0.4	2.000	12.5	8.3	101.6	3.5	3.4	14.69	59.73	23.35	86.18	43.09
CLA *D4*	0.6	4.000	13.4	9.0	105.7	260.9	478.8	0.20	0.44			(M)
CLA *D5*	3.8	4.000	13.4	9.0	74.6	260.9	478.8	0.14	0.31			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.5	4.000	15.9	8.8	1885.1	232.2	402.6	4.06	9.36			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: WR/CD Certificate No. and Grade: _____ Date: 3-9-14

TCEQ - (06-01-09) 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: ~~August 29, 2013~~ 3-10-14 6:00 AM

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.4	2.000	10.9	8.4	7.5	3.7	3.8	1.02	3.93			
CLO2 *D2*	0.4	2.000	10.1	8.4	9.3	3.8	4.0	1.23	4.64			
CLO2 *D3*	0.1	2.000	9.4	8.4	29.0	3.9	4.2	3.75	13.77	10.56	31.96	15.98
CLA *D4*	3.6	4.000	11.0	9.1	604.1	288.5	565.4	1.05	2.14			(a)
CLA *D5*	3.7	4.000	13.2	8.9	72.7	263.2	485.4	0.14	0.30			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.4	4.000	12.5	8.7	1831.2	271.3	509.6	3.38	7.19			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: JJ/BD/KO Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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: ~~August 29, 2013~~ 3-10-14 7:30 PM

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.4	2.000	10.2	8.4	7.7	3.8	4.0	1.02	3.85			
CLO2 *D2*	0.2	2.000	9.9	8.4	5.7	3.8	4.1	0.75	2.80			
CLO2 *D3*	0.2	2.000	10.3	8.3	55.1	3.8	4.0	7.35	27.84	13.71	44.12	22.06
CLA *D4*	3.5	4.000	11.1	9.1	587.3	287.4	561.5	1.02	2.09			(W)
CLA *D5*	3.6	4.000	11.1	9.1	70.7	287.4	561.5	0.12	0.25			

SUBMITTED BY: _____ Certificate No. and Grade: _____ 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	Viruses
Flow Rate (MGD)	10.000					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.5	4.000	12.3	8.9	1885.1	273.6	516.7	3.45	7.30			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: GA/cc Certificate No. and Grade: _____ Date: _____

TCEQ - (06-01-09) 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: 3-10-14 ~~August 29, 2013~~

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.4	2.000	13.5	8.4	8.1	3.3	3.2	1.22	5.10			
CLO2 *D2*	0.2	2.000	13.9	8.4	4.9	3.3	3.1	0.75	3.19			
CLO2 *D3*	0.1	2.000	12.1	8.4	40.6	3.5	3.5	5.79	23.24	12.59	41.99	20.99
CLA *D4*	3.6	4.000	14.3	9.1	604.1	250.6	449.8	1.21	2.69			(W)
CLA *D5*	3.5	4.000	12.7	8.9	68.7	269.0	502.6	0.13	0.27			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.5	4.000	12.7	8.9	1885.1	269.0	502.6	3.50	7.50			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: TAW Certificate No. and Grade: _____ Date: _____

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: ~~August 29, 2013~~ 3-11-14 6:45

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)	5.000	5.000	5.000	10.000	10.000	0.5	2.0
T_{10} (minutes)	8.3	10.4	116.1	67.1	7.9		

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	0.4	2.000	13.0	8.4	7.3	3.4	3.3	1.07	4.42			
CLO2 *D2*	0.4	2.000	12.6	8.5	9.1	3.4	3.4	1.32	5.37			
CLO2 *D3*	0.1	2.000	11.5	8.4	31.9	3.6	3.6	4.45	17.52	11.56	37.30	18.65
CLA *D4*	3.5	4.000	13.2	9.2	587.3	263.2	485.4	1.12	2.42			(M)
CLA *D5*	3.6	4.000	14.8	9.0	70.7	244.8	434.5	0.14	0.33			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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					0.5	2.0
T_{10} (minutes)	215.4						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.6	4.000	11.8	8.8	1939.0	279.3	534.9	3.47	7.25			
CLA *D7*												
CLA *D8*										SEE	PAGE	1
D9												
D10												

SUBMITTED BY: ERV BD Certificate No. and Grade: _____ Date: _____

RR WWTP CT Forms

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: [redacted] 1-27-14 6.3.14

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										PLANT TOTAL		
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 D1	1.1	2.600	14.5	6.9	1163.6	496.5	1349.2	2.34	4.31			
CLA D2	0.6	2.600	11.4	6.7	412.1	567.8	1672.6	0.73	1.23			
CLA D3	0.7	2.600	14.0	6.9	4.9	508.0	1396.8	0.01	0.02	7.51	13.00	2.60
CLA D4	3.2	4.000	6.9	9.3	537.0	671.3	2284.9	0.80	1.18			
CLA D5	3.7	4.000	11.8	8.9	72.7	558.6	1626.9	0.13	0.22			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

TCEQ - (05-01-13) CT STUDY

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	3.6	4.000	12.0	8.8	1939.0	554.0	1604.5	3.50	6.04			
D7												
D8												
D9												
D10												

SUBMITTED BY: BD ERV Certificate No. and Grade: _____ Date: _____

TCEQ - (05-01-13) CT STUDY

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~~ 1-27-14 3:45 pm

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										PLANT TOTAL		
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 D1	0.8	2.800	6.7	6.9	764.9	675.9	2316.8	1.13	1.65			
CLA D2	0.6	2.800	10.7	6.8	358.8	583.9	1755.8	0.61	1.02			
CLA D3	0.2	2.800	13.2	6.0	1.5	526.4	1476.4	0.00	0.01	5.95	9.79	1.96
CLA D4	3.3	4.000	8.3	9.0	553.8	639.1	2073.6	0.87	1.34			(M)
CLA D5	3.2	4.000	12.1	9.0	62.8	551.7	1593.4	0.11	0.20			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	12.1	9.0	1777.4	551.7	1593.4	3.22	5.58			
D7												
D8												
D9												
D10												

SUBMITTED BY: THW Certificate No. and Grade: _____ Date: _____

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 23, 2013~~ 1-22-14 10:45pm

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										PLANT TOTAL		
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 D1	0.8	2.800	10.7	6.9	764.9	583.9	1755.8	1.31	2.18			
CLA D2	0.7	2.800	10.7	6.8	430.5	583.9	1755.8	0.74	1.23			
CLA D3	0.5	2.800	13.2	7.0	3.1	526.4	1476.4	0.01	0.01	6.01	10.51	2.10
CLA D4	1.4	4.000	9.9	9.1	234.9	602.3	1855.9	0.39	0.63			
CLA D5	2.7	4.000	9.9	9.1	53.0	602.3	1855.9	0.09	0.14			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	13.9	8.9	1777.4	510.3	1406.5	3.48	6.32			
D7												
D8												
D9												
D10												

SUBMITTED BY: MM/RK Certificate No. and Grade: _____ Date: _____

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 7-004

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										PLANT TOTAL		
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 *D1*	1.1	2.600	7.3	6.9	1132.7	662.1	2222.4	1.71	2.55			
CLA *D2*	0.6	2.600	7.9	6.8	412.1	648.3	2131.9	0.64	0.97			
CLA *D3*	0.6	2.600	11.9	7.1	4.0	556.3	1615.7	0.01	0.01	6.37	10.21	2.04
CLA *D4*	3.0	4.000	6.9	9.1	503.4	671.3	2284.9	0.75	1.10			(M)
CLA *D5*	3.3	4.000	7.9	8.7	64.8	648.3	2131.9	0.10	0.15			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	11.7	8.8	1777.4	560.9	1638.2	3.17	5.42			
D7												
D8												
D9												
D10												

SUBMITTED BY: BD ERV ZD Certificate No. and Grade: _____ Date: _____

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										PLANT TOTAL		
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 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	6.97	11.50	2.30
CLA D4	3.0	4.000	8.1	9.1	503.4	643.7	2102.5	0.78	1.20			(W)
CLA D5	3.3	4.000	10.5	8.7	64.8	588.5	1780.3	0.11	0.18			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	588.5	1780.3	3.02	4.99			
D7												
D8												
D9												
D10												

SUBMITTED BY: TW/ID Certificate No. and Grade: _____ Date: _____

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

PWS ID No.: 2430001

PLANT NAME OR NUMBER: Temporary CT for DPR Full-Scale Verification Test - RR WWTP Source

Date: January 28, 2014 ~~August 28, 2013~~ 10:00 PM

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										PLANT TOTAL		
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 D1	1.0	2.800	8.1	6.8	956.2	643.7	2102.5	1.49	2.27			
CLA D2	0.8	2.800	11.0	7.3	478.4	577.0	1719.7	0.83	1.39			
CLA D3	0.6	2.800	12.7	6.9	4.2	538.6	1531.7	0.01	0.01	6.54	10.89	2.18
CLA D4	3.2	4.000	9.4	8.8	537.0	613.8	1921.4	0.87	1.40			
CLA D5	3.1	4.000	9.1	9.0	60.9	620.7	1961.7	0.10	0.16			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	12.3	8.4	1777.4	547.1	1571.5	3.25	5.66			
D7												
D8												
D9												
D10												

SUBMITTED BY: MM/TN Certificate No. and Grade: _____ Date: _____

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

PWS ID No.: 2430001

PLANT NAME OR NUMBER: Temporary CT for DPR Full-Scale Verification Test - RR WWTP Source

Date: ~~August 29, 2013~~ 1-29-14 6-20-14

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										PLANT TOTAL		
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 *D1*	1.2	2.800	7.5	6.8	1147.4	657.5	2191.8	1.75	2.62			
CLA *D2*	0.8	2.800	10.5	6.8	478.4	588.5	1780.3	0.81	1.34			
CLA *D3*	0.1	2.800	13.4	6.8	0.5	521.8	1456.1	0.00	0.00	6.65	11.00	2.20
CLA *D4*	2.9	4.000	7.9	9.1	486.7	648.3	2131.9	0.75	1.14			(V)
CLA *D5*	3.3	4.000	6.7	8.7	64.8	675.9	2316.8	0.10	0.14			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.2	4.000	13.0	8.2	1723.5	531.0	1497.1	3.25	5.76			
D7												
D8												
D9												
D10												

SUBMITTED BY: BD JD JY Certificate No. and Grade: _____ Date: _____

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~~ 1-29-14

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										PLANT TOTAL		
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 D1	0.9	2.800	13.4	6.7	831.9	521.8	1456.1	1.59	2.86			
CLA D2	0.9	2.800	12.5	6.7	520.2	542.5	1549.8	0.96	1.68			
CLA D3	0.6	2.800	13.7	7.0	3.9	514.9	1426.1	0.01	0.01	6.86	11.89	2.38
CLA D4	3.1	4.000	8.3	8.7	520.2	639.1	2073.6	0.81	1.25			(V)
CLA D5	3.5	4.000	12.4	8.6	68.7	544.8	1560.6	0.13	0.22			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	3.4	4.000	12.4	8.6	1831.2	544.8	1560.6	3.36	5.87			
D7												
D8												
D9												
D10												

SUBMITTED BY: TW Certificate No. and Grade: _____ Date: _____

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~~ 1/29-14 10:05pm

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										PLANT TOTAL		
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 *D1*	1.6	2.800	12.9	6.9	1529.8	533.3	1507.5	2.87	5.07			
CLA *D2*	0.9	2.800	11.5	6.9	556.1	565.5	1661.1	0.98	1.67			
CLA *D3*	0.8	2.800	12.5	6.9	5.3	542.5	1549.8	0.01	0.02	8.41	15.12	3.02
CLA *D4*	3.1	4.000	11.9	9.0	520.2	556.3	1615.7	0.94	1.61			
CLA *D5*	3.4	4.000	11.9	9.0	66.8	556.3	1615.7	0.12	0.21			

SUBMITTED BY: _____ **Certificate No. and Grade:** _____ **Date:** _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.1	4.000	15.3	8.1	1669.7	478.1	1276.4	3.49	6.54			
D7												
D8												
D9												
D10												

SUBMITTED BY: MM/TJ/CD **Certificate No. and Grade:** _____ **Date:** _____

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~~ 1-30-14 6.30.14

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										PLANT TOTAL		
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 D1	1.4	2.800	8.0	7.0	1338.6	646.0	2117.1	2.07	3.16			
CLA D2	1.0	2.800	12.3	6.8	574.0	547.1	1571.5	1.05	1.83			
CLA D3	0.7	2.800	12.8	6.8	4.6	535.6	1517.9	0.01	0.02	7.77	13.26	2.65
CLA D4	3.2	4.000	9.0	8.6	537.0	623.0	1975.4	0.86	1.36			
CLA D5	3.2	4.000	9.3	8.6	62.8	616.1	1934.7	0.10	0.16			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	3.4	4.000	14.4	8.2	1831.2	498.8	1358.6	3.67	6.74			
D7												
D8												
D9												
D10												

SUBMITTED BY: BD JY Certificate No. and Grade: _____ Date: _____

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 (1-30-14)

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										PLANT TOTAL		
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 *D1*	1.8	2.800	11.6	6.8	1759.3	563.2	1649.6	3.12	5.33			
CLA *D2*	0.8	2.800	14.3	6.5	478.4	501.1	1368.1	0.95	1.75			
CLA *D3*	0.9	2.800	12.9	7.0	6.0	533.3	1507.5	0.01	0.02	8.23	14.09	2.82
CLA *D4*	3.1	4.000	8.7	8.5	520.2	629.9	2016.9	0.83	1.29			(V)
CLA *D5*	3.3	4.000	11.9	8.1	64.8	556.3	1615.7	0.12	0.20			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	11.9	8.1	1777.4	556.3	1615.7	3.20	5.50			
D7												
D8												
D9												
D10												

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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: JANUARY 30, 2014 9:55pm ~~August 29, 2013~~

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										PLANT TOTAL		
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 D1	1.8	2.800	15.7	6.9	1759.3	468.9	1241.5	3.75	7.09			
CLA D2	0.8	2.800	13.4	6.9	478.4	521.8	1456.1	0.92	1.64			
CLA D3	0.9	2.800	13.5	6.9	5.7	519.5	1446.1	0.01	0.02	9.08	16.44	3.29
CLA D4	3.3	4.000	13.1	8.4	553.8	528.7	1486.7	1.05	1.86			
CLA D5	3.2	4.000	13.1	8.4	62.8	528.7	1486.7	0.12	0.21			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	12.2	8.0	1777.4	549.4	1582.4	3.24	5.62			
D7												
D8												
D9												
D10												

SUBMITTED BY: MM/TN/CD Certificate No. and Grade: _____ Date: _____

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: 1/31/14 ~~August 29, 2013~~ 6:15 am

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										PLANT TOTAL		
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 *D1*	1.4	2.900	11.3	6.9	1292.5	570.1	1684.3	2.27	3.84			
CLA *D2*	0.9	2.900	13.1	6.9	525.4	528.7	1486.7	0.99	1.77			
CLA *D3*	1.1	2.900	13.4	6.8	7.0	521.8	1456.1	0.01	0.02	7.84	13.42	2.68
CLA *D4*	3.4	4.000	9.1	8.6	570.6	620.7	1961.7	0.92	1.45			(V)
CLA *D5*	3.5	4.000	11.5	8.4	68.7	565.5	1661.1	0.12	0.21			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

TCEQ - (05-01-13) CT STUDY

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.6	4.000	12.2	7.7	1939.0	549.4	1582.4	3.53	6.13			
D7												
D8												
D9												
D10												

SUBMITTED BY: JO JY TO Certificate No. and Grade: _____ Date: 1/31/14

TCEQ - (05-01-13) CT STUDY

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: JANUARY 31, 2014 2:30pm ~~August 29, 2013~~

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										PLANT TOTAL		
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 *D1*	1.4	2.800	15.4	6.9	1338.6	475.8	1267.6	2.81	5.28			
CLA *D2*	0.9	2.800	13.1	6.7	556.1	528.7	1486.7	1.05	1.87			
CLA *D3*	0.5	2.800	14.0	6.9	3.1	508.0	1396.8	0.01	0.01	8.04	14.33	2.87
CLA *D4*	3.2	4.000	10.2	8.6	537.0	595.4	1817.7	0.90	1.48			
CLA *D5*	3.2	4.000	10.2	8.6	62.8	595.4	1817.7	0.11	0.17			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

TCEQ - (05-01-13) CT STUDY

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.2	4.000	12.4	7.8	1723.5	544.8	1560.6	3.16	5.52			
D7												
D8												
D9												
D10												

SUBMITTED BY: ID/TN/CC Certificate No. and Grade: _____ Date: _____

TCEQ - (05-01-13) CT STUDY

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

PWS ID No.: 2430001

PLANT NAME OR NUMBER: Temporary CT for DPR Full-Scale Verification Test - RR WWTP Source

Date: JANUARY 31, 2014 10:25PM ~~August 29, 2013~~

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										PLANT TOTAL		
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 D1	1.4	2.800	11.9	6.8	1338.6	556.3	1615.7	2.41	4.14			
CLA D2	0.8	2.800	13.3	6.7	478.4	524.1	1466.2	0.91	1.63			
CLA D3	0.8	2.800	13.5	6.9	5.3	519.5	1446.1	0.01	0.02	8.11	14.60	2.92
CLA D4	3.1	4.000	11.8	8.2	520.2	558.6	1626.9	0.93	1.60			
CLA D5	3.3	4.000	11.8	8.2	64.8	558.6	1626.9	0.12	0.20			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	15.4	7.9	1777.4	475.8	1267.6	3.74	7.01			
D7												
D8												
D9												
D10												

SUBMITTED BY: MM | WR | CD Certificate No. and Grade: _____ Date: _____

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~~ 2-1-14 7:15 AM

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										PLANT TOTAL		
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 *D1*	1.4	3.000	8.1	6.9	1249.4	643.7	2102.5	1.94	2.97			
CLA *D2*	1.2	3.000	12.9	6.8	669.7	533.3	1507.5	1.26	2.22			
CLA *D3*	0.8	3.000	13.8	6.9	4.9	512.6	1416.3	0.01	0.02	6.77	11.27	2.25
CLA *D4*	1.7	4.000	10.4	8.0	285.3	590.8	1792.7	0.48	0.80			
CLA *D5*	3.0	4.000	11.1	8.1	58.9	574.7	1707.8	0.10	0.17			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

TCEQ - (05-01-13) CT STUDY

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.1	4.000	11.7	7.6	1669.7	560.9	1638.2	2.98	5.10			
D7												
D8												
D9												
D10												

SUBMITTED BY: JY/JD Certificate No. and Grade: _____ Date: _____

TCEQ - (05-01-13) CT STUDY

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

3:15 pm

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~~ 2/1/14

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										PLANT TOTAL		
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 D1	0.9	2.900	14.0	7.0	803.2	508.0	1396.8	1.58	2.88			
CLA D2	0.7	2.900	11.8	6.7	421.4	558.6	1626.9	0.75	1.30			
CLA D3	1.2	2.900	14.3	6.8	7.6	501.1	1368.1	0.02	0.03	6.11	10.35	2.07
CLA D4	3.0	4.000	6.7	8.3	503.4	675.9	2316.8	0.74	1.09			(W)
CLA D5	3.1	4.000	11.1	7.7	60.9	574.7	1707.8	0.11	0.18			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

TCEQ - (05-01-13) CT STUDY

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	3.1	4.000	11.1	7.7	1669.7	574.7	1707.8	2.91	4.89			
D7												
D8												
D9												
D10												

SUBMITTED BY: TAW Certificate No. and Grade: _____ Date: _____

TCEQ - (05-01-13) CT STUDY

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: 02/01/14 ~~August 29, 2013~~ 10:30PM

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										PLANT TOTAL		
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 *D1*	0.7	2.800	13.2	6.9	688.4	526.4	1476.4	1.31	2.33			
CLA *D2*	0.7	2.800	13.2	6.9	430.5	526.4	1476.4	0.82	1.46			
CLA *D3*	0.7	2.800	14.0	6.8	4.4	508.7	1399.7	0.01	0.02	6.20	10.85	2.17
CLA *D4*	3.0	4.000	9.3	8.4	503.4	616.1	1934.7	0.82	1.30			
CLA *D5*	3.3	4.000	9.3	8.4	64.8	616.1	1934.7	0.11	0.17			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

TCEQ - (05-01-13) CT STUDY

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.1	4.000	13.0	7.9	1669.7	531.0	1497.1	3.14	5.58			
D7												
D8												
D9												
D10												

SUBMITTED BY: TN/KWR/CD - Certificate No. and Grade: _____ Date: _____

TCEQ - (05-01-13) CT STUDY

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~~ 2-2-14 6:00 AM

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										PLANT TOTAL		
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 D1	1.6	3.000	7.9	6.9	1427.9	648.3	2131.9	2.20	3.35			
CLA D2	0.8	3.000	12.6	6.8	446.5	540.2	1539.1	0.83	1.45			
CLA D3	0.5	3.000	13.8	6.9	2.9	512.6	1416.3	0.01	0.01	6.43	10.18	2.04
CLA D4	3.2	4.000	6.6	8.9	537.0	678.2	2332.9	0.79	1.15			
CLA D5	3.1	4.000	9.4	8.0	60.9	613.8	1921.4	0.10	0.16			

SUBMITTED BY: JY / JD / KQ

Certificate No. and Grade: _____ Date: _____

TCEQ - (05-01-13) CT STUDY

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	2.8	4.000	9.9	7.9	1508.1	602.3	1855.9	2.50	4.06			
D7												
D8												
D9												
D10												

SUBMITTED BY: JY / JD / KQ

Certificate No. and Grade: _____ Date: _____

TCEQ - (05-01-13) CT STUDY

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~~ 2-7-14 3:05 PM

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										PLANT TOTAL		
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 *D1*	1.7	2.900	8.1	6.8	1569.4	643.7	2102.5	2.44	3.73			
CLA *D2*	0.9	2.900	11.2	6.8	519.6	572.4	1696.0	0.91	1.53			
CLA *D3*	1.2	2.900	13.5	6.9	7.6	520.2	1449.1	0.01	0.03	7.46	12.13	2.43
CLA *D4*	3.2	4.000	8.7	8.5	537.0	629.9	2016.9	0.85	1.33			(V)
CLA *D5*	3.3	4.000	11.4	8.0	64.8	567.8	1672.6	0.11	0.19			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	11.4	8.0	1777.4	567.8	1672.6	3.13	5.31			
D7												
D8												
D9												
D10												

SUBMITTED BY: GA Certificate No. and Grade: _____ Date: _____

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: 2/2/14 ~~August 29, 2013~~ BB

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										PLANT TOTAL		
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 D1	1.7	2.800	8.3	6.9	1625.5	639.1	2073.6	2.54	3.92			
CLA D2	1.0	2.800	9.0	6.8	574.0	623.0	1975.4	0.92	1.45			
CLA D3	0.8	2.800	13.2	6.8	5.3	526.4	1476.4	0.01	0.02	7.63	12.75	2.55
CLA D4	3.1	4.000	9.2	8.3	520.2	618.4	1948.2	0.84	1.34			(A)
CLA D5	3.2	4.000	9.2	8.3	62.8	618.4	1948.2	0.10	0.16			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	3.0	4.000	14.2	7.7	1615.8	503.4	1377.6	3.21	5.86			
D7												
D8												
D9												
D10												

SUBMITTED BY: LWR/CO/SW - Certificate No. and Grade: _____ Date: _____

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~~ 2-3-14 6-30-14

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										PLANT TOTAL		
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 *D1*	1.9	3.000	8.3	6.8	1713.4	639.1	2073.6	2.68	4.13			
CLA *D2*	1.1	3.000	8.1	6.9	613.9	643.7	2102.5	0.95	1.46			
CLA *D3*	1.1	3.000	13.2	6.9	6.7	526.4	1476.4	0.01	0.02	7.45	11.80	2.36
CLA *D4*	3.0	4.000	7.2	8.9	503.4	664.4	2237.9	0.76	1.12			
CLA *D5*	3.0	4.000	9.2	8.2	58.9	618.4	1948.2	0.10	0.15			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.2	4.000	10.7	7.9	1723.5	583.9	1755.8	2.95	4.91			
D7												
D8												
D9												
D10												

SUBMITTED BY: BD KQ ERV Certificate No. and Grade: _____ Date: _____

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~~ 2-3-14 3:30 AM

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										PLANT TOTAL		
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 *D1*	1.8	3.000	9.7	6.6	1606.3	606.9	1881.8	2.65	4.27			
CLA *D2*	1.8	3.000	9.8	6.6	1004.6	604.6	1868.8	1.66	2.69			
CLA *D3*	0.9	3.000	9.7	6.6	5.4	606.9	1881.8	0.01	0.01	8.23	13.50	2.70
CLA *D4*	3.2	4.000	10.1	8.5	537.0	597.7	1830.4	0.90	1.47			(M)
CLA *D5*	3.1	4.000	11.1	7.8	60.9	574.7	1707.8	0.11	0.18			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.1	4.000	11.1	7.8	1669.7	574.7	1707.8	2.91	4.89			
D7												
D8												
D9												
D10												

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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~~ 2-3-14 10:30 AM

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										PLANT TOTAL		
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 D1	1.6	3.000	12.0	6.7	1427.9	554.0	1604.5	2.58	4.45			
CLA D2	1.0	3.000	12.2	6.6	558.1	549.4	1582.4	1.02	1.76			
CLA D3	0.9	3.000	13.0	6.8	5.7	531.0	1497.1	0.01	0.02	7.18	12.10	2.42
CLA D4	3.0	4.000	8.9	8.9	503.4	625.3	1989.1	0.81	1.27			
CLA D5	3.1	4.000	8.9	8.9	60.9	625.3	1989.1	0.10	0.15			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	2.9	4.000	10.7	7.9	1561.9	583.9	1755.8	2.68	4.45			
D7												
D8												
D9												
D10												

SUBMITTED BY: MM/TW/RK Certificate No. and Grade: _____ Date: _____

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~~ 2-4-14 6:10 AM

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										PLANT TOTAL		
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 *D1*	0.9	2.900	9.5	7.0	858.6	611.5	1908.1	1.40	2.25			
CLA *D2*	0.9	2.900	9.7	7.0	536.9	606.9	1881.8	0.88	1.43			
CLA *D3*	0.8	2.900	13.0	6.8	5.1	531.0	1497.1	0.01	0.02	5.97	9.64	1.93
CLA *D4*	2.9	4.000	7.3	8.1	486.7	662.1	2222.4	0.74	1.09			(M)
CLA *D5*	2.9	4.000	10.4	8.1	57.0	590.8	1792.7	0.10	0.16			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.1	4.000	10.5	7.8	1669.7	588.5	1780.3	2.84	4.69			
D7												
D8												
D9												
D10												

SUBMITTED BY: KQ / ERV / BD Certificate No. and Grade: _____ Date: _____

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: 2-4-14 ~~August 29, 2013~~ 7:30/4

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										PLANT TOTAL		
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 D1	1.7	2.800	11.5	6.7	1625.5	565.5	1661.1	2.87	4.89			
CLA D2	1.2	2.800	11.4	6.6	717.5	567.8	1672.6	1.26	2.14			
CLA D3	0.8	2.800	13.1	6.7	5.3	528.7	1486.7	0.01	0.02	7.76	13.00	2.60
CLA D4	2.8	4.000	8.0	8.1	469.9	646.0	2117.1	0.73	1.11			
CLA D5	2.9	4.000	8.0	8.1	57.0	646.0	2117.1	0.09	0.13			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	3.0	4.000	11.0	8.0	1615.8	577.0	1719.7	2.80	4.70			
D7												
D8												
D9												
D10												

SUBMITTED BY: Ed Hix ID Certificate No. and Grade: _____ Date: _____

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~~ 2-4-14 11:00 pm

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										PLANT TOTAL		
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 *D1*	1.8	2.800	11.7	6.8	1721.1	560.9	1638.2	3.07	5.25			
CLA *D2*	1.1	2.800	11.1	6.7	657.7	574.7	1707.8	1.14	1.93			
CLA *D3*	0.9	2.800	13.0	6.8	5.7	531.0	1497.1	0.01	0.02	8.27	14.21	2.84
CLA *D4*	3.0	4.000	8.7	8.5	503.4	629.9	2016.9	0.80	1.25			
CLA *D5*	3.0	4.000	8.7	8.5	58.9	629.9	2016.9	0.09	0.15			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.1	4.000	13.1	7.9	1669.7	528.7	1486.7	3.16	5.62			
D7												
D8												
D9												
D10												

SUBMITTED BY: MM/TW/JO Certificate No. and Grade: _____ Date: _____

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~~ 2-5-14 6:30 AM

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										PLANT TOTAL		
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 *D1*	1.5	2.800	8.9	7.1	1405.5	625.3	1989.1	2.25	3.53			
CLA *D2*	1.6	2.800	10.5	6.6	956.7	588.5	1780.3	1.63	2.69			
CLA *D3*	0.8	2.800	13.1	6.8	5.3	528.7	1486.7	0.01	0.02	7.56	12.07	2.41
CLA *D4*	2.9	4.000	5.9	8.4	486.7	694.3	2448.9	0.70	0.99			
CLA *D5*	3.2	4.000	6.5	8.5	62.8	680.5	2349.1	0.09	0.13			(M)

SUBMITTED BY: JY / JD / BD

Certificate No. and Grade: _____ Date: _____

TCEQ - (05-01-13)

CT STUDY

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.2	4.000	10.1	8.1	1723.5	597.7	1830.4	2.88	4.71			
D7												
D8												
D9												
D10												

SUBMITTED BY: JY / JD / BD

Certificate No. and Grade: _____ Date: _____

TCEQ - (05-01-13)

CT STUDY

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~~ 2-5-14 3:20 PM

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										PLANT TOTAL		
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 *D1*	1.6	2.800	9.1	6.8	1529.8	620.7	1961.7	2.46	3.90			
CLA *D2*	0.8	2.800	9.5	6.8	478.4	611.5	1908.1	0.78	1.25			
CLA *D3*	0.8	2.800	10.0	7.0	5.3	600.0	1843.1	0.01	0.01	6.80	10.84	2.17
CLA *D4*	2.9	4.000	6.9	8.6	486.7	671.3	2284.9	0.72	1.06			
CLA *D5*	3.1	4.000	6.9	8.6	60.9	671.3	2284.9	0.09	0.13			

SUBMITTED BY: _____ **Certificate No. and Grade:** _____ **Date:** _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.0	4.000	10.3	8.0	1615.8	593.1	1805.2	2.72	4.48			
D7												
D8												
D9												
D10												

SUBMITTED BY: ZA/IO **Certificate No. and Grade:** _____ **Date:** _____

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~~ 2-5-14 10:00 PM

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										PLANT TOTAL		
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 *D1*	1.5	2.700	9.0	6.7	1507.2	623.0	1975.4	2.42	3.81			
CLA *D2*	0.8	2.700	9.7	6.8	496.1	606.9	1881.8	0.82	1.32			
CLA *D3*	0.7	2.700	10.6	6.9	4.9	585.5	1764.3	0.01	0.01	6.97	11.51	2.30
CLA *D4*	2.8	4.000	7.9	7.8	469.9	648.3	2131.9	0.72	1.10			
CLA *D5*	3.3	4.000	7.9	7.8	64.8	648.3	2131.9	0.10	0.15			

SUBMITTED BY: JY/MM/CD

Certificate No. and Grade: _____ **Date:** _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	2.9	4.000	12.7	7.5	1561.9	537.9	1528.5	2.90	5.11			
D7												
D8												
D9												
D10												

SUBMITTED BY: JY/MM/CD

Certificate No. and Grade: _____ **Date:** _____

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

PWS ID No.: 2430001

PLANT NAME OR NUMBER: Temporary CT for DPR Full-Scale Verification Test - RR WWTP Source

Date: 2/6/2014 ~~August 29, 2013~~ 6:26 am

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										PLANT TOTAL		
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 D1	1.2	2.800	6.9	6.9	1147.4	671.3	2284.9	1.71	2.51			
CLA D2	0.9	2.800	6.9	8.9	556.1	671.3	2284.9	0.83	1.22			
CLA D3	0.8	2.800	10.2	6.9	5.3	595.4	1817.7	0.01	0.01	5.93	9.06	1.81
CLA D4	2.9	4.000	5.7	8.1	486.7	698.9	2483.1	0.70	0.98			
CLA D5	3.2	4.000	5.6	7.4	62.8	701.2	2500.3	0.09	0.13			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	2.9	4.000	9.9	7.3	1561.9	602.3	1855.9	2.59	4.21			
D7												
D8												
D9												
D10												

SUBMITTED BY: JD Certificate No. and Grade: _____ Date: _____

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: 2-6-14 ~~August 29, 2013~~ 3:20 PM

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										PLANT TOTAL		
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 D1	1.7	2.800	5.8	6.9	1625.5	696.6	2465.9	2.33	3.30			
CLA D2	0.8	2.800	7.0	6.7	478.4	669.0	2269.1	0.72	1.05			
CLA D3	0.8	2.800	9.8	6.9	5.3	604.6	1868.8	0.01	0.01	6.76	10.27	2.05
CLA D4	2.9	4.000	6.5	7.9	486.7	680.5	2349.1	0.72	1.04			
CLA D5	3.1	4.000	6.5	7.9	60.9	680.5	2349.1	0.09	0.13			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	3.2	4.000	10.2	7.5	1723.5	595.4	1817.7	2.89	4.74			
D7												
D8												
D9												
D10												

SUBMITTED BY: JH/IO Certificate No. and Grade: _____ Date: _____

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~~ 2-6-14 10:00 PM

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										PLANT TOTAL		
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 *D1*	1.6	2.800	7.5	6.9	1529.8	657.5	2191.8	2.33	3.49			
CLA *D2*	1.3	2.800	9.8	6.7	777.3	604.6	1868.8	1.29	2.08			
CLA *D3*	0.9	2.800	9.6	6.9	5.7	610.1	1900.2	0.01	0.02	7.85	13.01	2.60
CLA *D4*	2.9	4.000	7.0	7.6	486.7	669.0	2269.1	0.73	1.07			(V)
CLA *D5*	3.3	4.000	7.0	7.6	64.8	669.0	2269.1	0.10	0.14			

SUBMITTED BY: JY/MM/CD

Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.2	4.000	14.1	7.4	1723.5	505.7	1387.1	3.41	6.21			
D7												
D8												
D9												
D10												

SUBMITTED BY: JY/MM/CD

Certificate No. and Grade: _____ Date: _____

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~~ 2-7-14 6:30 AM

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										PLANT TOTAL		
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 *D1*	2.0	2.800	9.0	6.8	1912.3	623.0	1975.4	3.07	4.84			
CLA *D2*	1.0	2.800	10.2	6.8	597.9	595.4	1817.7	1.00	1.64			
CLA *D3*	0.8	2.800	9.4	6.9	5.3	613.8	1921.4	0.01	0.01	7.88	12.63	2.53
CLA *D4*	3.2	4.000	4.8	8.0	537.0	741.8	2663.7	0.72	1.01			
CLA *D5*	3.2	4.000	7.4	8.7	62.8	659.8	2207.1	0.10	0.14			

SUBMITTED BY: JY/JD/BD

Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.2	4.000	10.9	7.8	1723.5	579.3	1731.6	2.98	4.98			
D7												
D8												
D9												
D10												

SUBMITTED BY: JY/JD/BD

Certificate No. and Grade: _____ Date: _____

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: 2/7/14 ~~August 29, 2013~~

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										PLANT TOTAL		
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 *D1*	1.8	2.800	6.9	8.2	1721.1	671.3	2284.9	2.56	3.77			
CLA *D2*	1.0	2.800	6.4	8.6	597.9	682.8	2365.5	0.88	1.26			
CLA *D3*	0.9	2.800	9.4	6.9	5.9	613.8	1921.4	0.01	0.02	7.18	11.07	2.21
CLA *D4*	2.8	4.000	5.3	7.8	469.9	708.1	2552.9	0.66	0.92			
CLA *D5*	3.2	4.000	5.3	7.8	62.8	708.1	2552.9	0.09	0.12			(W)

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.2	4.000	10.9	7.5	1723.5	579.3	1731.6	2.98	4.98			
D7												
D8												
D9												
D10												

SUBMITTED BY: TW CC ID Certificate No. and Grade: _____ Date: _____

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~~ @ 2-7-14 10:30 a.m.

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										PLANT TOTAL		
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 D1	1.7	2.700	9.6	6.8	1685.7	609.2	1894.9	2.77	4.45			
CLA D2	0.9	2.700	9.7	7.0	558.1	606.9	1881.8	0.92	1.48			
CLA D3	0.8	2.700	9.4	6.9	5.4	613.8	1921.4	0.01	0.01	7.83	13.22	2.64
CLA D4	2.9	4.000	7.4	8.0	486.7	659.8	2207.1	0.74	1.10			
CLA D5	3.1	4.000	8.7	7.4	60.9	629.9	2016.9	0.10	0.15			

SUBMITTED BY: _____ **Certificate No. and Grade:** _____ **Date:** _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	3.1	4.000	14.1	7.4	1669.7	505.7	1387.1	3.30	6.02			
D7												
D8												
D9												
D10												

SUBMITTED BY: MM/CD/JT **Certificate No. and Grade:** _____ **Date:** _____

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~~ 2-8-14 6:18 AM

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										PLANT TOTAL		
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 D1	1.3	2.700	5.2	6.8	1289.0	710.4	2570.6	1.81	2.51			
CLA D2	0.9	2.700	9.7	6.9	576.7	606.9	1881.8	0.95	1.53			
CLA D3	0.9	2.700	9.5	7.0	6.0	611.5	1908.1	0.01	0.02	6.29	9.81	1.96
CLA D4	2.8	4.000	5.8	8.5	469.9	696.6	2465.9	0.67	0.95			(A)
CLA D5	2.8	4.000	8.8	7.7	55.0	627.6	2002.9	0.09	0.14			

SUBMITTED BY: JY/JP/BD

Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	2.9	4.000	11.4	7.6	1561.9	567.8	1672.6	2.75	4.67			
D7												
D8												
D9												
D10												

SUBMITTED BY: JY/JP/BD

Certificate No. and Grade: _____ Date: _____

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: 2/8/14 ~~August 29, 2013~~

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										PLANT TOTAL		
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 *D1*	1.6	2.700	11.2	6.8	1586.5	572.4	1696.0	2.77	4.68			
CLA *D2*	1.2	2.700	11.3	6.7	744.1	570.1	1684.3	1.31	2.21			
CLA *D3*	0.5	2.700	10.4	7.0	3.1	590.8	1792.7	0.01	0.01	7.48	12.36	2.47
CLA *D4*	2.7	4.000	7.3	8.1	453.1	662.1	2222.4	0.68	1.02			(M)
CLA *D5*	2.8	4.000	7.3	8.1	55.0	662.1	2222.4	0.08	0.12			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	2.9	4.000	10.3	7.6	1561.9	593.1	1805.2	2.63	4.33			
D7												
D8												
D9												
D10												

SUBMITTED BY: TW - ID Certificate No. and Grade: _____ Date: _____

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~~ 2-8-14 10:30 PM

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										PLANT TOTAL		
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 D1	1.5	2.700	13.9	6.7	1487.4	510.3	1406.5	2.91	5.29			
CLA D2	1.0	2.700	11.8	6.7	620.1	558.6	1626.9	1.11	1.91			
CLA D3	1.0	2.700	10.5	6.9	7.1	588.5	1780.3	0.01	0.02	7.95	14.03	2.81
CLA D4	3.0	4.000	9.3	7.9	503.4	616.1	1934.7	0.82	1.30			
CLA D5	3.2	4.000	8.8	7.7	62.8	627.6	2002.9	0.10	0.16			

SUBMITTED BY: JY/WR/CD

Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	2.9	4.000	13.4	7.7	1561.9	521.8	1456.1	2.99	5.36			
D7												
D8												
D9												
D10												

SUBMITTED BY: JY/WR/CD

Certificate No. and Grade: _____ Date: _____

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~~ 2-9-14 6:00 AM

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										PLANT TOTAL		
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 *D1*	1.2	2.700	6.7	6.9	1189.9	675.9	2316.8	1.76	2.57			
CLA *D2*	0.9	2.700	11.4	6.8	545.7	567.8	1672.6	0.96	1.63			
CLA *D3*	0.9	2.700	11.0	6.9	6.3	577.5	1722.0	0.01	0.02	6.16	9.76	1.95
CLA *D4*	2.7	4.000	6.6	8.3	453.1	678.2	2332.9	0.67	0.97			
CLA *D5*	2.8	4.000	7.8	8.0	55.0	650.6	2146.7	0.08	0.13			

SUBMITTED BY: JY/JD/KQ

Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	2.9	4.000	10.7	7.6	1561.9	583.9	1755.8	2.68	4.45			
D7												
D8												
D9												
D10												

SUBMITTED BY: JY/JD/KQ

Certificate No. and Grade: _____ Date: _____

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~~ 2/9/14 3:30p

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										PLANT TOTAL		
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 D1	1.0	2.700	11.3	6.9	991.6	570.1	1684.3	1.74	2.94			
CLA D2	1.0	2.700	11.3	6.9	620.1	570.1	1684.3	1.09	1.84			
CLA D3	0.8	2.700	11.7	7.0	5.4	560.9	1638.2	0.01	0.02	6.23	10.31	2.06
CLA D4	2.5	4.000	8.1	7.7	419.5	643.7	2102.5	0.65	1.00			
CLA D5	2.9	4.000	7.2	8.3	57.0	664.4	2237.9	0.09	0.13			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	2.9	4.000	10.5	7.8	1561.9	588.5	1780.3	2.65	4.39			
D7												
D8												
D9												
D10												

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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: 2-9-14 ~~August 29, 2013~~ 10:27 PM

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										PLANT TOTAL		
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 *D1*	1.3	2.600	4.9	6.8	1338.6	728.4	2634.4	1.84	2.54			
CLA *D2*	0.9	2.600	11.1	6.7	598.9	574.7	1707.8	1.04	1.75			
CLA *D3*	0.9	2.600	10.9	6.9	6.2	579.3	1731.6	0.01	0.02	6.91	11.30	2.26
CLA *D4*	3.1	4.000	7.9	8.4	520.2	648.3	2131.9	0.80	1.22			
CLA *D5*	3.1	4.000	7.9	8.4	60.9	648.3	2131.9	0.09	0.14			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.0	4.000	13.6	7.9	1615.8	517.2	1436.1	3.12	5.63			
D7												
D8												
D9												
D10												

SUBMITTED BY: WR Certificate No. and Grade: _____ Date: 2-9-14

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~~ 2.1014 6.1704

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										PLANT TOTAL		
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 D1	1.7	2.700	7.5	6.8	1685.7	657.5	2191.8	2.56	3.85			
CLA D2	0.8	2.700	7.3	6.8	496.1	662.1	2222.4	0.75	1.12			
CLA D3	0.9	2.700	10.9	7.0	6.3	579.3	1731.6	0.01	0.02	6.86	10.58	2.12
CLA D4	2.8	4.000	4.9	8.6	469.9	728.4	2634.4	0.65	0.89			(M)
CLA D5	3.1	4.000	8.7	8.5	60.9	629.9	2016.9	0.10	0.15			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

TCEQ - (05-01-13) CT STUDY

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	3.1	4.000	10.1	8.0	1669.7	597.7	1830.4	2.79	4.56			
D7												
D8												
D9												
D10												

SUBMITTED BY: BD ERV KQ Certificate No. and Grade: _____ Date: _____

TCEQ - (05-01-13) CT STUDY

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~~ 2-10-14 7:30 PM

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										PLANT TOTAL		
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 *D1*	1.8	2.700	8.7	6.8	1784.8	629.9	2016.9	2.83	4.42			
CLA *D2*	0.8	2.700	9.1	6.7	496.1	620.7	1961.7	0.80	1.26			
CLA *D3*	0.8	2.700	8.4	7.0	5.4	636.8	2059.3	0.01	0.01	7.16	11.33	2.27
CLA *D4*	2.9	3.900	7.3	8.7	499.1	662.1	2222.4	0.75	1.12			(N)
CLA *D5*	2.9	3.900	7.3	8.7	58.4	662.1	2222.4	0.09	0.13			

SUBMITTED BY: _____ **Certificate No. and Grade:** _____ **Date:** _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	2.9	3.900	10.1	8.1	1602.0	597.7	1830.4	2.68	4.38			
D7												
D8												
D9												
D10												

SUBMITTED BY: _____ **Certificate No. and Grade:** _____ **Date:** _____

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~~ 2-10-14 11:05 Jm

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										PLANT TOTAL		
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 D1	1.6	2.700	8.1	8.6	1586.5	643.7	2102.5	2.46	3.77			
CLA D2	0.8	2.700	10.6	6.8	496.1	586.2	1768.0	0.85	1.40			
CLA D3	0.8	2.700	10.6	7.0	5.4	586.2	1768.0	0.01	0.02	6.77	10.73	2.15
CLA D4	2.9	4.000	7.9	8.7	486.7	648.3	2131.9	0.75	1.14			
CLA D5	2.9	4.000	7.6	8.7	57.0	655.2	2176.7	0.09	0.13			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

TCEQ - (05-01-13) CT STUDY

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	2.9	4.000	10.1	8.1	1561.9	597.7	1830.4	2.61	4.27			
D7												
D8												
D9												
D10												

SUBMITTED BY: MM/JW/RK Certificate No. and Grade: _____ Date: _____

TCEQ - (05-01-13) CT STUDY

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~~ 2-11-14 6:05 PM

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										PLANT TOTAL		
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 D1	1.5	2.700	0.6	6.8	1487.4	1250.0	3778.9	1.19	1.97			
CLA D2	0.9	2.700	7.1	7.0	576.7	666.7	2253.4	0.86	1.28			
CLA D3	0.9	2.700	11.7	7.0	5.9	560.9	1638.2	0.01	0.02	5.60	8.93	1.79
CLA D4	2.9	4.000	5.3	8.3	486.7	708.1	2552.9	0.69	0.95			
CLA D5	3.0	4.000	8.4	8.6	58.9	636.8	2059.3	0.09	0.14			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	3.0	4.000	10.6	9.0	1615.8	586.2	1768.0	2.76	4.57			
D7												
D8												
D9												
D10												

SUBMITTED BY: ERL BD KQ Certificate No. and Grade: _____ Date: _____

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~~ 2-11-14 3:35 PM

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										PLANT TOTAL		
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 D1	1.5	2.700	7.5	6.8	1487.4	657.5	2191.8	2.26	3.39			
CLA D2	0.9	2.700	9.1	6.6	558.1	620.7	1961.7	0.90	1.42			
CLA D3	0.8	2.700	10.0	6.9	5.4	600.0	1843.1	0.01	0.01	6.82	10.64	2.13
CLA D4	2.8	4.000	7.8	8.4	469.9	650.6	2146.7	0.72	1.09			(M)
CLA D5	3.0	4.000	7.8	8.4	58.9	650.6	2146.7	0.09	0.14			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	3.2	4.000	9.7	8.9	1723.5	606.9	1881.8	2.84	4.58			
D7												
D8												
D9												
D10												

SUBMITTED BY: RR/ID Certificate No. and Grade: _____ Date: _____

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

PWS ID No.: 2430001

PLANT NAME OR NUMBER: Temporary CT for DPR Full-Scale Verification Test - RR WWTP Source

Date: FEBRUARY 11, 2014 ~~August 29, 2013~~ 10:05 PM

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										PLANT TOTAL		
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 *D1*	1.7	2.800	9.3	6.7	1625.5	616.1	1934.7	2.64	4.20			
CLA *D2*	0.9	2.800	9.3	6.8	538.2	616.1	1934.7	0.87	1.39			
CLA *D3*	0.7	2.800	10.0	6.9	4.6	600.0	1843.1	0.01	0.01	7.25	11.86	2.37
CLA *D4*	2.8	4.000	6.8	8.6	469.9	673.6	2300.8	0.70	1.02			
CLA *D5*	3.1	4.000	6.8	8.6	60.9	673.6	2300.8	0.09	0.13			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

TCEQ - (05-01-13) CT STUDY

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.0	4.000	12.2	8.0	1615.8	549.4	1582.4	2.94	5.11			
D7												
D8												
D9												
D10												

SUBMITTED BY: MM/TW/TN Certificate No. and Grade: _____ Date: _____

TCEQ - (05-01-13) CT STUDY

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~~ 2-12-14 6:15 AM

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										PLANT TOTAL		
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 *D1*	1.4	2.700	5.4	6.9	1388.2	705.8	2535.2	1.97	2.74			
CLA *D2*	1.0	2.700	10.1	6.8	620.1	597.7	1830.4	1.04	1.69			
CLA *D3*	0.8	2.700	10.0	6.9	5.4	600.0	1843.1	0.01	0.01	6.51	10.05	2.01
CLA *D4*	2.8	4.000	6.6	8.3	469.9	678.2	2332.9	0.69	1.01			
CLA *D5*	2.8	4.000	10.0	7.8	55.0	600.0	1843.1	0.09	0.15			(M)

SUBMITTED BY: JY/JD/BD

Certificate No. and Grade: _____ Date: _____

TCEQ - (05-01-13)

CT STUDY

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.0	4.000	10.2	8.6	1615.8	595.4	1817.7	2.71	4.44			
D7												
D8												
D9												
D10												

SUBMITTED BY: JY/JD/BD

Certificate No. and Grade: _____ Date: _____

TCEQ - (05-01-13)

CT STUDY

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: 2-12-14 ~~August 29, 2013~~ 3:15PM

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										PLANT TOTAL		
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 D1	1.5	2.700	11.5	6.9	1487.4	565.5	1661.1	2.63	4.48			
CLA D2	0.9	2.700	10.8	6.7	558.1	581.6	1743.7	0.96	1.60			
CLA D3	0.7	2.700	10.6	7.0	4.8	586.2	1768.0	0.01	0.01	7.00	11.36	2.27
CLA D4	2.9	4.000	6.5	8.3	486.7	680.5	2349.1	0.72	1.04			
CLA D5	2.8	4.000	6.5	8.3	55.0	680.5	2349.1	0.08	0.12			(V)

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	3.0	4.000	9.1	7.9	1615.8	620.7	1961.7	2.60	4.12			
D7												
D8												
D9												
D10												

SUBMITTED BY: DA/ID Certificate No. and Grade: _____ Date: _____

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: 2-12-14 ~~August 29, 2013~~ 9:58 PM

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										PLANT TOTAL		
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 D1	1.7	2.700	13.3	6.9	1685.7	524.1	1466.2	3.22	5.75			
CLA D2	1.0	2.700	12.4	6.8	620.1	544.8	1560.6	1.14	1.99			
CLA D3	0.8	2.700	11.2	7.0	5.4	572.4	1696.0	0.01	0.02	8.23	14.40	2.88
CLA D4	2.8	4.000	8.0	8.1	469.9	646.0	2117.1	0.73	1.11			(V)
CLA D5	3.1	4.000	8.0	8.1	60.9	646.0	2117.1	0.09	0.14			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

TCEQ - (05-01-13) CT STUDY

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	3.0	4.000	13.0	7.9	1615.8	531.0	1497.1	3.04	5.40			
D7												
D8												
D9												
D10												

SUBMITTED BY: MM / CD Certificate No. and Grade: _____ Date: 2-12-14

TCEQ - (05-01-13) CT STUDY

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: 2/13/14 ~~August 29, 2013~~ 6:20 AM

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										PLANT TOTAL		
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 D1	1.2	2.600	6.3	6.9	1235.6	685.1	2381.9	1.80	2.59			
CLA D2	0.9	2.600	10.8	6.8	598.9	581.6	1743.7	1.03	1.72			
CLA D3	0.8	2.600	11.5	7.0	5.7	565.5	1661.1	0.01	0.02	6.33	9.96	1.99
CLA D4	2.9	4.000	7.3	8.3	486.7	662.1	2222.4	0.74	1.09			
CLA D5	2.9	4.000	9.6	7.8	57.0	609.2	1894.9	0.09	0.15			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

TCEQ - (05-01-13) CT STUDY

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	2.9	4.000	10.5	8.1	1561.9	588.5	1780.3	2.65	4.39			
D7												
D8												
D9												
D10												

SUBMITTED BY: JD / JY / BD Certificate No. and Grade: _____ Date: _____

TCEQ - (05-01-13) CT STUDY

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: 2-13-14 ~~August 29, 2013~~ 3:25 PM

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										PLANT TOTAL		
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 D1	1.7	2.700	14.4	6.9	1685.7	498.8	1358.6	3.38	6.20			
CLA D2	0.9	2.700	13.5	6.8	558.1	519.5	1446.1	1.07	1.93			
CLA D3	0.8	2.700	12.6	7.0	5.4	540.2	1539.1	0.01	0.02	8.30	14.52	2.90
CLA D4	3.1	4.000	8.1	8.5	520.2	643.7	2102.5	0.81	1.24			
CLA D5	3.0	4.000	8.1	8.5	58.9	643.7	2102.5	0.09	0.14			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	3.1	4.000	11.4	7.8	1669.7	567.8	1672.6	2.94	4.99			
D7												
D8												
D9												
D10												

SUBMITTED BY: G.P/FD Certificate No. and Grade: _____ Date: _____

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: 2-13-14 ~~August 29, 2013~~ 9:57 PM

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										PLANT TOTAL		
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 D1	1.4	2.700	15.2	6.7	1388.2	480.4	1285.3	2.89	5.40			
CLA D2	0.8	2.700	13.6	6.7	496.1	517.2	1436.1	0.96	1.73			
CLA D3	0.7	2.700	12.5	7.1	5.0	542.5	1549.8	0.01	0.02	8.01	14.64	2.93
CLA D4	3.0	4.000	8.0	8.3	503.4	646.0	2117.1	0.78	1.19			
CLA D5	3.1	4.000	8.0	8.3	60.9	646.0	2117.1	0.09	0.14			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

TCEQ - (05-01-13)

CT STUDY

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	2.9	4.000	15.4	7.8	1561.9	475.8	1267.6	3.28	6.16			
D7												
D8												
D9												
D10												

SUBMITTED BY: MM / CD Certificate No. and Grade: _____ Date: 2-13-14

TCEQ - (05-01-13)

CT STUDY

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: 2/14/14 ~~August 29, 2013~~ 6:15 am

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										PLANT TOTAL		
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 D1	1.3	2.700	9.6	6.9	1289.0	609.2	1894.9	2.12	3.40			
CLA D2	0.8	2.700	12.9	6.8	496.1	533.3	1507.5	0.93	1.65			
CLA D3	0.8	2.700	13.0	7.0	5.4	532.2	1502.2	0.01	0.02	6.57	10.81	2.16
CLA D4	2.8	4.000	9.1	8.9	469.9	620.7	1961.7	0.76	1.20			
CLA D5	2.9	4.000	10.9	8.3	57.0	579.3	1731.6	0.10	0.16			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

TCEQ - (05-01-13) CT STUDY

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	2.9	4.000	10.5	8.3	1561.9	588.5	1780.3	2.65	4.39			
D7												
D8												
D9												
D10												

SUBMITTED BY: JD / JY / BD Certificate No. and Grade: _____ Date: _____

TCEQ - (05-01-13) CT STUDY

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: 2-14-14 ~~August 29, 2013~~

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										PLANT TOTAL		
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 D1	1.1	2.700	13.7	6.9	1090.7	514.9	1426.1	2.12	3.82			
CLA D2	0.7	2.700	13.2	6.8	434.1	526.4	1476.4	0.82	1.47			
CLA D3	0.7	2.700	13.3	7.1	4.8	524.1	1466.2	0.01	0.02	6.48	11.19	2.24
CLA D4	2.9	4.000	9.9	8.8	486.7	602.3	1855.9	0.81	1.31			
CLA D5	2.9	4.000	9.9	8.8	57.0	602.3	1855.9	0.09	0.15			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	2.8	4.000	11.1	8.2	1508.1	574.7	1707.8	2.62	4.42			
D7												
D8												
D9												
D10												

SUBMITTED BY: TW ID CC Certificate No. and Grade: _____ Date: _____

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: 2-14-14 ~~August 29, 2013~~ 9:38 PM

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										PLANT TOTAL		
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 D1	1.2	2.700	13.9	6.8	1189.9	510.3	1406.5	2.33	4.23			
CLA D2	0.5	2.700	14.9	6.8	291.4	487.3	1312.3	0.60	1.11			
CLA D3	0.5	2.700	14.9	6.8	3.6	487.3	1312.3	0.01	0.01	7.24	13.31	2.66
CLA D4	2.9	4.000	12.1	8.6	486.7	551.7	1593.4	0.88	1.53			
CLA D5	3.0	4.000	12.1	8.6	58.9	551.7	1593.4	0.11	0.18			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

TCEQ - (05-01-13)

CT STUDY

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	2.9	4.000	15.6	8.5	1561.9	471.2	1250.2	3.31	6.25			
D7												
D8												
D9												
D10												

SUBMITTED BY: MM / cd Certificate No. and Grade: _____ Date: 2-14-14

TCEQ - (05-01-13)

CT STUDY

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~~ 2-15-14 6:30 AM

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										PLANT TOTAL		
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 D1	1.2	2.700	8.8	6.9	1189.9	627.6	2002.9	1.90	2.97			
CLA D2	0.8	2.700	14.1	6.8	496.1	505.7	1387.1	0.98	1.79			
CLA D3	0.7	2.700	13.9	7.0	4.6	510.3	1406.5	0.01	0.02	6.48	10.75	2.15
CLA D4	2.9	4.000	9.4	8.7	486.7	613.8	1921.4	0.79	1.27			
CLA D5	2.8	4.000	12.0	8.3	55.0	554.0	1604.5	0.10	0.17			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	2.9	4.000	11.0	8.1	1561.9	577.0	1719.7	2.71	4.54			
D7												
D8												
D9												
D10												

SUBMITTED BY: JJ/JD/BD. Certificate No. and Grade: _____ Date: _____

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: 2/15/14 ~~August 29, 2013~~

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										PLANT TOTAL		
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 *D1*	0.8	2.700	11.6	6.9	793.3	563.2	1649.6	1.41	2.40			
CLA *D2*	0.8	2.700	14.3	6.9	496.1	501.1	1368.1	0.99	1.81			
CLA *D3*	0.5	2.700	14.2	7.0	3.4	503.4	1377.6	0.01	0.01	5.80	9.79	1.96
CLA *D4*	2.7	4.000	9.7	8.7	453.1	606.9	1881.8	0.75	1.20			(W)
CLA *D5*	2.8	4.000	9.7	8.7	55.0	606.9	1881.8	0.09	0.15			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	2.8	4.000	10.4	8.3	1508.1	590.8	1792.7	2.55	4.21			
D7												
D8												
D9												
D10												

SUBMITTED BY: TW ID MS Certificate No. and Grade: _____ Date: _____

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: 2-15-14 ~~August 29, 2013~~ 10:44 Pm

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										PLANT TOTAL		
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 D1	0.6	2.700	15.8	6.7	634.6	466.6	1233.0	1.36	2.57			
CLA D2	0.6	2.700	15.8	6.7	396.9	466.6	1233.0	0.85	1.61			
CLA D3	0.4	2.700	14.4	7.0	2.7	498.8	1358.6	0.01	0.01	6.44	11.97	2.39
CLA D4	2.8	4.000	12.1	8.5	469.9	551.7	1593.4	0.85	1.47			(V)
CLA D5	3.0	4.000	12.1	8.5	58.9	551.7	1593.4	0.11	0.18			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

TCEQ - (05-01-13)

CT STUDY

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	2.9	4.000	15.3	8.4	1561.9	478.1	1276.4	3.27	6.12			
D7												
D8												
D9												
D10												

SUBMITTED BY: TN / WR / CO Certificate No. and Grade: _____ Date: 2-15-14

TCEQ - (05-01-13)

CT STUDY

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~~ 2-16-14 6:30 AM

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										PLANT TOTAL		
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 *D1*	0.9	2.700	14.2	6.9	872.6	503.4	1377.6	1.73	3.17			
CLA *D2*	0.6	2.700	15.5	6.8	396.9	473.5	1258.9	0.84	1.58			
CLA *D3*	0.8	2.700	14.6	7.0	5.4	494.2	1339.9	0.01	0.02	6.72	12.39	2.48
CLA *D4*	2.8	4.000	10.0	9.1	469.9	600.0	1843.1	0.78	1.27			
CLA *D5*	2.9	4.000	13.3	8.8	57.0	524.1	1466.2	0.11	0.19			(M)

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

TCEQ - (05-01-13)

CT STUDY

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	2.8	4.000	15.9	7.8	1508.1	464.3	1224.4	3.25	6.16			
D7												
D8												
D9												
D10												

SUBMITTED BY: JY/JD/KB Certificate No. and Grade: _____ Date: _____

TCEQ - (05-01-13)

CT STUDY

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: 2-16-14 ~~August 29, 2013~~ 2:15 PM

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										PLANT TOTAL		
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 *D1*	1.3	2.700	21.2	7.0	1318.8	342.4	848.0	3.85	7.78			
CLA *D2*	0.6	2.700	16.2	6.8	390.7	457.4	1199.2	0.85	1.63			
CLA *D3*	0.6	2.700	16.0	6.9	3.9	462.0	1216.0	0.01	0.02	8.29	15.49	3.10
CLA *D4*	2.8	4.000	11.3	9.0	469.9	570.1	1684.3	0.82	1.39			
CLA *D5*	2.9	4.000	11.3	9.0	57.0	570.1	1684.3	0.10	0.17			(M)

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	2.8	4.000	11.4	8.3	1508.1	567.8	1672.6	2.66	4.51			
D7												
D8												
D9												
D10												

SUBMITTED BY: SA/NM Certificate No. and Grade: _____ Date: _____

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: 2-16-14 ~~August 29, 2013~~ 11:06 PM

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										PLANT TOTAL		
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 D1	0.7	2.700	18.1	6.8	723.8	413.7	1051.3	1.75	3.44			
CLA D2	0.6	2.700	16.7	6.8	372.1	445.9	1158.4	0.83	1.61			
CLA D3	0.6	2.700	16.7	6.8	4.3	445.9	1158.4	0.01	0.02	6.90	13.13	2.63
CLA D4	2.9	4.000	13.3	8.8	486.7	524.1	1466.2	0.93	1.66			
CLA D5	3.0	4.000	13.3	8.8	58.9	524.1	1466.2	0.11	0.20			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

TCEQ - (05-01-13) CT STUDY

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	2.8	4.000	16.0	8.5	1508.1	462.0	1216.0	3.26	6.20			
D7												
D8												
D9												
D10												

SUBMITTED BY: WR/CD Certificate No. and Grade: _____ Date: 2-16-14

TCEQ - (05-01-13) CT STUDY

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~~ 2-17-14

6:30 A

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										PLANT TOTAL		
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 *D1*	1.3	2.700	17.3	6.8	1289.0	432.1	1111.2	2.98	5.80			
CLA *D2*	0.5	2.700	15.5	6.7	310.0	473.5	1258.9	0.65	1.23			
CLA *D3*	0.6	2.700	15.6	7.0	4.1	471.2	1250.2	0.01	0.02	7.47	13.90	2.78
CLA *D4*	2.9	4.000	14.6	9.3	486.7	494.2	1339.9	0.98	1.82			(M)
CLA *D5*	2.8	4.000	13.0	9.1	55.0	531.0	1497.1	0.10	0.18			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	2.7	4.000	13.0	9.1	1454.2	531.0	1497.1	2.74	4.86			
D7												
D8												
D9												
D10												

SUBMITTED BY: BD Certificate No. and Grade: _____ Date: _____

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~~ 2-17-14 3:25 PM

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										PLANT TOTAL		
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 D1	0.9	2.700	18.4	6.9	862.7	406.8	1029.6	2.12	4.19			
CLA D2	0.4	2.700	17.5	6.7	248.0	427.5	1095.9	0.58	1.13			
CLA D3	0.5	2.700	17.9	6.9	3.1	418.3	1065.9	0.01	0.01	6.02	10.95	2.19
CLA D4	2.9	4.000	11.7	9.1	486.7	560.9	1638.2	0.87	1.49			(A)
CLA D5	2.6	4.000	11.7	9.1	51.1	560.9	1638.2	0.09	0.16			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	2.5	4.000	11.2	9.0	1346.5	572.4	1696.0	2.35	3.97			
D7												
D8												
D9												
D10												

SUBMITTED BY: GS Certificate No. and Grade: _____ Date: _____

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~~ 2-17-14 10:50 p

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										PLANT TOTAL		
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 D1	1.3	2.700	18.9	6.8	1289.0	395.3	994.6	3.26	6.48			
CLA D2	0.4	2.700	16.6	6.6	248.0	448.2	1166.4	0.55	1.06			
CLA D3	0.4	2.700	16.1	6.9	2.7	459.7	1207.6	0.01	0.01	7.47	13.91	2.78
CLA D4	2.9	4.000	14.2	9.1	486.7	503.4	1377.6	0.97	1.77			
CLA D5	2.9	4.000	12.1	9.0	57.0	551.7	1593.4	0.10	0.18			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

TCEQ - (05-01-13) CT STUDY

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	2.7	4.000	11.6	8.9	1454.2	563.2	1649.6	2.58	4.41			
D7												
D8												
D9												
D10												

SUBMITTED BY: MM HW/RK Certificate No. and Grade: _____ Date: 2-17-14

TCEQ - (05-01-13) CT STUDY

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~~ 2-18-14 6:00 AM

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										PLANT TOTAL		
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 *D1*	1.1	2.800	7.8	6.8	1051.8	650.6	2146.7	1.62	2.45			
CLA *D2*	0.6	2.800	14.0	6.8	358.8	508.0	1396.8	0.71	1.28			
CLA *D3*	0.4	2.800	17.5	6.9	2.6	427.5	1095.9	0.01	0.01	5.79	9.54	1.91
CLA *D4*	2.9	4.000	11.5	9.2	486.7	565.5	1661.1	0.86	1.46			(V)
CLA *D5*	2.8	4.000	13.4	9.0	55.0	521.8	1456.1	0.11	0.19			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	2.7	4.000	10.7	8.0	1454.2	583.9	1755.8	2.49	4.14			
D7												
D8												
D9												
D10												

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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: 2-15-14 ~~August 29, 2013~~ 7:25 PM

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										PLANT TOTAL		
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 D1	1.5	2.700	22.8	6.8	1487.4	305.6	759.0	4.87	9.80			
CLA D2	0.4	2.700	16.9	6.7	248.0	441.3	1142.4	0.56	1.09			
CLA D3	0.3	2.700	16.7	7.0	2.0	445.9	1158.4	0.00	0.01	8.96	16.74	3.35
CLA D4	2.7	4.000	11.9	9.1	453.1	556.3	1615.7	0.81	1.40			
CLA D5	2.9	4.000	11.9	9.1	57.0	556.3	1615.7	0.10	0.18			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

TCEQ - (05-01-13) CT STUDY

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	2.9	4.000	10.1	9.1	1561.9	597.7	1830.4	2.61	4.27			
D7												
D8												
D9												
D10												

SUBMITTED BY: GB IDCC Certificate No. and Grade: _____ Date: 2/18/14

TCEQ - (05-01-13) CT STUDY

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~~ 2-18-14 10.15am

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										PLANT TOTAL		
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 *D1*	1.6	2.700	18.5	6.8	1586.5	404.5	1022.5	3.92	7.76			
CLA *D2*	0.5	2.700	16.9	6.6	285.2	441.3	1142.4	0.65	1.25			
CLA *D3*	0.1	2.700	16.0	6.9	0.5	462.0	1216.0	0.00	0.00	9.12	17.30	3.46
CLA *D4*	3.2	4.000	18.4	9.1	537.0	406.8	1029.6	1.32	2.61			
CLA *D5*	3.1	4.000	18.4	9.1	60.9	406.8	1029.6	0.15	0.30			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

TCEQ - (05-01-13) CT STUDY

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.1	4.000	12.5	8.9	1669.7	542.5	1549.8	3.08	5.39			
D7												
D8												
D9												
D10												

SUBMITTED BY: MW/TW/TJ Certificate No. and Grade: _____ Date: 2-18-14

TCEQ - (05-01-13) CT STUDY

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~~ 8-19-14 7:00 pm ERV

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										PLANT TOTAL		
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 *D1*	1.2	2.700	16.7	6.9	1189.9	445.9	1158.4	2.67	5.14			
CLA *D2*	0.4	2.700	16.3	6.8	248.0	455.1	1191.0	0.55	1.04			
CLA *D3*	0.5	2.700	16.8	6.4	3.1	443.6	1150.4	0.01	0.01	7.16	12.92	2.58
CLA *D4*	3.2	4.000	13.4	9.2	537.0	521.8	1456.1	1.03	1.84			(V)
CLA *D5*	3.3	4.000	14.9	9.0	64.8	487.3	1312.3	0.13	0.25			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.0	4.000	10.8	8.8	1615.8	581.6	1743.7	2.78	4.63			
D7												
D8												
D9												
D10												

SUBMITTED BY: ERV-JD-JY Certificate No. and Grade: _____ Date: _____

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: 2-19-14 ~~August 29, 2013~~ 3:75 PM

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										PLANT TOTAL		
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 D1	1.1	2.700	22.5	6.9	1090.7	312.5	774.9	3.49	7.04			
CLA D2	0.5	2.700	18.4	6.7	291.4	406.8	1029.6	0.72	1.42			
CLA D3	0.5	2.700	17.4	7.1	3.1	429.8	1103.5	0.01	0.01	7.97	14.86	2.97
CLA D4	3.0	4.000	13.9	9.1	503.4	510.3	1406.5	0.99	1.79			(M)
CLA D5	3.1	4.000	13.9	9.1	60.9	510.3	1406.5	0.12	0.22			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

TCEQ - (05-01-13) CT STUDY

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	2.9	4.000	10.5	8.8	1561.9	588.5	1780.3	2.65	4.39			
D7												
D8												
D9												
D10												

SUBMITTED BY: GB ID CC Certificate No. and Grade: _____ Date: 2/19/14

TCEQ - (05-01-13) CT STUDY

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: Feb. 19 2014 ~~August 29, 2013~~ 10:05PM

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										PLANT TOTAL		
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 *D1*	1.5	2.700	18.6	6.8	1487.4	402.2	1015.5	3.70	7.32			
CLA *D2*	0.5	2.700	17.6	6.7	291.4	425.2	1088.3	0.69	1.34			
CLA *D3*	0.1	2.700	16.9	6.9	0.5	441.3	1142.4	0.00	0.00	9.10	17.41	3.48
CLA *D4*	3.1	4.000	14.6	9.1	520.2	494.2	1339.9	1.05	1.94			(M)
CLA *D5*	3.2	4.000	14.6	9.1	62.8	494.2	1339.9	0.13	0.23			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.2	4.000	14.9	8.8	1723.5	487.3	1312.3	3.54	6.57			
D7												
D8												
D9												
D10												

SUBMITTED BY: MM/TN/CD Certificate No. and Grade: _____ Date: _____

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~~ 6/10/14 2-20-14

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										PLANT TOTAL		
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 D1	1.6	2.700	18.8	6.8	1586.5	397.6	1001.5	3.99	7.92			
CLA D2	0.5	2.700	18.1	6.7	316.2	413.7	1051.3	0.76	1.50			
CLA D3	0.5	2.700	17.0	7.0	3.1	439.0	1134.6	0.01	0.01	8.61	16.14	3.23
CLA D4	2.8	4.000	15.5	9.1	469.9	473.5	1258.9	0.99	1.87			
CLA D5	2.9	4.000	15.9	8.9	57.0	464.3	1224.4	0.12	0.23			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	2.9	4.000	11.2	8.8	1561.9	572.4	1696.0	2.73	4.60			
D7												
D8												
D9												
D10												

SUBMITTED BY: BD JD JY Certificate No. and Grade: _____ Date: _____

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~~ 2-20-14 3:05 PM

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										PLANT TOTAL		
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 D1	0.9	2.700	17.9	6.8	922.2	418.3	1065.9	2.20	4.33			
CLA D2	0.5	2.700	17.3	6.7	291.4	432.1	1111.2	0.67	1.31			
CLA D3	0.3	2.700	17.9	7.1	2.2	418.3	1065.9	0.01	0.01	6.49	11.76	2.35
CLA D4	2.9	4.000	12.9	9.3	486.7	533.3	1507.5	0.91	1.61			
CLA D5	2.7	4.000	12.9	9.3	53.0	533.3	1507.5	0.10	0.18			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	2.8	4.000	10.8	8.9	1508.1	581.6	1743.7	2.59	4.32			
D7												
D8												
D9												
D10												

SUBMITTED BY: GJ/ CC Certificate No. and Grade: _____ Date: _____

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: Feb. 20, 2014 ~~August 29, 2013~~ 10:05PM

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										PLANT TOTAL		
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 D1	1.6	2.700	17.3	6.8	1586.5	432.1	1111.2	3.67	7.14			
CLA D2	0.3	2.700	16.6	6.8	167.4	448.2	1166.4	0.37	0.72			
CLA D3	0.2	2.700	16.9	7.0	1.1	441.3	1142.4	0.00	0.00	7.98	15.27	3.05
CLA D4	1.7	4.000	14.6	9.2	285.3	494.2	1339.9	0.58	1.06			
CLA D5	3.1	4.000	14.6	9.2	60.9	494.2	1339.9	0.12	0.23			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	2.8	4.000	15.8	8.8	1508.1	466.6	1233.0	3.23	6.12			
D7												
D8												
D9												
D10												

SUBMITTED BY: MM/TN/CD Certificate No. and Grade: _____ Date: _____

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~~ 2-21-14
6.307

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										PLANT TOTAL		
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 *D1*	1.0	2.700	7.4	6.9	991.6	659.8	2207.1	1.50	2.25			
CLA *D2*	0.5	2.700	16.1	6.8	285.2	459.7	1207.6	0.62	1.18			
CLA *D3*	0.4	2.700	16.9	7.0	2.7	441.3	1142.4	0.01	0.01	5.83	9.87	1.97
CLA *D4*	2.8	4.000	11.7	9.3	469.9	560.9	1638.2	0.84	1.43			
CLA *D5*	2.7	4.000	14.9	9.1	53.0	487.3	1312.3	0.11	0.20			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	2.8	4.000	12.3	8.9	1508.1	547.1	1571.5	2.76	4.80			
D7												
D8												
D9												
D10												

SUBMITTED BY: BD JD JY Certificate No. and Grade: _____ Date: _____

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: 2-21-14 ~~August 29, 2013~~ 3:50PM cc

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										PLANT TOTAL		
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 *D1*	0.9	2.700	21.6	6.8	852.7	333.2	824.8	2.56	5.17			
CLA *D2*	0.2	2.700	18.3	6.7	142.6	409.1	1036.8	0.35	0.69			
CLA *D3*	0.3	2.700	16.8	7.1	1.8	443.6	1150.4	0.00	0.01	6.59	12.19	2.44
CLA *D4*	2.9	4.000	13.0	9.1	486.7	531.0	1497.1	0.92	1.63			
CLA *D5*	2.9	4.000	13.0	9.1	57.0	531.0	1497.1	0.11	0.19			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	2.8	4.000	11.4	9.0	1508.1	567.8	1672.6	2.66	4.51			
D7												
D8												
D9												
D10												

SUBMITTED BY: CC Certificate No. and Grade: _____ Date: _____

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: Feb 21, 2014 ~~August 29, 2013~~ 9:57 PM

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										PLANT TOTAL		
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 *D1*	1.4	2.700	17.2	6.9	1427.9	434.4	1118.9	3.29	6.38			
CLA *D2*	0.3	2.700	16.3	6.8	204.6	455.1	1191.0	0.45	0.86			
CLA *D3*	0.1	2.700	16.5	7.1	0.4	450.5	1174.6	0.00	0.00	8.06	15.33	3.07
CLA *D4*	3.0	4.000	14.3	9.2	503.4	501.1	1368.1	1.00	1.84			
CLA *D5*	3.0	4.000	14.3	9.2	58.9	501.1	1368.1	0.12	0.22			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	2.8	4.000	15.6	8.9	1508.1	471.2	1250.2	3.20	6.03			
D7												
D8												
D9												
D10												

SUBMITTED BY: MM/TN/CD Certificate No. and Grade: _____ Date: _____

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~~ 2-22-14 6:00 AM

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										PLANT TOTAL		
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 *D1*	1.8	2.700	11.8	6.9	1824.5	558.6	1626.9	3.27	5.61			
CLA *D2*	0.7	2.700	16.7	6.8	452.7	445.9	1158.4	1.02	1.95			
CLA *D3*	0.6	2.700	16.3	7.0	4.2	455.1	1191.0	0.01	0.02	9.54	17.25	3.45
CLA *D4*	3.8	4.000	12.8	9.1	637.7	535.6	1517.9	1.19	2.10			
CLA *D5*	3.8	4.000	14.9	9.1	74.6	487.3	1312.3	0.15	0.28			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.5	4.000	15.1	8.9	1885.1	482.7	1294.3	3.91	7.28			
D7												
D8												
D9												
D10												

SUBMITTED BY: JY/BD Certificate No. and Grade: _____ Date: _____

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

PWS ID No.: 2430001

PLANT NAME OR NUMBER: Temporary CT for DPR Full-Scale Verification Test - RR WWTP Source

Date: 2/22/14 ~~August 29, 2013~~

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										PLANT TOTAL		
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 D1	1.9	2.700	19.3	6.9	1844.3	386.1	967.4	4.78	9.53			
CLA D2	0.8	2.700	17.8	6.9	483.7	420.6	1073.4	1.15	2.25			
CLA D3	0.5	2.700	17.4	7.0	3.1	429.8	1103.5	0.01	0.01	10.90	20.46	4.09
CLA D4	3.8	4.000	13.9	9.1	637.7	510.3	1406.5	1.25	2.27			
CLA D5	3.7	4.000	11.9	8.8	72.7	556.3	1615.7	0.13	0.22			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

CEQ - (05-01-13)

CT STUDY

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	3.7	4.000	11.9	8.8	1992.8	556.3	1615.7	3.58	6.17			
D7												
D8												
D9												
D10												

SUBMITTED BY: THW/ID Certificate No. and Grade: _____ Date: _____

CEQ - (05-01-13)

CT STUDY

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

PWS ID No.: 2430001

PLANT NAME OR NUMBER: Temporary CT for DPR Full-Scale Verification Test - RR WWTP Source

Date: Feb. 22, 2014 ~~August 29, 2013~~ 10:35 PM

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										PLANT TOTAL		
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 D1	0.7	2.700	28.4	6.8	704.0	255.0	514.8	2.76	6.84			
CLA D2	0.7	2.700	17.4	6.8	440.3	429.8	1103.5	1.02	1.99			
CLA D3	0.4	2.700	16.6	7.0	2.4	448.2	1166.4	0.01	0.01	9.60	19.83	3.97
CLA D4	3.5	4.000	14.5	9.2	587.3	496.5	1349.2	1.18	2.18			(V)
CLA D5	3.8	4.000	14.5	9.2	74.6	496.5	1349.2	0.15	0.28			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

CEQ - (05-01-13)

CT STUDY

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	3.8	4.000	16.2	9.4	2046.7	457.4	1199.2	4.47	8.53			
D7												
D8												
D9												
D10												

SUBMITTED BY: TN/WR/CD Certificate No. and Grade: _____ Date: _____

CEQ - (05-01-13)

CT STUDY

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~~ 2-23-14 6:30 AM

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										PLANT TOTAL		
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 *D1*	1.5	2.700	15.8	6.9	1437.8	466.6	1233.0	3.08	5.83			
CLA *D2*	0.8	2.700	17.3	6.9	465.1	432.1	1111.2	1.08	2.09			
CLA *D3*	0.8	2.700	16.7	7.1	5.4	445.9	1158.4	0.01	0.02	9.24	16.94	3.39
CLA *D4*	3.7	4.000	13.5	9.2	620.9	519.5	1446.1	1.20	2.15			
CLA *D5*	3.7	4.000	15.2	9.1	72.7	480.4	1285.3	0.15	0.28			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.7	4.000	12.8	8.9	1992.8	535.6	1517.9	3.72	6.56			
D7												
D8												
D9												
D10												

SUBMITTED BY: JY/JD Certificate No. and Grade: _____ Date: _____

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~~ 2-23-14 2:20 PM

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										PLANT TOTAL		
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 D1	1.8	2.700	13.7	6.8	1745.2	514.9	1426.1	3.39	6.12			
CLA D2	0.9	2.700	17.8	6.8	527.1	420.6	1073.4	1.25	2.46			
CLA D3	0.6	2.700	17.2	7.0	4.2	434.4	1118.9	0.01	0.02	9.34	16.76	3.35
CLA D4	3.6	4.000	13.3	9.2	604.1	524.1	1466.2	1.15	2.06			
CLA D5	3.6	4.000	12.6	9.2	70.7	540.2	1539.1	0.13	0.23			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	3.5	4.000	12.0	8.8	1885.1	554.0	1604.5	3.40	5.87			
D7												
D8												
D9												
D10												

SUBMITTED BY: [signature] Certificate No. and Grade: _____ Date: _____

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: 2-23-14 ~~August 29, 2013~~ 10:31 AM

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										PLANT TOTAL		
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 *D1*	1.5	2.700	11.9	6.8	1487.4	556.3	1615.7	2.67	4.60			
CLA *D2*	0.8	2.700	15.6	6.7	483.7	471.2	1250.2	1.03	1.93			
CLA *D3*	0.4	2.700	15.6	6.7	2.4	471.2	1250.2	0.01	0.01	9.11	16.61	3.32
CLA *D4*	3.6	4.000	13.6	9.1	604.1	517.2	1436.1	1.17	2.10			
CLA *D5*	3.8	4.000	13.6	9.1	74.6	517.2	1436.1	0.14	0.26			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.6	4.000	15.5	8.7	1939.0	473.5	1258.9	4.09	7.70			
D7												
D8												
D9												
D10												

SUBMITTED BY: WR/TW/CO Certificate No. and Grade: _____ Date: 2-23-14

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~~ 2-24-14
6.730

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										PLANT TOTAL		
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 D1	1.5	2.600	10.3	6.8	1544.6	593.1	1805.2	2.60	4.28			
CLA D2	0.7	2.600	15.0	6.7	476.5	485.0	1303.3	0.98	1.83			
CLA D3	0.4	2.600	16.7	6.3	2.8	445.9	1158.4	0.01	0.01	8.60	14.86	2.97
CLA D4	3.6	4.000	11.2	9.2	604.1	572.4	1696.0	1.06	1.78			
CLA D5	3.8	4.000	13.8	8.9	74.6	512.6	1416.3	0.15	0.26			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	3.8	4.000	12.7	8.7	2046.7	537.9	1528.5	3.80	6.70			
D7												
D8												
D9												
D10												

SUBMITTED BY: BD Certificate No. and Grade: _____ Date: _____

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

PWS ID No.: 2430001

PLANT NAME OR NUMBER: Temporary CT for DPR Full-Scale Verification Test - RR WWTP Source

Date: 2-24-14 ~~August 28, 2013~~ 3:15 PM

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										PLANT TOTAL		
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 *D1*	2.0	2.700	11.5	6.7	1983.1	565.5	1661.1	3.51	5.97			
CLA *D2*	0.8	2.700	15.5	6.6	477.5	473.5	1258.9	1.01	1.90			
CLA *D3*	0.5	2.700	17.0	6.9	3.3	439.0	1134.6	0.01	0.01	9.58	16.78	3.36
CLA *D4*	3.6	4.000	12.3	9.1	604.1	547.1	1571.5	1.10	1.92			(V)
CLA *D5*	3.7	4.000	12.3	9.1	72.7	547.1	1571.5	0.13	0.23			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.8	4.000	12.8	8.6	2046.7	535.6	1517.9	3.82	6.74			
D7												
D8												
D9												
D10												

SUBMITTED BY: RR/CC Certificate No. and Grade: _____ Date: _____

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~~ 2-24-14 10:40 am

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										PLANT TOTAL		
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 D1	2.0	2.700	16.5	6.7	1983.1	450.5	1174.6	4.40	8.44			
CLA D2	0.7	2.700	15.7	7.0	458.9	468.9	1241.5	0.98	1.85			
CLA D3	0.5	2.700	15.7	7.0	3.5	468.9	1241.5	0.01	0.01	11.15	21.12	4.22
CLA D4	3.7	4.000	13.5	9.1	620.9	519.5	1446.1	1.20	2.15			
CLA D5	3.8	4.000	13.1	9.0	74.6	528.7	1486.7	0.14	0.25			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	3.8	4.000	16.0	8.6	2046.7	462.0	1216.0	4.43	8.42			
D7												
D8												
D9												
D10												

SUBMITTED BY: MM/TW/RK Certificate No. and Grade: _____ Date: 2-24-14

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~~ 2-25-14 6:30 AM

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										PLANT TOTAL		
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 *D1*	1.7	2.700	15.1	7.0	1685.7	482.7	1294.3	3.49	6.51			
CLA *D2*	0.7	2.700	14.6	6.7	440.3	494.2	1339.9	0.89	1.64			
CLA *D3*	0.5	2.700	15.9	6.2	3.5	464.3	1224.4	0.01	0.01	9.51	17.08	3.42
CLA *D4*	3.7	4.000	10.9	9.1	620.9	579.3	1731.6	1.07	1.79			(A)
CLA *D5*	3.7	4.000	13.5	9.2	72.7	519.5	1446.1	0.14	0.25			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.9	4.000	12.7	8.6	2100.5	537.9	1528.5	3.91	6.87			
D7												
D8												
D9												
D10												

SUBMITTED BY: BD Certificate No. and Grade: _____ Date: _____

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: 2-25-14 ~~August 29, 2013~~ 3:05 PM

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										PLANT TOTAL		
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 *D1*	1.3	2.700	12.3	6.7	1289.0	547.1	1571.5	2.36	4.10			
CLA *D2*	0.8	2.700	14.7	6.7	477.5	491.9	1330.6	0.97	1.79			
CLA *D3*	0.6	2.700	15.0	6.9	4.1	485.0	1303.3	0.01	0.02	8.33	14.73	2.95
CLA *D4*	3.6	4.000	12.1	8.9	604.1	551.7	1593.4	1.10	1.90			
CLA *D5*	3.6	4.000	12.1	8.9	70.7	551.7	1593.4	0.13	0.22			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.7	4.000	13.1	8.9	1992.8	528.7	1486.7	3.77	6.70			
D7												
D8												
D9												
D10												

SUBMITTED BY: GM CC Certificate No. and Grade: _____ Date: _____

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~~ 2-25-14 10:10 a

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										PLANT TOTAL		
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 *D1*	1.9	2.700	12.9	6.7	1854.2	533.3	1507.5	3.48	6.15			
CLA *D2*	0.6	2.700	13.2	6.7	372.1	526.4	1476.4	0.71	1.26			
CLA *D3*	0.4	2.700	14.7	6.9	2.7	491.9	1330.6	0.01	0.01	9.20	16.24	3.25
CLA *D4*	3.7	4.000	12.3	9.0	620.9	547.1	1571.5	1.13	1.98			
CLA *D5*	3.8	4.000	12.3	9.0	74.6	547.1	1571.5	0.14	0.24			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.7	4.000	12.9	8.7	1992.8	533.3	1507.5	3.74	6.61			
D7												
D8												
D9												
D10												

SUBMITTED BY: MM/JW/TJ Certificate No. and Grade: _____ Date: 2-25-14

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: 2/26/2014 ~~August 29, 2013~~
6:20 pm

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										PLANT TOTAL		
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 D1	1.1	2.700	6.2	6.8	1090.7	687.4	2398.5	1.59	2.27			
CLA D2	0.7	2.700	12.7	6.8	452.7	537.9	1528.5	0.84	1.48			
CLA D3	0.5	2.700	13.9	6.9	3.5	510.3	1406.5	0.01	0.01	7.00	11.46	2.29
CLA D4	3.6	4.000	7.2	9.0	604.1	664.4	2237.9	0.91	1.35			
CLA D5	3.6	4.000	11.9	8.9	70.7	556.3	1615.7	0.13	0.22			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	3.6	4.000	12.2	8.6	1939.0	549.4	1582.4	3.53	6.13			
D7												
D8												
D9												
D10												

SUBMITTED BY: JD / JY / BD Certificate No. and Grade: _____ Date: _____

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~~ 2-26-14 3:40 PM

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										PLANT TOTAL		
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 *D1*	1.6	2.700	4.2	6.8	1586.5	822.0	2839.8	1.93	2.79			
CLA *D2*	0.6	2.700	11.9	6.6	372.1	556.3	1615.7	0.67	1.15			
CLA *D3*	0.5	2.700	14.1	6.9	3.5	505.7	1387.1	0.01	0.01	7.19	11.71	2.34
CLA *D4*	3.6	4.000	10.0	8.9	604.1	600.0	1843.1	1.01	1.64			(W)
CLA *D5*	3.6	4.000	10.0	8.9	70.7	600.0	1843.1	0.12	0.19			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.6	4.000	11.7	8.6	1939.0	560.9	1638.2	3.46	5.92			
D7												
D8												
D9												
D10												

SUBMITTED BY: GAI CC Certificate No. and Grade: _____ Date: _____

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: FEB. 26, 2014 ~~August 29, 2013~~ 10:20PM

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										PLANT TOTAL		
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 *D1*	1.6	2.700	8.1	6.8	1586.5	643.7	2102.5	2.46	3.77			
CLA *D2*	1.2	2.700	13.3	6.7	744.1	524.1	1466.2	1.42	2.54			
CLA *D3*	0.2	2.700	13.7	6.9	1.4	514.9	1426.1	0.00	0.00	9.50	16.65	3.33
CLA *D4*	3.6	4.000	11.7	8.9	604.1	560.9	1638.2	1.08	1.84			(M)
CLA *D5*	3.5	4.000	11.7	8.9	68.7	560.9	1638.2	0.12	0.21			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.9	4.000	15.4	7.7	2100.5	475.8	1267.6	4.41	8.29			
D7												
D8												
D9												
D10												

SUBMITTED BY: TN/CD/JY Certificate No. and Grade: _____ Date: _____

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~~ 2-27-14 6:30 AM

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										PLANT TOTAL		
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 D1	1.5	2.700	5.9	6.8	1487.4	694.3	2448.9	2.14	3.04			
CLA D2	0.8	2.700	15.0	6.7	496.1	485.0	1303.3	1.02	1.90			
CLA D3	0.6	2.700	13.5	6.9	3.7	519.5	1446.1	0.01	0.01	8.08	13.29	2.66
CLA D4	3.9	4.000	8.6	8.9	654.5	632.2	2030.9	1.04	1.61			(M)
CLA D5	3.8	4.000	10.9	8.5	74.6	579.3	1731.6	0.13	0.22			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	3.8	4.000	12.3	7.9	2046.7	547.1	1571.5	3.74	6.51			
D7												
D8												
D9												
D10												

SUBMITTED BY: JY / JDS / BD Certificate No. and Grade: _____ Date: _____

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~~ 2-27-14 3:15PM

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										PLANT TOTAL		
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 *D1*	1.5	2.700	11.2	6.7	1487.4	572.4	1696.0	2.60	4.38			
CLA *D2*	0.7	2.700	13.6	6.5	434.1	517.2	1436.1	0.84	1.51			
CLA *D3*	0.4	2.700	14.3	7.0	2.7	501.1	1368.1	0.01	0.01	8.37	14.39	2.88
CLA *D4*	3.7	4.000	9.6	8.9	620.9	609.2	1894.9	1.02	1.64			
CLA *D5*	3.8	4.000	9.6	8.9	74.6	609.2	1894.9	0.12	0.20			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.8	4.000	12.6	8.2	2046.7	540.2	1539.1	3.79	6.65			
D7												
D8												
D9												
D10												

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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~~ FEB. 27, 2014 10:10 PM

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										PLANT TOTAL		
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 *D1*	1.8	2.700	14.4	6.8	1784.8	498.8	1358.6	3.58	6.57			
CLA *D2*	0.6	2.700	13.9	6.7	347.3	510.3	1406.5	0.68	1.23			
CLA *D3*	0.2	2.700	13.5	6.8	1.1	519.5	1446.1	0.00	0.00	10.19	18.93	3.79
CLA *D4*	3.8	4.000	12.2	8.9	637.7	549.4	1582.4	1.16	2.01			
CLA *D5*	3.7	4.000	12.2	8.9	72.7	549.4	1582.4	0.13	0.23			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.9	4.000	16.4	7.9	2100.5	452.8	1182.7	4.64	8.88			
D7												
D8												
D9												
D10												

SUBMITTED BY: MM/TN/CD Certificate No. and Grade: _____ Date: _____

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~~ 2-28-14 6:30 AM

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										PLANT TOTAL		
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 *D1*	1.2	2.700	9.5	6.6	1189.9	611.5	1908.1	1.95	3.12			
CLA *D2*	0.7	2.700	14.1	6.6	440.3	505.7	1387.1	0.87	1.59			
CLA *D3*	0.4	2.700	13.7	6.9	3.0	514.9	1426.1	0.01	0.01	7.89	13.44	2.69
CLA *D4*	3.8	4.000	10.2	9.0	637.7	595.4	1817.7	1.07	1.75			
CLA *D5*	4.0	4.000	11.5	9.0	78.6	565.5	1661.1	0.14	0.24			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.9	4.000	12.4	8.2	2100.5	544.8	1560.6	3.86	6.73			
D7												
D8												
D9												
D10												

SUBMITTED BY: JY/JD/BO. Certificate No. and Grade: _____ Date: _____

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: 2-28-14 3:20PM ~~August 29, 2013~~

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										PLANT TOTAL		
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 D1	1.8	2.700	16.6	6.7	1784.8	448.2	1166.4	3.98	7.65			
CLA D2	0.6	2.700	15.1	6.6	384.5	482.7	1294.3	0.80	1.49			
CLA D3	0.5	2.700	14.7	6.9	3.4	491.0	1327.0	0.01	0.01	9.71	17.59	3.52
CLA D4	3.8	4.000	12.4	9.1	637.7	544.8	1560.6	1.17	2.04			(M)
CLA D5	3.8	4.000	12.4	9.1	74.6	544.8	1560.6	0.14	0.24			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	3.8	4.000	11.5	8.3	2046.7	565.5	1661.1	3.62	6.16			
D7												
D8												
D9												
D10												

SUBMITTED BY: TW/IO/cc Certificate No. and Grade: _____ Date: _____

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: FEB. 28, 2014 ~~August 28, 2013~~ 10:06PM

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										PLANT TOTAL		
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 D1	1.9	2.700	18.5	6.7	1893.9	404.5	1022.5	4.68	9.26			
CLA D2	0.5	2.700	15.7	6.6	279.0	468.9	1241.5	0.60	1.12			
CLA D3	0.2	2.700	15.7	6.6	1.5	468.9	1241.5	0.00	0.01	10.22	19.37	3.87
CLA D4	3.6	4.000	13.1	8.9	604.1	528.7	1486.7	1.14	2.03			
CLA D5	3.9	4.000	13.1	8.9	76.6	528.7	1486.7	0.14	0.26			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	3.4	4.000	14.3	8.3	1831.2	501.1	1368.1	3.65	6.69			
D7												
D8												
D9												
D10												

SUBMITTED BY: MM/TN/CD Certificate No. and Grade: _____ Date: _____

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 20, 2013~~ 3-1-14 6:15 AM

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										PLANT TOTAL		
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 D1	1.5	2.700	12.9	6.7	1487.4	533.3	1507.5	2.79	4.93			
CLA D2	0.6	2.700	16.1	6.7	384.5	459.7	1207.6	0.84	1.59			
CLA D3	0.3	2.700	15.5	7.0	1.9	473.5	1258.9	0.00	0.01	9.47	17.45	3.49
CLA D4	3.7	4.000	12.2	9.1	620.9	549.4	1582.4	1.13	1.96			
CLA D5	3.8	4.000	13.7	8.9	74.6	514.9	1426.1	0.14	0.26			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	3.9	4.000	16.1	8.3	2100.5	459.7	1207.6	4.57	8.70			
D7												
D8												
D9												
D10												

SUBMITTED BY: JJ/BD Certificate No. and Grade: _____ Date: _____

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~~ 3/4/14

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										PLANT TOTAL		
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 *D1*	1.4	2.700	19.1	6.8	1388.2	390.7	980.9	3.55	7.08			
CLA *D2*	0.8	2.700	16.5	6.7	496.1	450.5	1174.6	1.10	2.11			
CLA *D3*	0.6	2.700	16.6	7.0	3.9	448.2	1166.4	0.01	0.02	9.82	18.49	3.70
CLA *D4*	3.6	4.000	15.7	9.0	604.1	468.9	1241.5	1.29	2.43			(W)
CLA *D5*	3.7	4.000	12.9	8.5	72.7	533.3	1507.5	0.14	0.24			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.7	4.000	12.9	8.5	1992.8	533.3	1507.5	3.74	6.61			
D7												
D8												
D9												
D10												

SUBMITTED BY: Titus Certificate No. and Grade: _____ Date: _____

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~~ 3-1-14 10:00 PM

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										PLANT TOTAL		
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 *D1*	1.3	2.700	19.7	7.0	1289.0	376.9	940.9	3.42	6.85			
CLA *D2*	0.5	2.700	16.4	6.9	322.4	452.8	1182.7	0.71	1.36			
CLA *D3*	0.6	2.700	15.6	7.0	4.1	471.2	1250.2	0.01	0.02	9.38	17.75	3.55
CLA *D4*	3.8	4.000	16.6	9.1	637.7	448.2	1166.4	1.42	2.73			(V)
CLA *D5*	3.7	4.000	16.6	9.1	72.7	448.2	1166.4	0.16	0.31			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.6	4.000	13.0	8.7	1939.0	531.0	1497.1	3.65	6.48			
D7												
D8												
D9												
D10												

SUBMITTED BY: JY/JD/CD Certificate No. and Grade: _____ Date: _____

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~~ 3-2-14 Le:15 Am

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										PLANT TOTAL		
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 *D1*	1.4	2.700	12.1	6.9	1388.2	551.7	1593.4	2.52	4.36			
CLA *D2*	0.6	2.700	12.4	6.7	359.7	544.8	1560.6	0.66	1.15			
CLA *D3*	0.3	2.700	14.9	6.9	2.0	487.3	1312.3	0.00	0.01	7.63	13.19	2.64
CLA *D4*	3.4	4.000	9.3	9.3	570.6	616.1	1934.7	0.93	1.47			
CLA *D5*	3.4	4.000	12.1	8.9	66.8	551.7	1593.4	0.12	0.21			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.4	4.000	12.7	9.0	1831.2	537.9	1528.5	3.40	5.99			
D7												
D8												
D9												
D10												

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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: 3-7-14 ~~August 29, 2013~~ 3:00PM

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										PLANT TOTAL		
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 *D1*	1.4	2.700	7.6	6.9	1417.9	655.2	2176.7	2.16	3.26			
CLA *D2*	0.6	2.700	12.4	6.8	396.9	544.8	1560.6	0.73	1.27			
CLA *D3*	0.4	2.700	15.0	6.9	2.4	485.0	1303.3	0.00	0.01	7.43	12.33	2.47
CLA *D4*	3.7	4.000	9.7	9.2	620.9	606.9	1881.8	1.02	1.65			
CLA *D5*	3.6	4.000	10.4	9.2	70.7	590.8	1792.7	0.12	0.20			

SUBMITTED BY: _____ **Certificate No. and Grade:** _____ **Date:** _____

TCEQ - (05-01-13) CT STUDY

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.4	4.000	12.6	8.8	1831.2	540.2	1539.1	3.39	5.95			
D7												
D8												
D9												
D10												

SUBMITTED BY: [signature] **Certificate No. and Grade:** _____ **Date:** _____

TCEQ - (05-01-13) CT STUDY

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: 3-2-14 ~~August 29, 2013~~ 10:40 PM

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										PLANT TOTAL		
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 D1	1.6	2.700	9.5	6.8	1586.5	611.5	1908.1	2.59	4.16			
CLA D2	0.6	2.700	11.4	6.6	372.1	567.8	1672.6	0.66	1.11			
CLA D3	0.3	2.700	13.1	6.9	2.3	528.7	1486.7	0.00	0.01	8.04	13.60	2.72
CLA D4	3.6	4.000	6.9	9.0	604.1	671.3	2284.9	0.90	1.32			
CLA D5	3.6	4.000	6.9	9.0	70.7	671.3	2284.9	0.11	0.15			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

TCEQ - (05-01-13) CT STUDY

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	3.6	4.000	13.8	8.6	1939.0	512.6	1416.3	3.78	6.85			
D7												
D8												
D9												
D10												

SUBMITTED BY: WR / CO / RK Certificate No. and Grade: _____ Date: 3-2-14

TCEQ - (05-01-13) CT STUDY

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~~ 3-3-14 6-25-14

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										PLANT TOTAL		
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 *D1*	1.9	2.700	7.7	6.5	1884.0	652.9	2161.6	2.89	4.36			
CLA *D2*	0.6	2.700	10.3	6.6	341.1	593.1	1805.2	0.58	0.94			
CLA *D3*	0.4	2.700	10.1	7.0	2.7	597.7	1830.4	0.00	0.01	8.61	14.49	2.90
CLA *D4*	3.7	4.000	10.1	9.2	620.9	597.7	1830.4	1.04	1.70			(M)
CLA *D5*	3.8	4.000	10.1	8.9	74.6	597.7	1830.4	0.12	0.20			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.7	4.000	14.3	8.5	1992.8	501.1	1368.1	3.98	7.28			
D7												
D8												
D9												
D10												

SUBMITTED BY: BD KQ Certificate No. and Grade: _____ Date: _____

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: 3-3-14 ~~August 29, 2013~~ 2:55PM

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										PLANT TOTAL		
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 *D1*	1.8	2.700	9.1	6.6	1784.8	620.7	1961.7	2.88	4.55			
CLA *D2*	0.6	2.700	9.9	6.6	359.7	602.3	1855.9	0.60	0.97			
CLA *D3*	0.4	2.700	11.7	6.9	3.0	560.2	1634.8	0.01	0.01	8.22	13.49	2.70
CLA *D4*	3.6	4.000	7.5	9.1	604.1	657.5	2191.8	0.92	1.38			(V)
CLA *D5*	3.7	4.000	7.5	9.1	72.7	657.5	2191.8	0.11	0.17			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.8	4.000	12.1	8.8	2046.7	551.7	1593.4	3.71	6.42			
D7												
D8												
D9												
D10												

SUBMITTED BY: GA cc Certificate No. and Grade: _____ Date: _____

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~~ 3-3-14 10:25 pm

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										PLANT TOTAL		
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 D1	1.9	2.700	9.4	6.7	1884.0	613.8	1921.4	3.07	4.90			
CLA D2	0.7	2.700	11.6	6.8	434.1	563.2	1649.6	0.77	1.32			
CLA D3	0.3	2.700	11.0	6.9	1.7	577.0	1719.7	0.00	0.00	8.61	14.39	2.88
CLA D4	3.6	4.000	8.9	9.0	604.1	625.3	1989.1	0.97	1.52			
CLA D5	3.8	4.000	8.2	9.0	74.6	641.4	2088.0	0.12	0.18			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

TCEQ - (05-01-13) CT STUDY

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	3.7	4.000	12.6	8.7	1992.8	540.2	1539.1	3.69	6.47			
D7												
D8												
D9												
D10												

SUBMITTED BY: MM TW/RK Certificate No. and Grade: _____ Date: 3-3-14

TCEQ - (05-01-13) CT STUDY

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~~ 3-4-14 5.307

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										PLANT TOTAL		
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 *D1*	1.7	2.700	10.9	6.7	1685.7	579.3	1731.6	2.91	4.87			
CLA *D2*	0.7	2.700	9.5	6.6	427.9	611.5	1908.1	0.70	1.12			
CLA *D3*	0.6	2.700	11.0	6.8	4.2	577.0	1719.7	0.01	0.01	8.28	13.99	2.80
CLA *D4*	3.6	4.000	9.8	8.9	604.1	604.6	1868.8	1.00	1.62			(V)
CLA *D5*	3.8	4.000	9.9	8.8	74.6	602.3	1855.9	0.12	0.20			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.6	4.000	12.3	8.6	1939.0	547.1	1571.5	3.54	6.17			
D7												
D8												
D9												
D10												

SUBMITTED BY: BD KA Certificate No. and Grade: _____ Date: _____

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: 3-4-14 ~~August 29, 2013~~ 3:25PM

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										PLANT TOTAL		
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 *D1*	1.8	2.700	10.7	6.7	1784.8	583.9	1755.8	3.06	5.08			
CLA *D2*	0.7	2.700	10.9	6.7	434.1	579.3	1731.6	0.75	1.25			
CLA *D3*	0.6	2.700	11.9	6.9	3.8	557.5	1621.3	0.01	0.01	8.43	14.23	2.85
CLA *D4*	3.5	4.000	7.9	8.8	587.3	648.3	2131.9	0.91	1.38			(V)
CLA *D5*	3.6	4.000	7.9	8.8	70.7	648.3	2131.9	0.11	0.17			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.6	4.000	12.7	8.4	1939.0	537.9	1528.5	3.60	6.34			
D7												
D8												
D9												
D10												

SUBMITTED BY: [signature] CC Certificate No. and Grade: _____ Date: _____

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: MARCH 4, 2014 ~~August 29, 2013~~ 10:11 PM

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										PLANT TOTAL		
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 *D1*	1.6	2.700	13.1	6.7	1586.5	528.7	1486.7	3.00	5.34			
CLA *D2*	0.5	2.700	11.4	6.7	310.0	567.8	1672.6	0.55	0.93			
CLA *D3*	0.5	2.700	11.6	6.9	3.1	563.2	1649.6	0.01	0.01	8.25	14.45	2.89
CLA *D4*	3.6	4.000	9.7	9.0	604.1	606.9	1881.8	1.00	1.61			
CLA *D5*	3.6	4.000	9.7	9.0	70.7	606.9	1881.8	0.12	0.19			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

TCEQ - (05-01-13)

CT STUDY

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.5	4.000	13.2	8.5	1885.1	526.4	1476.4	3.58	6.38			
D7												
D8												
D9												
D10												

SUBMITTED BY: MM/TAW/TN Certificate No. and Grade: _____ Date: _____

TCEQ - (05-01-13)

CT STUDY

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~~ 3-5-14 G:104

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										PLANT TOTAL		
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 D1	1.4	2.700	7.7	7.1	1388.2	652.9	2161.6	2.13	3.21			
CLA D2	0.6	2.700	12.3	6.8	359.7	547.1	1571.5	0.66	1.14			
CLA D3	0.6	2.700	12.0	6.8	3.9	554.0	1604.5	0.01	0.01	7.83	13.29	2.66
CLA D4	3.7	4.000	10.0	9.2	620.9	600.0	1843.1	1.03	1.68			
CLA D5	3.5	4.000	11.0	8.6	68.7	577.0	1719.7	0.12	0.20			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	3.7	4.000	13.8	8.5	1992.8	512.6	1416.3	3.89	7.04			
D7												
D8												
D9												
D10												

SUBMITTED BY: BD JY Certificate No. and Grade: _____ Date: _____

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: 3-5-14 ~~August 29, 2013~~ 3:20 PM

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										PLANT TOTAL		
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 *D1*	1.4	2.700	13.2	6.8	1388.2	526.4	1476.4	2.64	4.70			
CLA *D2*	0.5	2.700	12.8	6.6	328.6	535.6	1517.9	0.61	1.08			
CLA *D3*	0.5	2.700	12.7	6.9	3.1	538.1	1529.6	0.01	0.01	7.83	13.51	2.70
CLA *D4*	3.6	4.000	8.7	9.1	604.1	629.9	2016.9	0.96	1.50			(M)
CLA *D5*	3.7	4.000	8.7	9.1	72.7	629.9	2016.9	0.12	0.18			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.6	4.000	12.0	8.6	1939.0	554.0	1604.5	3.50	6.04			
D7												
D8												
D9												
D10												

SUBMITTED BY: RH CC Certificate No. and Grade: _____ Date: _____

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: MARCH 05, 2014 ~~August 29, 2013~~ 10:06 PM

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										PLANT TOTAL		
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 *D1*	1.8	2.700	12.9	6.8	1804.7	533.3	1507.5	3.38	5.99			
CLA *D2*	0.6	2.700	11.6	6.7	359.7	563.2	1649.6	0.64	1.09			
CLA *D3*	0.4	2.700	12.7	6.9	2.4	537.9	1528.5	0.00	0.01	8.84	15.49	3.10
CLA *D4*	3.6	4.000	11.3	9.2	604.1	570.1	1684.3	1.06	1.79			
CLA *D5*	3.8	4.000	11.3	9.2	74.6	570.1	1684.3	0.13	0.22			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.6	4.000	12.8	8.7	1939.0	535.6	1517.9	3.62	6.39			
D7												
D8												
D9												
D10												

SUBMITTED BY: MM/TN/CD Certificate No. and Grade: _____ Date: _____

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~~ 3-6-14 6:15 AM

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										PLANT TOTAL		
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 D1	1.6	2.700	9.1	6.8	1586.5	620.7	1961.7	2.56	4.04			
CLA D2	0.8	2.700	13.9	6.7	477.5	510.3	1406.5	0.94	1.70			
CLA D3	0.4	2.700	12.9	6.9	2.7	533.3	1507.5	0.01	0.01	8.00	13.29	2.66
CLA D4	3.5	4.000	8.3	9.2	587.3	639.1	2073.6	0.92	1.42			
CLA D5	3.6	4.000	11.1	8.9	70.7	574.7	1707.8	0.12	0.21			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	3.6	4.000	11.7	9.0	1939.0	560.9	1638.2	3.46	5.92			
D7												
D8												
D9												
D10												

SUBMITTED BY: JY/JB/RD Certificate No. and Grade: _____ Date: _____

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: 3-6-14 ~~August 29, 2013~~ 3:35 PM

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										PLANT TOTAL		
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 *D1*	1.5	2.700	11.9	6.8	1487.4	556.3	1615.7	2.67	4.60			
CLA *D2*	0.6	2.700	13.5	6.7	384.5	519.5	1446.1	0.74	1.33			
CLA *D3*	0.5	2.700	14.3	6.9	3.3	500.2	1364.3	0.01	0.01	7.88	13.60	2.72
CLA *D4*	3.5	4.000	9.0	8.9	587.3	623.0	1975.4	0.94	1.49			(M)
CLA *D5*	3.6	4.000	9.0	8.9	70.7	623.0	1975.4	0.11	0.18			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.4	4.000	12.7	8.8	1831.2	537.9	1528.5	3.40	5.99			
D7												
D8												
D9												
D10												

SUBMITTED BY: YA / CC Certificate No. and Grade: _____ Date: _____

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

PWS ID No.: 2430001

PLANT NAME OR NUMBER: Temporary CT for DPR Full-Scale Verification Test - RR WWTP Source

Date: MARCH 06, 2014 ~~August 29, 2013~~ 10:15PM

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										PLANT TOTAL		
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 *D1*	1.9	2.700	15.3	6.8	1884.0	478.1	1276.4	3.94	7.38			
CLA *D2*	0.6	2.700	14.5	6.7	359.7	496.5	1349.2	0.72	1.33			
CLA *D3*	0.4	2.700	13.8	6.9	2.4	512.6	1416.3	0.00	0.01	9.62	17.77	3.55
CLA *D4*	3.5	4.000	13.1	9.0	587.3	528.7	1486.7	1.11	1.98			(V)
CLA *D5*	3.7	4.000	13.1	9.0	72.7	528.7	1486.7	0.14	0.24			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

TCEQ - (05-01-13) CT STUDY

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.4	4.000	14.6	8.5	1831.2	494.2	1339.9	3.71	6.83			
D7												
D8												
D9												
D10												

SUBMITTED BY: TN/CD Certificate No. and Grade: _____ Date: _____

TCEQ - (05-01-13) CT STUDY

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~~ 3-7-14 6:00 AM

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										PLANT TOTAL		
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 D1	1.4	2.700	9.2	6.8	1368.4	618.4	1948.2	2.21	3.51			
CLA D2	0.7	2.700	13.6	6.6	452.7	517.2	1436.1	0.88	1.58			
CLA D3	0.6	2.700	13.9	6.9	3.7	510.3	1406.5	0.01	0.01	7.57	12.69	2.54
CLA D4	3.5	4.000	9.8	9.2	587.3	604.6	1868.8	0.97	1.57			
CLA D5	3.6	4.000	12.0	9.0	70.7	554.0	1604.5	0.13	0.22			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	3.5	4.000	11.8	8.9	1885.1	558.6	1626.9	3.37	5.79			
D7												
D8												
D9												
D10												

SUBMITTED BY: JY/JD/BD Certificate No. and Grade: _____ Date: _____

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: 3-7-14 ~~August 28, 2013~~ 2:50 PM

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										PLANT TOTAL		
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 *D1*	1.8	2.700	15.9	6.8	1784.8	464.3	1224.4	3.84	7.29			
CLA *D2*	0.6	2.700	15.3	6.6	384.5	478.1	1276.4	0.80	1.51			
CLA *D3*	0.4	2.700	14.8	7.0	3.0	490.5	1325.1	0.01	0.01	9.17	16.55	3.31
CLA *D4*	3.4	4.000	12.0	9.1	570.6	554.0	1604.5	1.03	1.78			(M)
CLA *D5*	3.5	4.000	11.7	9.0	68.7	560.9	1638.2	0.12	0.21			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.5	4.000	11.7	9.0	1885.1	560.9	1638.2	3.36	5.75			
D7												
D8												
D9												
D10												

SUBMITTED BY: CL Certificate No. and Grade: _____ Date: _____

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: 3-7-14 ~~August 29, 2013~~ 9:52 PM

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										PLANT TOTAL		
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 D1	1.6	2.700	18.2	6.7	1586.5	411.4	1044.0	3.86	7.60			
CLA D2	0.5	2.700	16.2	6.6	310.0	457.4	1199.2	0.68	1.29			
CLA D3	0.4	2.700	16.2	6.6	2.5	457.4	1199.2	0.01	0.01	9.63	18.46	3.69
CLA D4	3.1	4.000	14.5	9.0	520.2	496.5	1349.2	1.05	1.93			
CLA D5	3.5	4.000	14.5	9.0	68.7	496.5	1349.2	0.14	0.25			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

TCEQ - (05-01-13) CT STUDY

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	3.4	4.000	15.7	8.9	1831.2	468.9	1241.5	3.91	7.37			
D7												
D8												
D9												
D10												

SUBMITTED BY: MM / CD Certificate No. and Grade: _____ Date: 3-7-14

TCEQ - (05-01-13) CT STUDY

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~~ 3-8-14 6:15 AM

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										PLANT TOTAL		
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 D1	1.2	2.700	13.5	6.7	1189.9	519.5	1446.1	2.29	4.11			
CLA D2	0.6	2.700	15.3	6.7	359.7	478.1	1276.4	0.75	1.41			
CLA D3	0.5	2.700	15.1	7.0	3.1	482.7	1294.3	0.01	0.01	7.52	13.26	2.65
CLA D4	3.4	4.000	12.6	9.1	570.6	540.2	1539.1	1.06	1.85			
CLA D5	3.5	4.000	14.1	9.0	68.7	505.7	1387.1	0.14	0.25			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	3.4	4.000	11.8	9.1	1831.2	558.6	1626.9	3.28	5.63			
D7												
D8												
D9												
D10												

SUBMITTED BY: JY/BO Certificate No. and Grade: _____ Date: _____

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

PWS ID No.: 2430001

PLANT NAME OR NUMBER: Temporary CT for DPR Full-Scale Verification Test - RR WWTP Source

Date: ~~August 29, 2013~~ 8 MARCH-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										PLANT TOTAL		
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 *D1*	1.3	2.700	12.3	6.7	1289.0	547.1	1571.5	2.36	4.10			
CLA *D2*	0.6	2.700	14.1	6.7	341.1	505.7	1387.1	0.67	1.23			
CLA *D3*	0.6	2.700	15.1	7.0	3.7	482.7	1294.3	0.01	0.01	7.47	12.95	2.59
CLA *D4*	3.4	4.000	11.3	9.2	570.6	570.1	1684.3	1.00	1.69			(W)
CLA *D5*	3.4	4.000	12.0	9.1	66.8	554.0	1604.5	0.12	0.21			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.4	4.000	12.0	9.1	1831.2	554.0	1604.5	3.31	5.71			
D7												
D8												
D9												
D10												

SUBMITTED BY: TAW Certificate No. and Grade: _____ Date: _____

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~~ 3-8-14 10:32 PM

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										PLANT TOTAL		
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 D1	0.9	2.700	10.1	6.7	892.4	597.7	1830.4	1.49	2.44			
CLA D2	0.3	2.700	13.9	6.6	210.8	510.3	1406.5	0.41	0.75			
CLA D3	0.3	2.700	13.9	6.6	2.3	510.3	1406.5	0.00	0.01	6.57	11.30	2.26
CLA D4	3.5	4.000	9.0	9.2	587.3	623.0	1975.4	0.94	1.49			
CLA D5	3.8	4.000	9.0	9.2	74.6	623.0	1975.4	0.12	0.19			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	3.5	4.000	13.3	8.8	1885.1	524.1	1466.2	3.60	6.43			
D7												
D8												
D9												
D10												

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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~~ 3-9-14 6:00 AM

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										PLANT TOTAL		
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 *D1*	1.3	2.700	8.4	6.7	1239.5	636.8	2059.3	1.95	3.01			
CLA *D2*	0.6	2.700	13.8	6.8	341.1	512.6	1416.3	0.67	1.20			
CLA *D3*	0.3	2.700	14.7	7.0	2.2	491.9	1330.6	0.00	0.01	7.16	11.90	2.38
CLA *D4*	3.5	4.000	9.9	9.2	587.3	602.3	1855.9	0.98	1.58			
CLA *D5*	3.6	4.000	11.6	9.1	70.7	563.2	1649.6	0.13	0.21			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.6	4.000	11.6	9.0	1939.0	563.2	1649.6	3.44	5.88			
D7												
D8												
D9												
D10												

SUBMITTED BY: JY/JD/KQ Certificate No. and Grade: _____ Date: _____

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: 3-9-14 ~~August 29, 2013~~ 2:40PM

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										PLANT TOTAL		
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 D1	1.6	2.700	16.8	6.8	1546.8	443.6	1150.4	3.49	6.72			
CLA D2	0.6	2.700	17.1	6.7	359.7	436.7	1126.7	0.82	1.60			
CLA D3	0.5	2.700	15.5	6.8	3.3	473.5	1258.9	0.01	0.01	8.80	15.97	3.19
CLA D4	3.4	4.000	10.2	9.3	570.6	595.4	1817.7	0.96	1.57			
CLA D5	3.6	4.000	10.2	9.3	70.7	595.4	1817.7	0.12	0.19			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	3.5	4.000	12.0	8.8	1885.1	554.0	1604.5	3.40	5.87			
D7												
D8												
D9												
D10												

SUBMITTED BY: [signature] Certificate No. and Grade: _____ Date: _____

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: 3-9-14 ~~August 29, 2013~~ 10:40 PM

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										PLANT TOTAL		
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 D1	0.5	2.700	14.9	6.7	495.8	487.3	1312.3	1.02	1.89			
CLA D2	0.4	2.700	16.7	6.7	248.0	445.9	1158.4	0.56	1.07			
CLA D3	0.3	2.700	16.7	6.7	1.8	445.9	1158.4	0.00	0.01	6.87	12.88	2.58
CLA D4	3.4	4.000	13.4	9.0	570.6	521.8	1456.1	1.09	1.96			
CLA D5	3.8	4.000	13.4	9.0	74.6	521.8	1456.1	0.14	0.26			(A)

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	3.5	4.000	15.9	8.8	1885.1	464.3	1224.4	4.06	7.70			
D7												
D8												
D9												
D10												

SUBMITTED BY: WR / CD Certificate No. and Grade: _____ Date: 3-9-14

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~~ 3-10-14 6:10 - AM

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										PLANT TOTAL		
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 D1	1.5	2.700	14.3	6.7	1517.1	501.1	1368.1	3.03	5.54			
CLA D2	0.7	2.700	15.8	6.7	421.7	466.6	1233.0	0.90	1.71			
CLA D3	0.6	2.700	15.0	7.0	3.7	485.0	1303.3	0.01	0.01	8.46	15.05	3.01
CLA D4	3.6	4.000	9.9	9.3	604.1	602.3	1855.9	1.00	1.63			AM
CLA D5	3.7	4.000	13.2	8.9	72.7	526.4	1476.4	0.14	0.25			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	3.4	4.000	12.5	8.7	1831.2	542.5	1549.8	3.38	5.91			
D7												
D8												
D9												
D10												

SUBMITTED BY: JY/BD/KQ Certificate No. and Grade: _____ Date: _____

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: 3-10-14 ~~August 29, 2013~~ 3:30 PM

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										PLANT TOTAL		
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 D1	1.7	2.700	15.9	6.7	1685.7	464.3	1224.4	3.63	6.88			
CLA D2	0.7	2.700	16.5	6.6	421.7	450.5	1174.6	0.94	1.79			
CLA D3	0.5	2.700	16.1	7.0	3.5	460.6	1210.9	0.01	0.01	9.16	16.62	3.32
CLA D4	3.5	4.000	11.1	9.1	587.3	574.7	1707.8	1.02	1.72			(M)
CLA D5	3.6	4.000	11.1	9.1	70.7	574.7	1707.8	0.12	0.21			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	3.5	4.000	12.3	8.9	1885.1	547.1	1571.5	3.45	6.00			
D7												
D8												
D9												
D10												

SUBMITTED BY: GB/CC Certificate No. and Grade: _____ Date: _____

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

PWS ID No.: 2430001

PLANT NAME OR NUMBER: Temporary CT for DPR Full-Scale Verification Test - RR WWTP Source

Date: 3-10-14 ~~August 29, 2013~~

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										PLANT TOTAL		
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 *D1*	1.6	2.700	19.1	6.7	1586.5	390.7	980.9	4.06	8.09			
CLA *D2*	0.6	2.700	17.3	6.6	347.3	432.1	1111.2	0.80	1.56			
CLA *D3*	0.9	2.700	15.8	7.0	6.1	466.6	1233.0	0.01	0.02	9.72	18.27	3.65
CLA *D4*	3.6	4.000	14.3	9.1	604.1	501.1	1368.1	1.21	2.21			(M)
CLA *D5*	3.5	4.000	12.7	8.9	68.7	537.9	1528.5	0.13	0.22			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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*	3.5	4.000	12.7	8.9	1885.1	537.9	1528.5	3.50	6.17			
D7												
D8												
D9												
D10												

SUBMITTED BY: TAW Certificate No. and Grade: _____ Date: _____

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~~ 3-11-14 6:45Am

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										PLANT TOTAL		
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 D1	1.3	2.700	15.1	6.7	1289.0	482.7	1294.3	2.67	4.98			
CLA D2	0.6	2.700	17.0	6.7	372.1	439.0	1134.6	0.85	1.64			
CLA D3	0.4	2.700	16.3	7.0	2.7	455.1	1191.0	0.01	0.01	8.24	14.80	2.96
CLA D4	3.5	4.000	13.2	9.2	587.3	526.4	1476.4	1.12	1.99			
CLA D5	3.6	4.000	11.8	8.8	70.7	558.6	1626.9	0.13	0.22			

SUBMITTED BY: _____ Certificate No. and Grade: _____ Date: _____

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						

DISINFECTION PROCESS DATA

INDIVIDUAL DISINFECTION ZONES										PLANT TOTAL		
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	3.6	4.000	11.8	8.8	1939.0	558.6	1626.9	3.47	5.96			
D7												
D8												
D9												
D10												

SUBMITTED BY: ERV BT Certificate No. and Grade: _____ Date: _____