

ICR TREATMENT STUDY ANALYSIS

Base Analysis and Data Review Comments

Treatment Study ID	1061
Study Protocol	GAC bench-scale treatment study
Plant ICR Number	761
PWS Name	City of Lincoln Water System
City, State, Zip	Lincoln, NE 68503

These are general comments that do not need to be responded to directly.

Major comments:

1. The source water for this treatment study is a groundwater. Due to limited seasonal variability, quarterly runs did not evaluate the impact of seasonal variability on GAC performance. Instead, four GACs were evaluated: Calgon F-400, Calgon F-200, Norit GAC 1240, and Picacarb 830. The Norit GAC 1240 and Calgon F-400 yielded the longest throughput to effluent criteria. The same SDS chlorination conditions were utilized during all runs.
2. All RSSCTs were designed based on literature values of the GAC dry bed density to yield full-scale EBCTs of 10 and 20 minutes. The measured dry bed density was used to determine the reported full-scale EBCTs. These values ranged from 84 to 126 percent of the target EBCTs. Table III-4 of the Summary Report summarizes the actual EBCTs obtained during the study.

General Comments:

1. Quarter 2 (Calgon F-400 10 and 20 minute EBCT runs): The 20 minute EBCT run data reported was performed on a separate batch sample. (An insufficient amount of water was collected for the original 20 minute EBCT run, performed in July, and it did not reach 70 percent TOC breakthrough. The run was repeated with a new grab sample in November.) The average influent TOC concentration of each EBCT run differed by 21 percent (1.7 and 2.1 mg/L). The lower influent concentration was associated with the 10 minute EBCT run. UV-254 showed a similar difference. SDS-THM4 and SDS-HAA6 showed little difference in formed GAC influent concentrations between the two runs, but the relative percent difference for SDS-TOX between the two runs was 53 percent. TSUVA and bromide concentration were similar between the two runs. *Due to the differences in influent water*

quality, the two runs may not be directly comparable. Furthermore, although the influent SDS-THM4 concentrations were similar, as were the bromide concentrations, changes occurred in GAC effluent THM speciation between the two EBCT runs.

2. Quarter 4 (Norit GAC 1240 10 and 20 minute EBCT runs): Since the actual EBCTs (9.6 and 19.2 minutes) obtained were within 5 percent of the target EBCTs (10 and 20 minutes), the target EBCTs can be used for data analysis.
3. This study also evaluated the breakthrough of the herbicides atrazine, diethylatrazine, and di-isopropylatrazine. Results are summarized in Table IV-3 of the Summary Report. Although GAC influent levels were measured above detection limits, all GAC effluent concentrations were below detection limits. All runs except the F-200 runs were evaluated. The runs were monitored for herbicides until the run was completed based on TOC breakthrough.
4. Missing GAC Cost Parameters include: Special Sitework Factor and Labor Overhead Factor. Utility was unable to provide this data. With regard to Modifications to Existing Plant, EPA Treatment Studies Coordinator estimated a value based on discussions with the utility.

Outlier Data:

No outliers were removed.

Cell: A1

Comment: 1061-761-SAS.xls 2/22/00 13:41

All curve fits reviewed and approved. See below for log of refit datasets.

Cell: C6

Comment: 1061-084-01 - Run 1 (CHCl3) 2/22/00 13:20
Original value (CoefA0) = 0 New value = -0.537
Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: D6

Comment: 1061-084-01 - Run 1 (CHCl3) 2/22/00 13:20
Original value (CoefAf) = 0 New value = 5.6978
Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: E6

Comment: 1061-084-01 - Run 1 (CHCl3) 2/22/00 13:20
Original value (CoefB) = 0 New value = 22.4188
Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: F6

Comment: 1061-084-01 - Run 1 (CHCl3) 2/22/00 13:20
Original value (CoefD) = 0 New value = 0.0473
Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: J6

Comment: 1061-084-01 - Run 1 (CHCl3) 2/22/00 13:20
Original value (S) = 0 New value = 0
Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: C43

Comment: 1061-10-02 - Run 3 (TOX) 2/22/00 13:23
Original value (CoefA0) = -14.1503 New value = -5.364
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

Cell: D43

Comment: 1061-10-02 - Run 3 (TOX) 2/22/00 13:23
Original value (CoefAf) = 50.7 New value = 38.0114
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

Cell: E43

Comment: 1061-10-02 - Run 3 (TOX) 2/22/00 13:23
Original value (CoefB) = 1.3999 New value = 2.5405
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

Cell: F43

Comment: 1061-10-02 - Run 3 (TOX) 2/22/00 13:23
Original value (CoefD) = 0.0133 New value = 0.0207
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

Cell: J43

Comment: 1061-10-02 - Run 3 (TOX) 2/22/00 13:23

Original value (S) = 0 New value = 0

Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

Cell: C44

Comment: 1061-10-02 - Run 3 (TSUVA) 2/22/00 13:22

Original value (CoefA0) = -0.8174 New value = -0.0752

Poor peak curve fit. Data was refit by iterative curve fit procedure.

Cell: D44

Comment: 1061-10-02 - Run 3 (TSUVA) 2/22/00 13:22

Original value (CoefAf) = 2.4521 New value = 1.6277

Poor peak curve fit. Data was refit by iterative curve fit procedure.

Cell: E44

Comment: 1061-10-02 - Run 3 (TSUVA) 2/22/00 13:22

Original value (CoefB) = 1.8602 New value = 19.9836

Poor peak curve fit. Data was refit by iterative curve fit procedure.

Cell: F44

Comment: 1061-10-02 - Run 3 (TSUVA) 2/22/00 13:22

Original value (CoefD) = 0.0364 New value = 0.0756

Poor peak curve fit. Data was refit by iterative curve fit procedure.

Cell: J44

Comment: 1061-10-02 - Run 3 (TSUVA) 2/22/00 13:22

Original value (S) = 0 New value = -0.0056

Poor peak curve fit. Data was refit by iterative curve fit procedure.

Cell: C50

Comment: 1061-126-03 - Run 5 (CHCl3) 2/22/00 13:26

Original value (CoefA0) = 0 New value = -0.425

Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: D50

Comment: 1061-126-03 - Run 5 (CHCl3) 2/22/00 13:26

Original value (CoefAf) = 0 New value = 4.0618

Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: E50

Comment: 1061-126-03 - Run 5 (CHCl3) 2/22/00 13:26

Original value (CoefB) = 0 New value = 196.5579

Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: F50

Comment: 1061-126-03 - Run 5 (CHCl3) 2/22/00 13:26

Original value (CoefD) = 0 New value = 0.2382

Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: J50

Comment: 1061-126-03 - Run 5 (CHCI3) 2/22/00 13:26
Original value (S) = 0 New value = 0
Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: C54

Comment: 1061-126-03 - Run 5 (DCAA) 2/22/00 13:27
Original value (CoefA0) = 0 New value = -0.5108
Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: D54

Comment: 1061-126-03 - Run 5 (DCAA) 2/22/00 13:27
Original value (CoefAf) = 0 New value = 2.8309
Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: E54

Comment: 1061-126-03 - Run 5 (DCAA) 2/22/00 13:27
Original value (CoefB) = 0 New value = 135.2368
Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: F54

Comment: 1061-126-03 - Run 5 (DCAA) 2/22/00 13:27
Original value (CoefD) = 0 New value = 0.2469
Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: J54

Comment: 1061-126-03 - Run 5 (DCAA) 2/22/00 13:27
Original value (S) = 0 New value = 0
Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: C72

Comment: 1061-096-04 - Run 7 (CHCI3) 2/22/00 13:28
Original value (CoefA0) = 0 New value = -0.6758
Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: D72

Comment: 1061-096-04 - Run 7 (CHCI3) 2/22/00 13:28
Original value (CoefAf) = 0 New value = 14.6252
Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: E72

Comment: 1061-096-04 - Run 7 (CHCI3) 2/22/00 13:28
Original value (CoefB) = 0 New value = 43.5558
Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: F72

Comment: 1061-096-04 - Run 7 (CHCI3) 2/22/00 13:28
Original value (CoefD) = 0 New value = 0.0187
Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: J72

Comment: 1061-096-04 - Run 7 (CHCI3) 2/22/00 13:28

Original value (S) = 0 New value = 0
Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: C94

Comment: 1061-167-01 - Run 2 (CHCl3) 2/22/00 13:21
Original value (CoefA0) = 0 New value = -0.2518
Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: D94

Comment: 1061-167-01 - Run 2 (CHCl3) 2/22/00 13:21
Original value (CoefAf) = 0 New value = 8.2176
Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: E94

Comment: 1061-167-01 - Run 2 (CHCl3) 2/22/00 13:21
Original value (CoefB) = 0 New value = 234.3528
Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: F94

Comment: 1061-167-01 - Run 2 (CHCl3) 2/22/00 13:21
Original value (CoefD) = 0 New value = 0.0459
Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: J94

Comment: 1061-167-01 - Run 2 (CHCl3) 2/22/00 13:21
Original value (S) = 0 New value = 0
Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: C116

Comment: 1061-20-02 - Run 4 (CHCl3) 2/22/00 13:24
Original value (CoefA0) = 0 New value = -0.2436
Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: D116

Comment: 1061-20-02 - Run 4 (CHCl3) 2/22/00 13:24
Original value (CoefAf) = 0 New value = 7.5154
Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: E116

Comment: 1061-20-02 - Run 4 (CHCl3) 2/22/00 13:24
Original value (CoefB) = 0 New value = 119.2314
Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: F116

Comment: 1061-20-02 - Run 4 (CHCl3) 2/22/00 13:24
Original value (CoefD) = 0 New value = 0.0149
Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: J116

Comment: 1061-20-02 - Run 4 (CHCl3) 2/22/00 13:24
Original value (S) = 0 New value = 0

Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: C120

Comment: 1061-20-02 - Run 4 (DCAA) 2/22/00 13:25
Original value (CoefA0) = 0 New value = -0.2658
Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: D120

Comment: 1061-20-02 - Run 4 (DCAA) 2/22/00 13:25
Original value (CoefAf) = 0 New value = 9.6136
Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: E120

Comment: 1061-20-02 - Run 4 (DCAA) 2/22/00 13:25
Original value (CoefB) = 0 New value = 94.8054
Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: F120

Comment: 1061-20-02 - Run 4 (DCAA) 2/22/00 13:25
Original value (CoefD) = 0 New value = 0.0115
Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: J120

Comment: 1061-20-02 - Run 4 (DCAA) 2/22/00 13:25
Original value (S) = 0 New value = 0
Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: C150

Comment: 1061-252-03 - Run 6 (TCAA) 2/22/00 13:17
Original value (CoefA0) = 0 New value = 1.1
Fewer than 6 points above MRL. Step function applied.

Cell: D150

Comment: 1061-252-03 - Run 6 (TCAA) 2/22/00 13:17
Original value (CoefAf) = 0 New value = 0
Fewer than 6 points above MRL. Step function applied.

Cell: E150

Comment: 1061-252-03 - Run 6 (TCAA) 2/22/00 13:17
Original value (CoefB) = 0 New value = 0
Fewer than 6 points above MRL. Step function applied.

Cell: F150

Comment: 1061-252-03 - Run 6 (TCAA) 2/22/00 13:17
Original value (CoefD) = 0 New value = 0
Fewer than 6 points above MRL. Step function applied.

Cell: J150

Comment: 1061-252-03 - Run 6 (TCAA) 2/22/00 13:17
Original value (S) = 0 New value = 0
Fewer than 6 points above MRL. Step function applied.

Cell: K150

Comment: 1061-252-03 - Run 6 (TCAA) 2/22/00 13:17
Original value (t0) = 0 New value = 68.5676
Fewer than 6 points above MRL. Step function applied.

Cell: C160

Comment: 1061-192-04 - Run 8 (CHCl3) 2/22/00 13:28
Original value (CoefA0) = 0 New value = -0.1634
Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: D160

Comment: 1061-192-04 - Run 8 (CHCl3) 2/22/00 13:28
Original value (CoefAf) = 0 New value = 5.6501
Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: E160

Comment: 1061-192-04 - Run 8 (CHCl3) 2/22/00 13:28
Original value (CoefB) = 0 New value = 122.8889
Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: F160

Comment: 1061-192-04 - Run 8 (CHCl3) 2/22/00 13:28
Original value (CoefD) = 0 New value = 0.0166
Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: J160

Comment: 1061-192-04 - Run 8 (CHCl3) 2/22/00 13:28
Original value (S) = 0 New value = 0
Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: C164

Comment: 1061-192-04 - Run 8 (DCAA) 2/22/00 13:30
Original value (CoefA0) = 0 New value = -0.1868
Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: D164

Comment: 1061-192-04 - Run 8 (DCAA) 2/22/00 13:30
Original value (CoefAf) = 0 New value = 21.8615
Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: E164

Comment: 1061-192-04 - Run 8 (DCAA) 2/22/00 13:30
Original value (CoefB) = 0 New value = 545.1942
Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: F164

Comment: 1061-192-04 - Run 8 (DCAA) 2/22/00 13:30
Original value (CoefD) = 0 New value = 0.0128
Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: J164

Comment: 1061-192-04 - Run 8 (DCAA) 2/22/00 13:30

Original value (S) = 0 New value = 0

Fewer than 6 points above MRL. Logistic function (type 1) applied.

ICR Information

ID / ICR#: NE3110926 / ICR761
 ICR Contact: Jerry Obrist
 Phone No.: (402)441-7571
 Period: 7/28/98 - 8/7/98 (10 B-S days)

Design Information

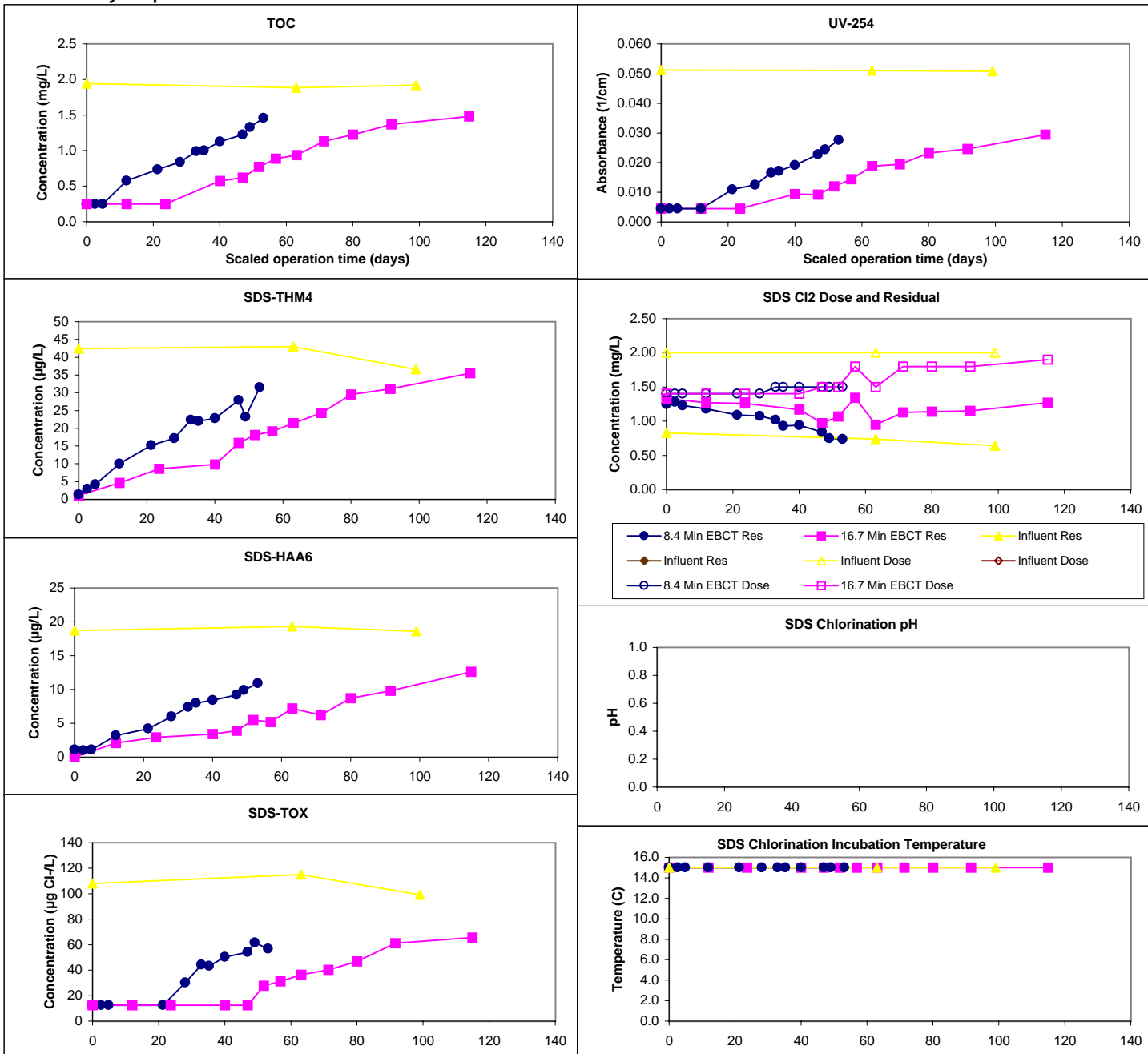
Design TOC: 2.0 mg/L
 Col Diameter: 11.0 mm
 Min Reynolds#: 0.48
 Full-Scale Temp: 12.9 C

Full-Scale GAC Size: 12x40 Bituminous
 Bench-Scale GAC Size: 140x200
 Scaling Factor: 11.63
 Meas Dry Bed Density: 0.54 g/cm3

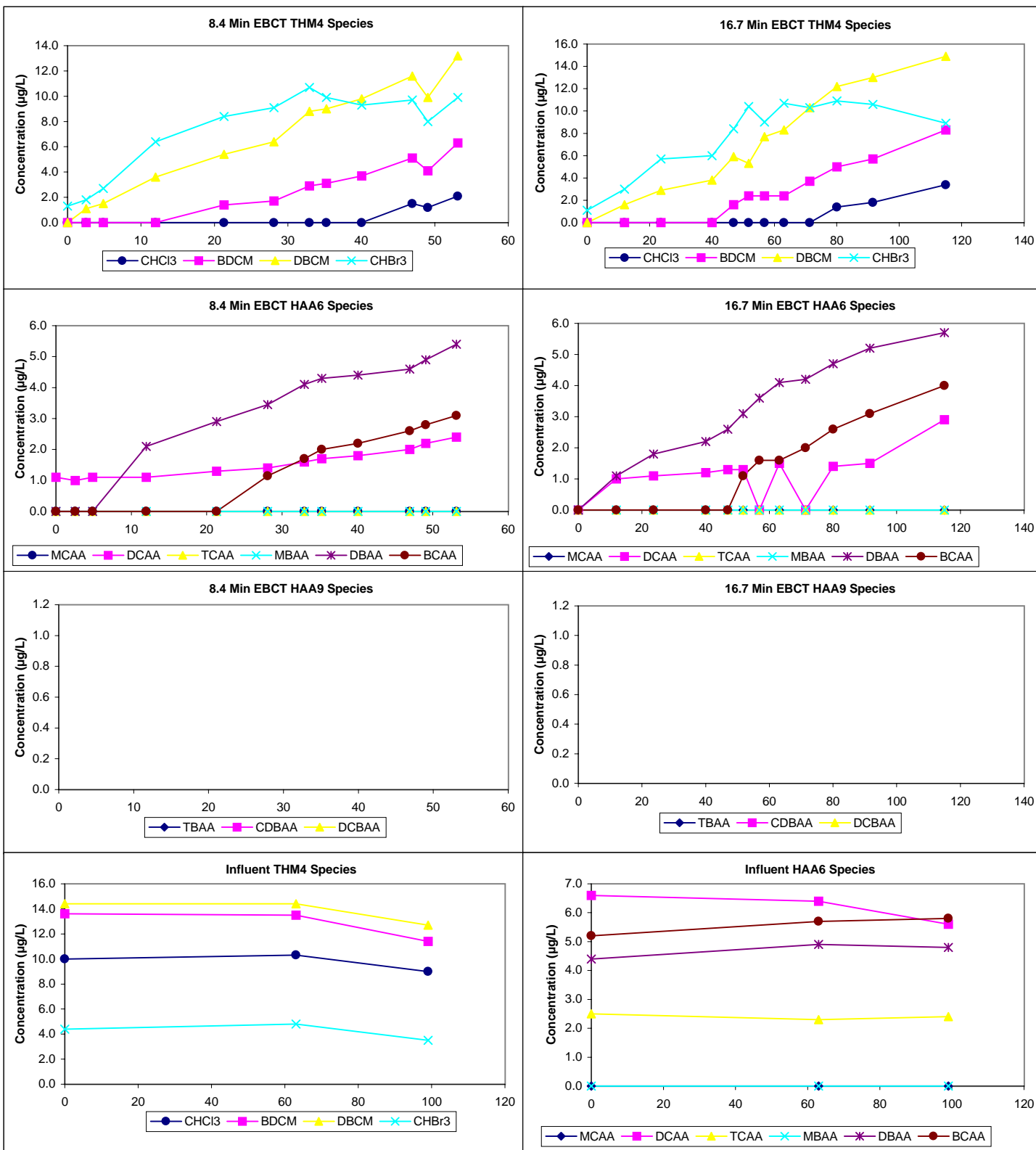
Water Quality Summary

Influent	Influent				Influent				Res (0)	Mean	SD	Count	Min/Max
	Mean	SD/RD	Count	Min/Max	Mean	SD/RD	Count	Min/Max					
TOC	1.9	0.0	3	1.9 - 1.9						1.06	0.20	27	0.64 - 1.34
pH	8.0	0.2	3	7.7 - 8.2						15.0	0.0	27	15.0 - 15.0
UV254	0.051	0.000	3	0.051 - 0.051						NA	NA	0	0.0 - 0.0
SUVA	2.66	0.04	3	2.64 - 2.71						16.5	0.0	27	16.5 - 16.5
Bromide	136	1	2	135 - 136						Comments:			
SDS-TOX	107	8	3	99 - 115									
SDS-THM4	41	4	3	37 - 43									
SDS-HAA6	19	0	3	19 - 19									
Effluent	8.4 Min EBCT (5 B-S days)				16.7 Min EBCT (10 B-S days)				Chart Legend:	<div><div><div></div><div>8.4 Min EBCT</div></div><div><div></div><div>16.7 Min EBCT</div></div><div><div></div><div>Influent</div></div><div><div></div><div>Influent</div></div></div>			
Effluent pH	8.1	0.1	12	7.8 - 8.3	8.3	0.1	12	8.0 - 8.4					
Effluent Temp	23.6	0.6	12	22.2 - 24.3	23.3	0.5	12	22.5 - 24.1					

Water Quality Graphs



Water Quality Graphs (Continued)



ICR Information

ID / ICR#: NE3110926 / ICR761
 ICR Contact: Jerry Obrist
 Phone No.: (402)441-7571
 Period: 7/2/98 - 12/17/98 (168 B-S days)

Design Information

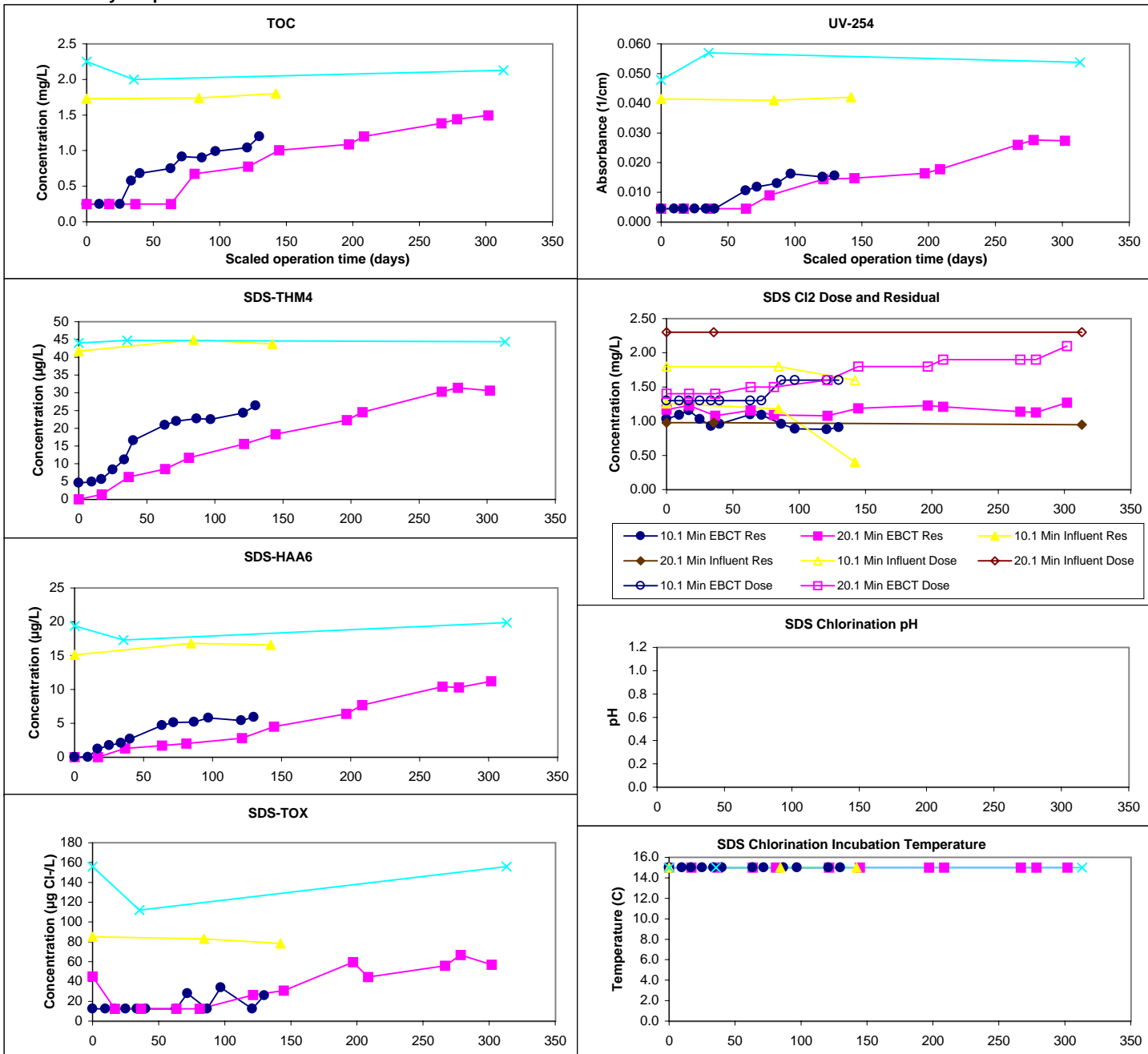
Design TOC: 2.0 mg/L
 Col Diameter: 11.0 mm
 Min Reynolds#: 0.48
 Full-Scale Temp: 13.0 C

Full-Scale GAC Size: 12x40 Bituminous
 Bench-Scale GAC Size: 140x200
 Scaling Factor: 11.63
 Meas Dry Bed Density: 0.45 g/cm3

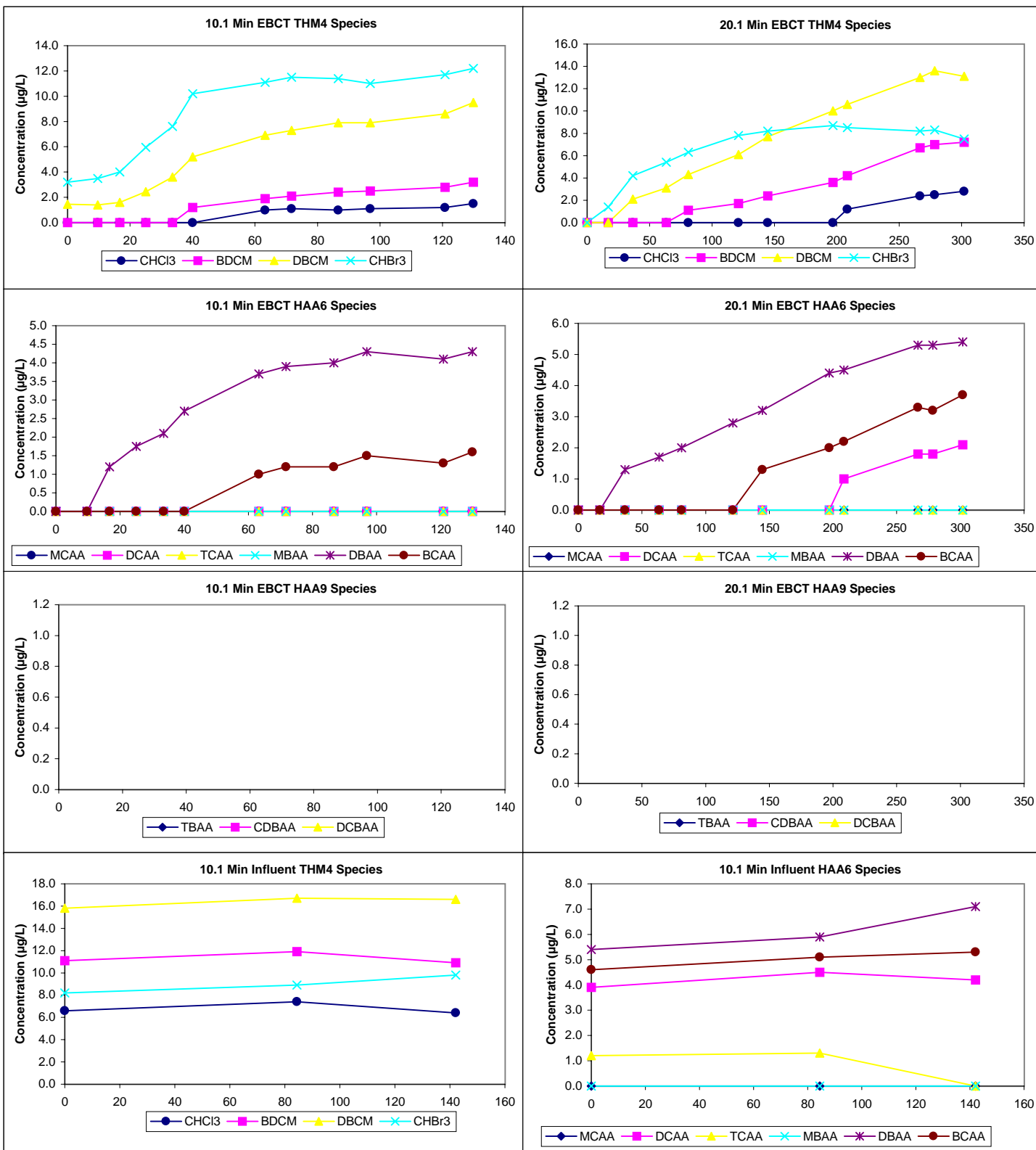
Water Quality Summary

Influent	10.1 Min Influent				20.1 Min Influent				Res (0)	Mean	SD	Count	Min/Max
	Mean	SD/RD	Count	Min/Max	Mean	SD/RD	Count	Min/Max					
TOC	1.8	0.0	3	1.7 - 1.8	2.1	0.1	3	2.0 - 2.3	Temp	15.0	0.0	30	15.0 - 15.0
pH	8.0	0.4	3	7.7 - 8.5	8.0	0.1	3	7.9 - 8.0	pH	NA	NA	0	0.0 - 0.0
UV254	0.041	0.001	3	0.041 - 0.042	0.053	0.005	3	0.048 - 0.057	Time	16.5	0.0	30	16.5 - 16.5
SUVA	2.36	0.03	3	2.33 - 2.39	2.50	0.36	3	2.12 - 2.85	Comments:				
Bromide	147	3	2	145 - 148	150	66	2	117 - 183					
SDS-TOX	82	3	3	78 - 85	141	25	3	112 - 156					
SDS-THM4	43	2	3	42 - 45	44	0	3	44 - 45					
SDS-HAA6	16	1	3	15 - 17	19	1	3	17 - 20	Chart Legend:				
Effluent	10.1 Min EBCT (11 B-S days)				20.1 Min EBCT (26 B-S days)								
Effluent pH	7.9	0.1	12	7.7 - 8.0	8.0	0.1	12	7.9 - 8.3					
Effluent Temp	NA	NA	0	0.0 - 0.0	21.9	0.8	12	20.6 - 23.0					

Water Quality Graphs



Water Quality Graphs (Continued)



ICR Information

ID / ICR#: NE3110926 / ICR761
 ICR Contact: Jerry Obrist
 Phone No.: (402)441-7571
 Period: 9/1/98 - 9/5/98 (4 B-S days)

Design Information

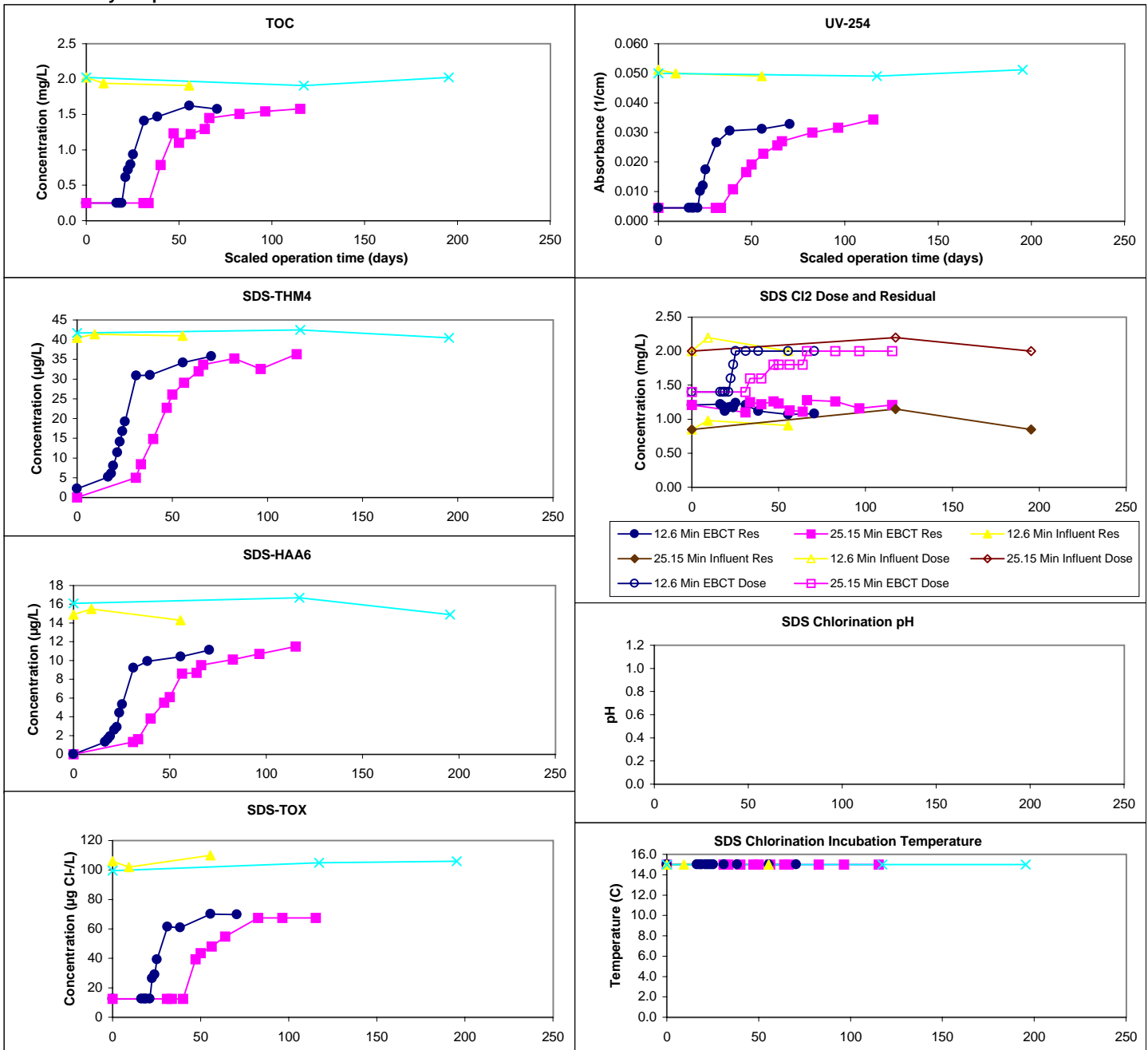
Design TOC: 2.0 mg/L
 Col Diameter: 11.0 mm
 Min Reynolds#: 0.51
 Full-Scale Temp: 13.7 C

Full-Scale GAC Size: 8x30 Bituminous acc
 Bench-Scale GAC Size: 140x200
 Scaling Factor: 16.35
 Meas Dry Bed Density: 0.46 g/cm3

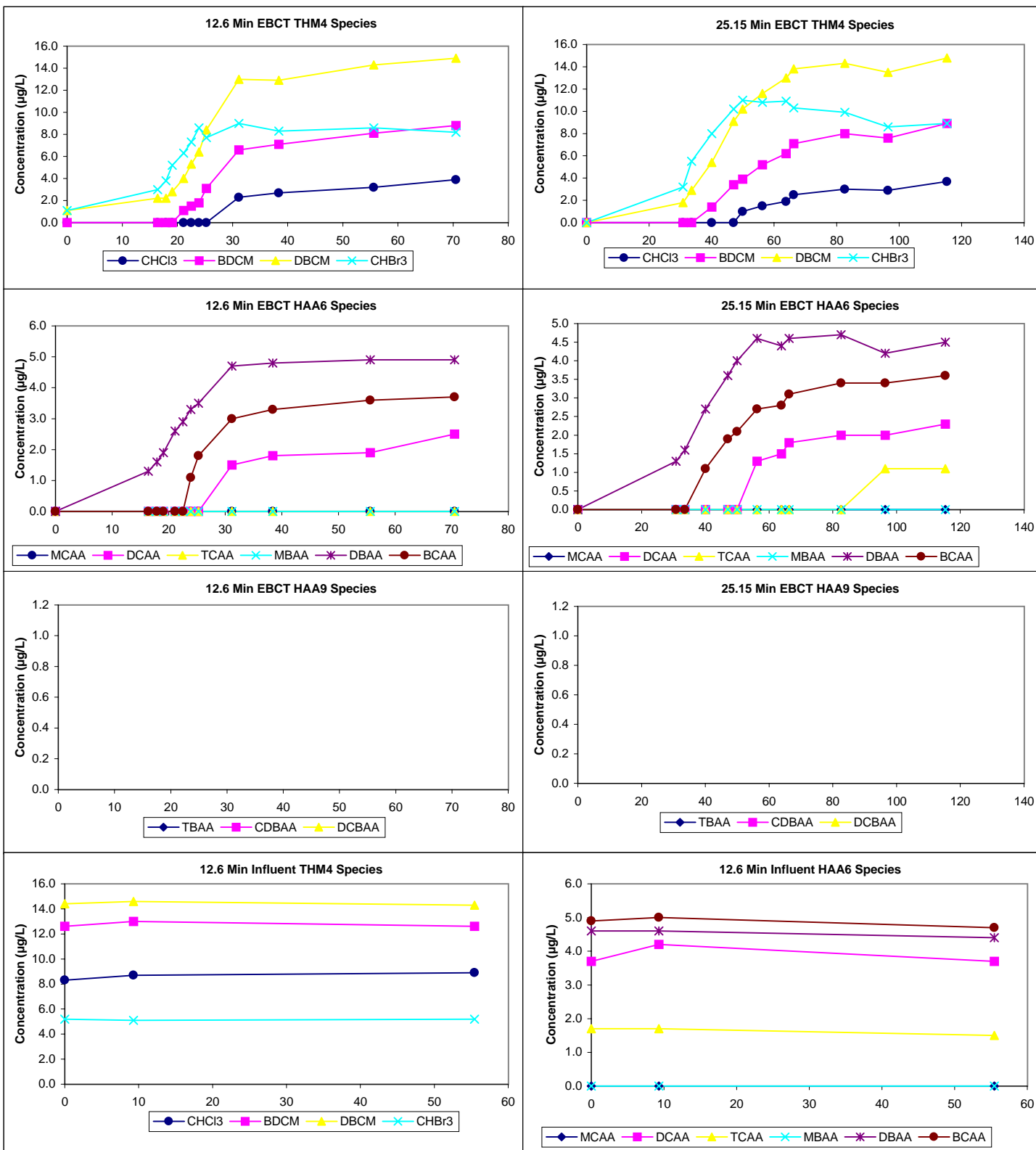
Water Quality Summary

Influent	12.6 Min Influent				25.15 Min Influent				Res (0)	Mean	SD	Count	Min/Max
	Mean	SD/RD	Count	Min/Max	Mean	SD/RD	Count	Min/Max					
TOC	2.0	0.1	3	1.9 - 2.0	2.0	0.1	3	1.9 - 2.0		1.13	0.13	30	0.85 - 1.28
pH	8.0	0.3	3	7.8 - 8.3	8.1	0.2	3	7.9 - 8.2	Temp	15.0	0.0	30	15.0 - 15.0
UV254	0.050	0.001	3	0.049 - 0.051	0.050	0.001	3	0.049 - 0.051	pH	NA	NA	0	0.0 - 0.0
SUVA	2.56	0.02	3	2.53 - 2.58	2.52	0.05	3	2.47 - 2.57	Time	16.5	0.0	30	16.5 - 16.5
Bromide	134	2	2	133 - 135	132	0	1	132 - 132	Comments:				
SDS-TOX	106	4	3	102 - 110	104	4	3	100 - 106					
SDS-THM4	41	0	3	41 - 41	42	1	3	41 - 43					
SDS-HAA6	15	1	3	14 - 16	16	1	3	15 - 17					
Effluent	12.6 Min EBCT (4 B-S days)				25.15 Min EBCT (7 B-S days)				Chart Legend:				
Effluent pH	7.8	0.1	12	7.7 - 8.0	8.1	0.1	12	8.0 - 8.3					
Effluent Temp	23.1	1.0	12	22.1 - 25.1	24.3	0.3	12	23.9 - 24.9					

Water Quality Graphs



Water Quality Graphs (Continued)



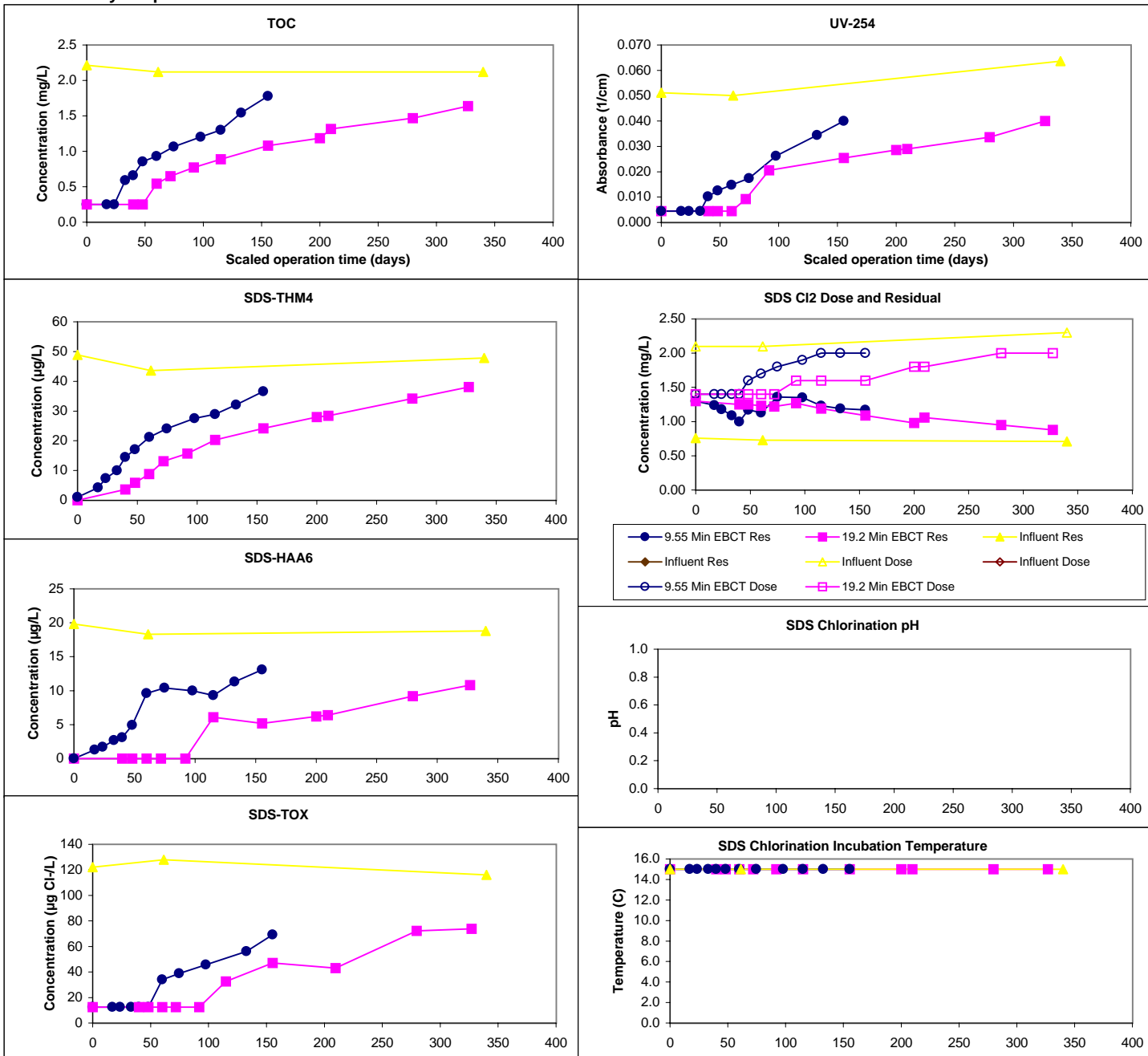
Design Information

ID / ICR#: NE3110926 / ICR761	Design TOC: 2.0 mg/L	Full-Scale GAC Size: 12x40 Bituminous
ICR Contact: Jerry Obrist	Col Diameter: 11.0 mm	Bench-Scale GAC Size: 140x200
Phone No.: (402)441-7571	Min Reynolds#: 0.49	Scaling Factor: 11.63
Period: 10/6/98 - 11/3/98 (28 B-S days)	Full-Scale Temp: 13.0 C	Meas Dry Bed Density: 0.46 g/cm3

Cumulative SDS Conditions

Influent	Influent				Influent				Res (0)	Mean	SD	Count	Min/Max
	Mean	SD/RD	Count	Min/Max	Mean	SD/RD	Count	Min/Max					
TOC	2.2	0.1	3	2.1 - 2.2									
pH	8.0	0.1	3	7.9 - 8.1									
UV254	0.055	0.008	3	0.050 - 0.064									
SUVA	2.56	0.38	3	2.31 - 3.00									
Bromide	136	5	2	133 - 138									
SDS-TOX	122	6	3	116 - 128									
SDS-THM4	47	3	3	44 - 49									
SDS-HAA6	19	1	3	18 - 20									
Effluent	9.55 Min EBCT (13 B-S days)				19.2 Min EBCT (28 B-S days)				Chart Legend:				
Effluent pH	8.0	0.1	12	7.8 - 8.3	8.1	0.2	12	7.9 - 8.3					
Effluent Temp	22.6	0.7	12	21.2 - 23.6	22.5	0.6	12	21.2 - 23.2					

Water Quality Graphs



Water Quality Graphs (Continued)

