

ICR TREATMENT STUDY ANALYSIS

Base Analysis and Data Review Comments

Treatment Study ID	1020
Study Protocol	GAC RSSCT treatment study
Plant ICR Number	300
PWS Name	Miami Dade Water and Sewer Department
City, State, Zip	Miami, FL 33173

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

Major comments:

1. The influent to the treatment study was collected after the addition of activated silica and approximately 1 mg/L free chlorine as the activation agent. This resulted in the presence of small amounts of formed DBPs in the influent water as summarized in Table 6 of the Summary Report. Results of a mini-study demonstrated that the levels of formed THMs and HAAs remained relatively constant over a seven-day period (Table 7 of the Summary Report). Breakthrough of these formed DBPs was also characterized during this study, and Section 8.3 of the Summary Report presents these results. Preformed DCAA was the most prevalent DBP in the GAC effluent.
2. Since this study was conducted on a Florida ground water, other parameters were evaluated in lieu of seasonal variability. Specifically, EBCTs of 5, 10, 12.5, 15 and 20-minutes were evaluated, and influent pH values of 8.2, 8.7 and 9.2 were evaluated at an EBCT of 10-minutes. However, for a ground water, the variability in the influent water was greater than expected (see Table 2 of the Summary Report) -- although, the standard deviations are not excessive, the min/max range is significant.

General Comments:

1. In Table 44 of the report, please verify the RPD data for the field duplicates. I thought the maximum count should be 24 – 6 dups per quarter for 4 quarters? Also, I found at least three TBAA results with very high RPDs, yet the average and all percentiles are reported as zero?

Response: Due to a systematic error, QA/QC data reported in Table 44 of the Treatment Study Summary Report were incorrect. The values have been corrected, and the updated version of Table 44 has been added to the hard copy and to the electronic version (PDF) of the report.

2. The MRL for UV-254 is reported at 0.009 1/cm, but values as low as 0.001 1/cm are reported in the Data Collection Spreadsheets. The MRL for TOC is reported as 0.5 mg/L, but values as low as 0.25 are reported in Data Collection Spreadsheets. The MRL for TOX is reported as 25 ug/L, but values as low as 13 ug/L are reported in Data Collection Spreadsheets. It is acceptable to use these measured values below the MRL, but comments should be included that indicate these values are BMRL. Alternatively, the MRL could be revised if it was determined according to acceptable procedures.

Response: Values below the MRL in the Data Collection Spreadsheets are estimates. A comment indicating this has been added to the Data Collection Spreadsheets.

3. During all quarters, except the first, the measured dry bed density was slightly lower than values reported for other studies using this carbon.
4. In the second quarter influent pH values of 8.2, 8.7 and 9.2 were evaluated. The speciation of THMs was similar for the three pH values; however, there was a difference in HAA speciation. The concentration of DCAA was much lower in the pH 8.7 effluent compared to the 8.2 and 9.2 effluents. Furthermore, DCAA concentrations in the effluent of the pH 8.2 contactor looked more like DCAA concentrations in the effluent from the 9.2 contactor.

Response: An explanation for the low DCAA concentrations in the effluent to the pH 8.7 contactor relative to those in the effluents of the pH 8.2 and 9.2 contactor is unknown. Note that during this run instantaneous DCAA was measured at 6 µg/L in the GAC influent, and instantaneous sampling in the pH 8.2 contactor showed that the effluent instantaneous DCAA levels reached 100 percent breakthrough after 20 full-scale days of operation. If for some reason instantaneous DCAA did not show a similar breakthrough pattern during the pH 8.2 run, this could in part account for the difference in the observed SDS + instantaneous DCAA breakthrough curves, as the difference between measured "SDS-DCAA" concentrations in the effluent to the pH 8.7 contactor and the other two runs was 4 to 5 µg/L. However, a definitive explanation cannot be made because instantaneous DCAA breakthrough was not monitored in the effluent to the pH 8.7 contactor.

5. In the second quarter, DCAA increases to a peak and then decreases. The trend is more pronounced in the pH 8.2 effluent compared to the pH 8.7 effluent. This is the only quarter in which this trend was significant.
6. In general, the DBP yield, i.e., the amount of DBPs formed per unit amount of TOC, seems relatively low. This is also evident from the relatively low chlorine demand values. This could be due, in part, to the relatively short incubation time of 6 hours.

Outlier Data:

No outliers were removed.

Cell: A1

Comment: 1020_SAS.xls 2/3/00 15:21

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

Cell: C33

Comment: 1020-10-02 - Run 3 (DCBAA) 2/3/00 14:36

Original value (CoefA0) = 0 New value = 1.5852

Fewer than 6 points above MRL, average above 1/2 MRL. Step function applied.

Cell: D33

Comment: 1020-10-02 - Run 3 (DCBAA) 2/3/00 14:36

Original value (CoefAf) = 0 New value = 0

Fewer than 6 points above MRL, average above 1/2 MRL. Step function applied.

Cell: E33

Comment: 1020-10-02 - Run 3 (DCBAA) 2/3/00 14:36

Original value (CoefB) = 0 New value = 0

Fewer than 6 points above MRL, average above 1/2 MRL. Step function applied.

Cell: F33

Comment: 1020-10-02 - Run 3 (DCBAA) 2/3/00 14:36

Original value (CoefD) = 0 New value = 0

Fewer than 6 points above MRL, average above 1/2 MRL. Step function applied.

Cell: J33

Comment: 1020-10-02 - Run 3 (DCBAA) 2/3/00 14:36

Original value (S) = 0 New value = 0

Fewer than 6 points above MRL, average above 1/2 MRL. Step function applied.

Cell: K33

Comment: 1020-10-02 - Run 3 (DCBAA) 2/3/00 14:36

Original value (t0) = 0 New value = 39.0056

Fewer than 6 points above MRL, average above 1/2 MRL. Step function applied.

Cell: C55

Comment: 1020-10-03 - Run 5 (DCBAA) 2/3/00 14:39

Original value (CoefA0) = 1 New value = 1.5222

Fewer than 6 points above MRL, average above 1/2 MRL. Step function applied.

1020-10-03 - Run 5 (DCBAA) 2/3/00 14:51

Original value (CoefA0) = 1.5222 New value = -0.1464

Fewer than 6 points above MRL, average above 1/2 MRL. Logistic function (type 1) applied.

Cell: D55

Comment: 1020-10-03 - Run 5 (DCBAA) 2/3/00 14:39

Original value (CoefAf) = 0 New value = 0

Fewer than 6 points above MRL, average above 1/2 MRL. Step function applied.

1020-10-03 - Run 5 (DCBAA) 2/3/00 14:51

Original value (CoefAf) = 0 New value = 1.9019

Fewer than 6 points above MRL, average above 1/2 MRL. Logistic function (type 1) applied.

Cell: E55

Comment: 1020-10-03 - Run 5 (DCBAA) 2/3/00 14:39

Original value (CoefB) = 0 New value = 0

Fewer than 6 points above MRL, average above 1/2 MRL. Step function applied.

1020-10-03 - Run 5 (DCBAA) 2/3/00 14:51

Original value (CoefB) = 0 New value = 163.667

Fewer than 6 points above MRL, average above 1/2 MRL. Logistic function (type 1) applied.

Cell: F55

Comment: 1020-10-03 - Run 5 (DCBAA) 2/3/00 14:39

Original value (CoefD) = 0 New value = 0

Fewer than 6 points above MRL, average above 1/2 MRL. Step function applied.

1020-10-03 - Run 5 (DCBAA) 2/3/00 14:51

Original value (CoefD) = 0 New value = 0.1996

Fewer than 6 points above MRL, average above 1/2 MRL. Logistic function (type 1) applied.

Cell: J55

Comment: 1020-10-03 - Run 5 (DCBAA) 2/3/00 14:39

Original value (S) = 0 New value = 0

Fewer than 6 points above MRL, average above 1/2 MRL. Step function applied.

1020-10-03 - Run 5 (DCBAA) 2/3/00 14:51

Original value (S) = 0 New value = 0

Fewer than 6 points above MRL, average above 1/2 MRL. Logistic function (type 1) applied.

Cell: K55

Comment: 1020-10-03 - Run 5 (DCBAA) 2/3/00 14:39

Original value (t0) = 0 New value = 28.7461

Fewer than 6 points above MRL, average above 1/2 MRL. Step function applied.

Cell: C62

Comment: 1020-10-03 - Run 5 (TCAA) 2/3/00 14:52

Original value (CoefA0) = 0 New value = -0.2953

Fewer than 6 points above MRL, average above 1/2 MRL. Logistic function (type 1) applied.

Cell: D62

Comment: 1020-10-03 - Run 5 (TCAA) 2/3/00 14:52

Original value (CoefAf) = 0 New value = 1.8415

Fewer than 6 points above MRL, average above 1/2 MRL. Logistic function (type 1) applied.

Cell: E62

Comment: 1020-10-03 - Run 5 (TCAA) 2/3/00 14:52

Original value (CoefB) = 0 New value = 20.0891

Fewer than 6 points above MRL, average above 1/2 MRL. Logistic function (type 1) applied.

Cell: F62

Comment: 1020-10-03 - Run 5 (TCAA) 2/3/00 14:52
Original value (CoefD) = 0 New value = 0.1165
Fewer than 6 points above MRL, average above 1/2 MRL. Logistic function (type 1) applied.

Cell: J62

Comment: 1020-10-03 - Run 5 (TCAA) 2/3/00 14:52
Original value (S) = 0 New value = 0
Fewer than 6 points above MRL, average above 1/2 MRL. Logistic function (type 1) applied.

Cell: C77

Comment: 1020-05-04 - Run 7 (DCBAA) 2/3/00 14:53
Original value (CoefA0) = 0 New value = -0.2243
Fewer than 6 points above MRL, average above 1/2 MRL. Logistic function (type 1) applied.

Cell: D77

Comment: 1020-05-04 - Run 7 (DCBAA) 2/3/00 14:53
Original value (CoefAf) = 0 New value = 1.6924
Fewer than 6 points above MRL, average above 1/2 MRL. Logistic function (type 1) applied.

Cell: E77

Comment: 1020-05-04 - Run 7 (DCBAA) 2/3/00 14:53
Original value (CoefB) = 0 New value = 26.7565
Fewer than 6 points above MRL, average above 1/2 MRL. Logistic function (type 1) applied.

Cell: F77

Comment: 1020-05-04 - Run 7 (DCBAA) 2/3/00 14:53
Original value (CoefD) = 0 New value = 0.2319
Fewer than 6 points above MRL, average above 1/2 MRL. Logistic function (type 1) applied.

Cell: J77

Comment: 1020-05-04 - Run 7 (DCBAA) 2/3/00 14:53
Original value (S) = 0 New value = 0
Fewer than 6 points above MRL, average above 1/2 MRL. Logistic function (type 1) applied.

Cell: C84

Comment: 1020-05-04 - Run 7 (TCAA) 2/3/00 14:54
Original value (CoefA0) = 0 New value = -0.1244
Fewer than 6 points above MRL, average above 1/2 MRL. Logistic function (type 1) applied.

Cell: D84

Comment: 1020-05-04 - Run 7 (TCAA) 2/3/00 14:54
Original value (CoefAf) = 0 New value = 2.5484
Fewer than 6 points above MRL, average above 1/2 MRL. Logistic function (type 1) applied.

Cell: E84

Comment: 1020-05-04 - Run 7 (TCAA) 2/3/00 14:54
Original value (CoefB) = 0 New value = 99.9935
Fewer than 6 points above MRL, average above 1/2 MRL. Logistic function (type 1) applied.

Cell: F84

Comment: 1020-05-04 - Run 7 (TCAA) 2/3/00 14:54
Original value (CoefD) = 0 New value = 0.2974
Fewer than 6 points above MRL, average above 1/2 MRL. Logistic function (type 1) applied.

Cell: J84

Comment: 1020-05-04 - Run 7 (TCAA) 2/3/00 14:54
Original value (S) = 0 New value = 0
Fewer than 6 points above MRL, average above 1/2 MRL. Logistic function (type 1) applied.

Cell: C99

Comment: 1020-20-01 - Run 2 (DCBAA) 2/3/00 14:48
Original value (CoefA0) = 0 New value = -0.3815
Fewer than 6 points above MRL, average above 1/2 MRL. Logistic function (type 1) applied.

Cell: D99

Comment: 1020-20-01 - Run 2 (DCBAA) 2/3/00 14:48
Original value (CoefAf) = 0 New value = 5.2326
Fewer than 6 points above MRL, average above 1/2 MRL. Logistic function (type 1) applied.

Cell: E99

Comment: 1020-20-01 - Run 2 (DCBAA) 2/3/00 14:48
Original value (CoefB) = 0 New value = 21.6679
Fewer than 6 points above MRL, average above 1/2 MRL. Logistic function (type 1) applied.

Cell: F99

Comment: 1020-20-01 - Run 2 (DCBAA) 2/3/00 14:48
Original value (CoefD) = 0 New value = 0.0291
Fewer than 6 points above MRL, average above 1/2 MRL. Logistic function (type 1) applied.

Cell: J99

Comment: 1020-20-01 - Run 2 (DCBAA) 2/3/00 14:48
Original value (S) = 0 New value = 0
Fewer than 6 points above MRL, average above 1/2 MRL. Logistic function (type 1) applied.

Cell: C106

Comment: 1020-20-01 - Run 2 (TCAA) 2/3/00 14:48
Original value (CoefA0) = 1 New value = -1.2364
Fewer than 6 points above MRL, average above 1/2 MRL. Logistic function (type 1) applied.

Cell: D106

Comment: 1020-20-01 - Run 2 (TCAA) 2/3/00 14:49
Original value (CoefAf) = 0 New value = 15.017
Fewer than 6 points above MRL, average above 1/2 MRL. Logistic function (type 1) applied.

Cell: E106

Comment: 1020-20-01 - Run 2 (TCAA) 2/3/00 14:49
Original value (CoefB) = 0 New value = 31.5968
Fewer than 6 points above MRL, average above 1/2 MRL. Logistic function (type 1) applied.

Cell: F106

Comment: 1020-20-01 - Run 2 (TCAA) 2/3/00 14:49

Original value (CoefD) = 0 New value = 0.0234
Fewer than 6 points above MRL, average above 1/2 MRL. Logistic function (type 1) applied.

Cell: J106

Comment: 1020-20-01 - Run 2 (TCAA) 2/3/00 14:49
Original value (S) = 0 New value = 0
Fewer than 6 points above MRL, average above 1/2 MRL. Logistic function (type 1) applied.

Cell: C116

Comment: 1020-20-02 - Run 4 (CHCl3) 2/3/00 14:50
Original value (CoefA0) = 1.2 New value = -0.5525
Fewer than 6 points above MRL, average above 1/2 MRL. Logistic function (type 1) applied.

Cell: D116

Comment: 1020-20-02 - Run 4 (CHCl3) 2/3/00 14:50
Original value (CoefAf) = 0 New value = 5.9751
Fewer than 6 points above MRL, average above 1/2 MRL. Logistic function (type 1) applied.

Cell: E116

Comment: 1020-20-02 - Run 4 (CHCl3) 2/3/00 14:50
Original value (CoefB) = 0 New value = 75.6181
Fewer than 6 points above MRL, average above 1/2 MRL. Logistic function (type 1) applied.

Cell: F116

Comment: 1020-20-02 - Run 4 (CHCl3) 2/3/00 14:50
Original value (CoefD) = 0 New value = 0.1742
Fewer than 6 points above MRL, average above 1/2 MRL. Logistic function (type 1) applied.

Cell: J116

Comment: 1020-20-02 - Run 4 (CHCl3) 2/3/00 14:50
Original value (S) = 0 New value = 0
Fewer than 6 points above MRL, average above 1/2 MRL. Logistic function (type 1) applied.

Cell: C121

Comment: 1020-20-02 - Run 4 (DCBAA) 2/3/00 14:38
Original value (CoefA0) = 1 New value = 1.3059
Fewer than 6 points above MRL, average above 1/2 MRL. Step function applied.

Cell: D121

Comment: 1020-20-02 - Run 4 (DCBAA) 2/3/00 14:38
Original value (CoefAf) = 0 New value = 0
Fewer than 6 points above MRL, average above 1/2 MRL. Step function applied.

Cell: E121

Comment: 1020-20-02 - Run 4 (DCBAA) 2/3/00 14:38
Original value (CoefB) = 0 New value = 0
Fewer than 6 points above MRL, average above 1/2 MRL. Step function applied.

Cell: F121

Comment: 1020-20-02 - Run 4 (DCBAA) 2/3/00 14:38
Original value (CoefD) = 0 New value = 0

Fewer than 6 points above MRL, average above 1/2 MRL. Step function applied.

Cell: J121

Comment: 1020-20-02 - Run 4 (DCBAA) 2/3/00 14:38

Original value (S) = 0 New value = 0

Fewer than 6 points above MRL, average above 1/2 MRL. Step function applied.

Cell: K121

Comment: 1020-20-02 - Run 4 (DCBAA) 2/3/00 14:38

Original value (t0) = 0 New value = 16.2906

Fewer than 6 points above MRL, average above 1/2 MRL. Step function applied.

Cell: C143

Comment: 1020-15-03 - Run 6 (DCBAA) 2/3/00 14:43

Original value (CoefA0) = 0 New value = 1.2895

Fewer than 6 points above MRL, average above 1/2 MRL. Step function applied.

Cell: D143

Comment: 1020-15-03 - Run 6 (DCBAA) 2/3/00 14:43

Original value (CoefAf) = 0 New value = 0

Fewer than 6 points above MRL, average above 1/2 MRL. Step function applied.

Cell: E143

Comment: 1020-15-03 - Run 6 (DCBAA) 2/3/00 14:43

Original value (CoefB) = 0 New value = 0

Fewer than 6 points above MRL, average above 1/2 MRL. Step function applied.

Cell: F143

Comment: 1020-15-03 - Run 6 (DCBAA) 2/3/00 14:43

Original value (CoefD) = 0 New value = 0

Fewer than 6 points above MRL, average above 1/2 MRL. Step function applied.

Cell: J143

Comment: 1020-15-03 - Run 6 (DCBAA) 2/3/00 14:43

Original value (S) = 0 New value = 0

Fewer than 6 points above MRL, average above 1/2 MRL. Step function applied.

Cell: K143

Comment: 1020-15-03 - Run 6 (DCBAA) 2/3/00 14:43

Original value (t0) = 0 New value = 40.6182

Fewer than 6 points above MRL, average above 1/2 MRL. Step function applied.

Cell: C150

Comment: 1020-15-03 - Run 6 (TCAA) 2/3/00 14:44

Original value (CoefA0) = 0 New value = 1.3001

Fewer than 6 points above MRL, average above 1/2 MRL. Step function applied.

Cell: D150

Comment: 1020-15-03 - Run 6 (TCAA) 2/3/00 14:44

Original value (CoefAf) = 0 New value = 0

Fewer than 6 points above MRL, average above 1/2 MRL. Step function applied.

Cell: E150

Comment: 1020-15-03 - Run 6 (TCAA) 2/3/00 14:44
Original value (CoefB) = 0 New value = 0
Fewer than 6 points above MRL, average above 1/2 MRL. Step function applied.

Cell: F150

Comment: 1020-15-03 - Run 6 (TCAA) 2/3/00 14:44
Original value (CoefD) = 0 New value = 0
Fewer than 6 points above MRL, average above 1/2 MRL. Step function applied.

Cell: J150

Comment: 1020-15-03 - Run 6 (TCAA) 2/3/00 14:44
Original value (S) = 0 New value = 0
Fewer than 6 points above MRL, average above 1/2 MRL. Step function applied.

Cell: K150

Comment: 1020-15-03 - Run 6 (TCAA) 2/3/00 14:44
Original value (t0) = 0 New value = 50.3729
Fewer than 6 points above MRL, average above 1/2 MRL. Step function applied.

Cell: C165

Comment: 1020-125-04 - Run 8 (DCBAA) 2/3/00 14:54
Original value (CoefA0) = 1 New value = -0.3392
Fewer than 6 points above MRL, average above 1/2 MRL. Logistic function (type 1) applied.

Cell: D165

Comment: 1020-125-04 - Run 8 (DCBAA) 2/3/00 14:54
Original value (CoefAf) = 0 New value = 2.643
Fewer than 6 points above MRL, average above 1/2 MRL. Logistic function (type 1) applied.

Cell: E165

Comment: 1020-125-04 - Run 8 (DCBAA) 2/3/00 14:54
Original value (CoefB) = 0 New value = 47.3783
Fewer than 6 points above MRL, average above 1/2 MRL. Logistic function (type 1) applied.

Cell: F165

Comment: 1020-125-04 - Run 8 (DCBAA) 2/3/00 14:54
Original value (CoefD) = 0 New value = 0.1783
Fewer than 6 points above MRL, average above 1/2 MRL. Logistic function (type 1) applied.

Cell: J165

Comment: 1020-125-04 - Run 8 (DCBAA) 2/3/00 14:54
Original value (S) = 0 New value = 0
Fewer than 6 points above MRL, average above 1/2 MRL. Logistic function (type 1) applied.

ICR Information

ID / ICR#: FL4130871 / 300 ICR Contact: Raymond Diaz Phone No.: (305) 275-3170 Period: 4/29/98 - 5/12/98 (12 B-S days)

Design Information

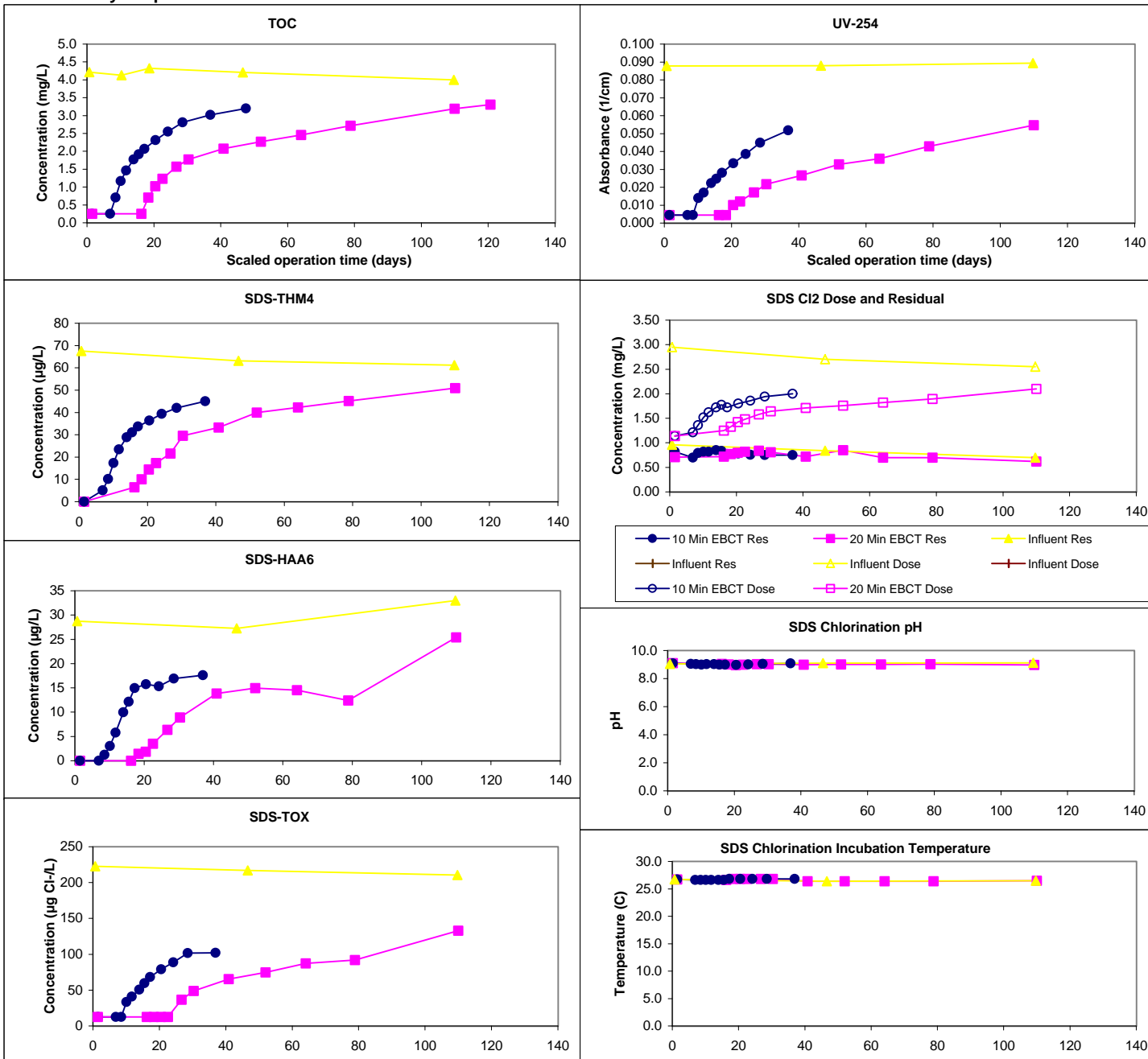
Design TOC:	4.2 mg/L
Col Diameter:	11.0 mm
Min Reynolds#:	0.50
Full-Scale Temp:	25.0 C

Full-Scale GAC Size:	12x40 Bituminous
Bench-Scale GAC Size:	100x200
Scaling Factor:	9.44
Meas Dry Bed Density:	0.52 g/cm3

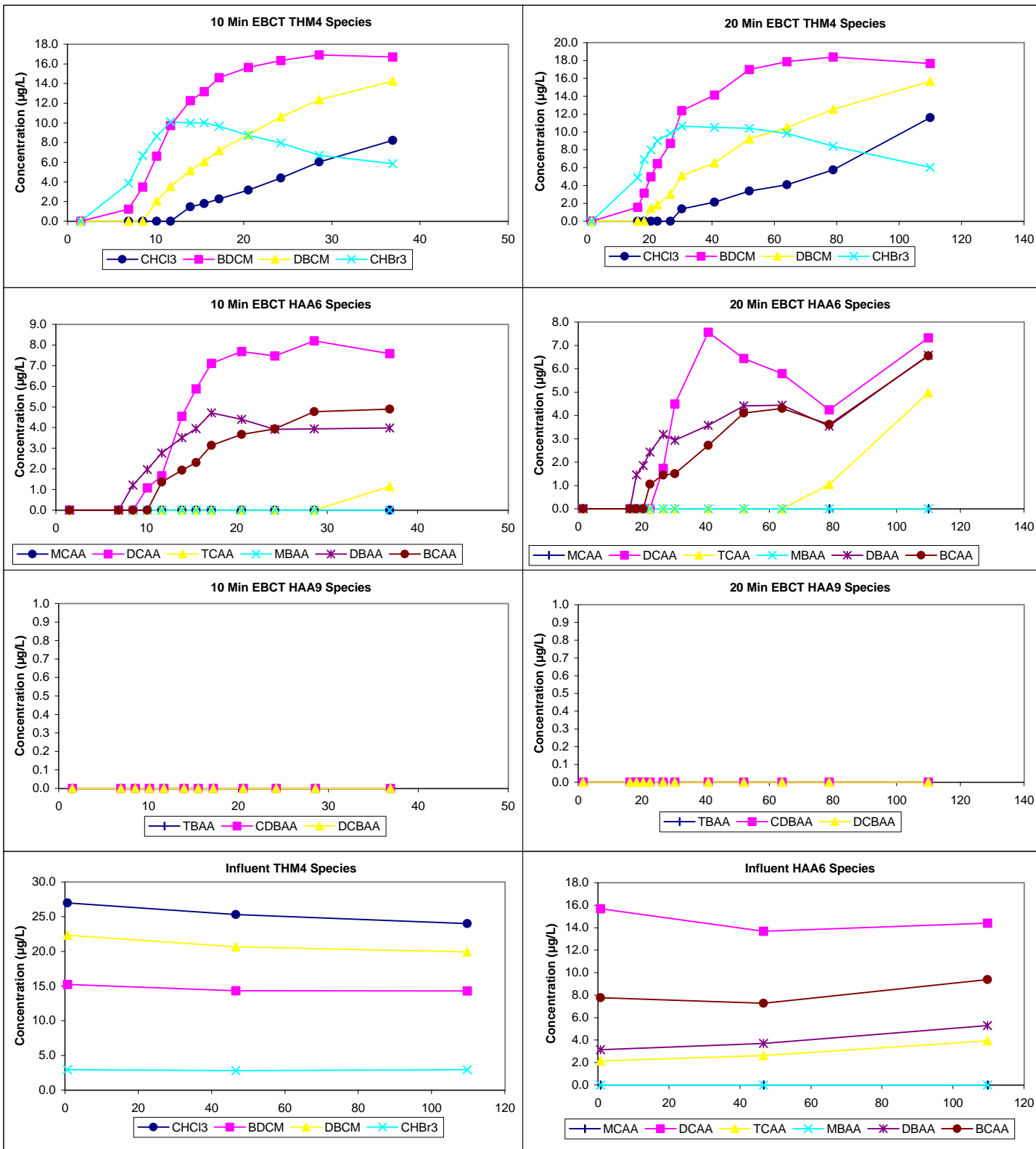
Water Quality Summary

Influent	Influent				Influent				Res (0)	Mean	SD	Count	Min/Max
	Mean	SD/RD	Count	Min/Max	Mean	SD/RD	Count	Min/Max					
TOC	4.2	0.1	5	4.0 - 4.3									
pH	9.2	0.1	5	9.1 - 9.3					Temp	26.6	0.2	27	26.4 - 26.8
UV254	0.088	0.001	3	0.088 - 0.089					pH	9.0	0.0	27	9.0 - 9.1
SUVA	2.14	0.08	3	2.08 - 2.23					Time	6.0	0.1	27	5.8 - 6.3
Bromide	NA	0	0	0 - 0					Comments:				
SDS-TOX	217	6	3	211 - 223									
SDS-THM4	64	3	3	61 - 68									
SDS-HAA6	30	3	3	27 - 33									
Effluent	10 Min EBCT (5 B-S days)				20 Min EBCT (13 B-S days)				Chart Legend:	<div><div><div></div><div>10 Min EBCT</div></div><div><div></div><div>20 Min EBCT</div></div><div><div></div><div>Influent</div></div><div><div></div><div>Influent</div></div></div>			
Effluent pH	8.7	0.1	13	8.5 - 9.1	8.9	0.3	12	8.6 - 9.4					
Effluent Temp	22.0	0.3	13	21.3 - 22.6	21.6	0.4	13	20.8 - 22.4					

Water Quality Graphs



Water Quality Graphs (Continued)



ICR Information

ID / ICR#: FL4130871 / 300
 ICR Contact: Raymond Diaz
 Phone No.: (305) 275-3170
 Period: 7/2/98 - 7/14/98 (11 B-S days)

Design Information

Design TOC: 4.1 mg/L
 Col Diameter: 11.0 mm
 Min Reynolds#: 0.51
 Full-Scale Temp: 25.0 C

Full-Scale GAC Size: 12x40 Bituminous
 Bench-Scale GAC Size: 100x200
 Scaling Factor: 9.44
 Meas Dry Bed Density: 0.45 g/cm3

Water Quality Summary

	10 Min Influent				10 Min Influent								
Influent	Mean	SD/RD	Count	Min/Max	Mean	SD/RD	Count	Min/Max		Mean	SD	Count	Min/Max
TOC	4.2	0.1	3	4.1 - 4.3	4.2	0.1	4	4.1 - 4.3	Res (0)	0.85	0.06	27	0.72 - 1.03
pH	8.2	0.1	3	8.2 - 8.3	8.7	0.0	4	8.7 - 8.7	Temp	26.7	0.3	27	26.5 - 27.2
UV254	0.081	0.000	1	0.081 - 0.081	0.082	0.001	2	0.082 - 0.083	pH	9.1	0.0	27	9.0 - 9.1
SUVA	1.90	0.00	1	1.90 - 1.90	1.98	0.06	2	1.95 - 2.01	Time	6.1	0.1	27	6.0 - 6.2
Bromide	125	30	2	110 - 140	140	0	2	140 - 140	Comments:				
SDS-TOX	210	0	1	210 - 210	194	2	2	193 - 195					
SDS-THM4	77	0	1	77 - 77	72	7	2	69 - 76					
SDS-HAA6	35	0	1	35 - 35	25	5	2	23 - 27					
Effluent	10 Min EBCT (6 B-S days)				10 Min EBCT (6 B-S days)				Chart Legend:				
Effluent pH	8.0	0.2	13	7.6 - 8.3	8.3	0.2	13	8.0 - 8.5					
Effluent Temp	22.6	0.7	13	21.3 - 23.7	22.7	0.6	13	22.0 - 23.6					

Cumulative SDS Conditions

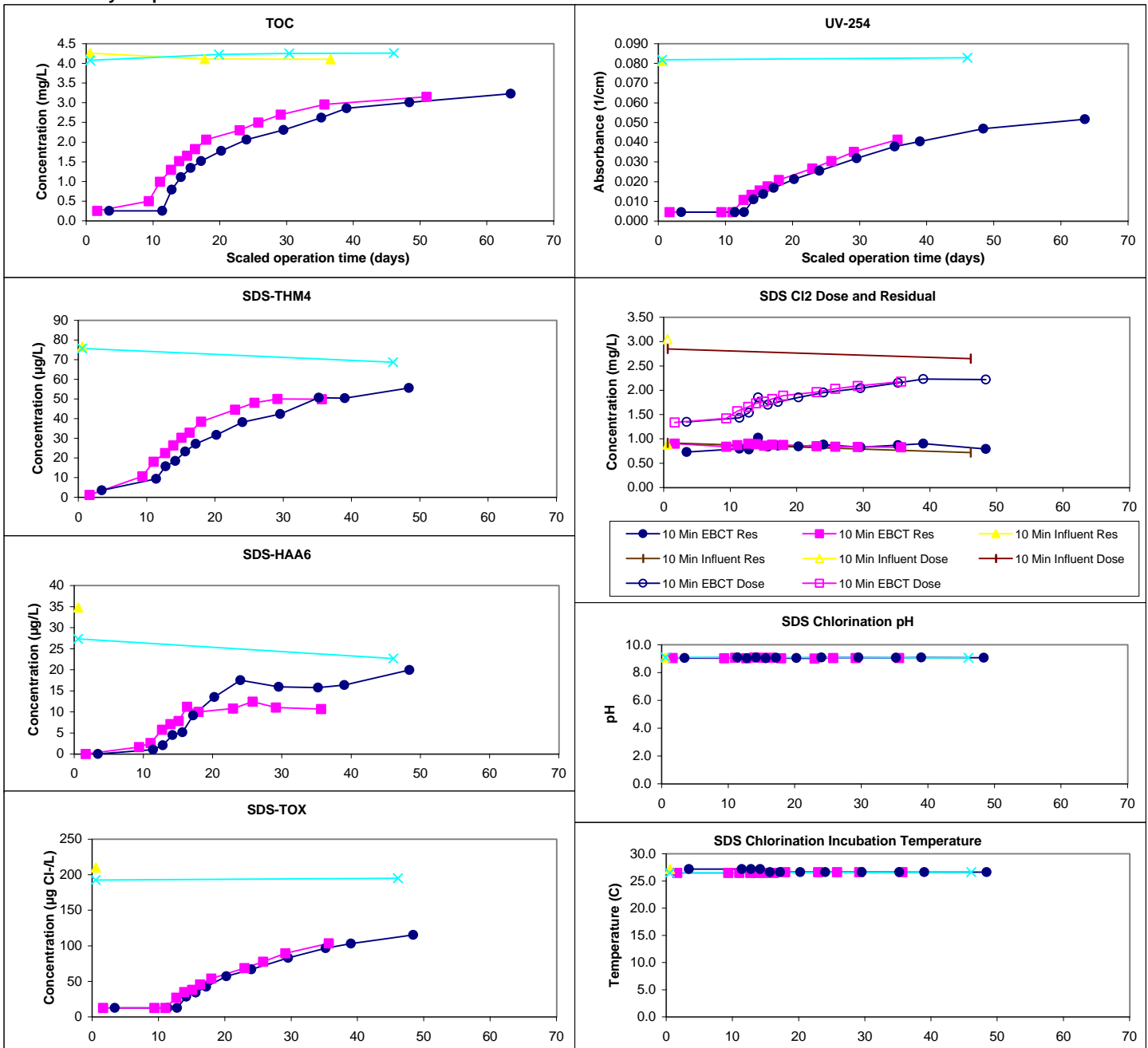
	Mean	SD	Count	Min/Max
Res (0)	0.85	0.06	27	0.72 - 1.03
Temp	26.7	0.3	27	26.5 - 27.2
pH	9.1	0.0	27	9.0 - 9.1
Time	6.1	0.1	27	6.0 - 6.2

Comments:

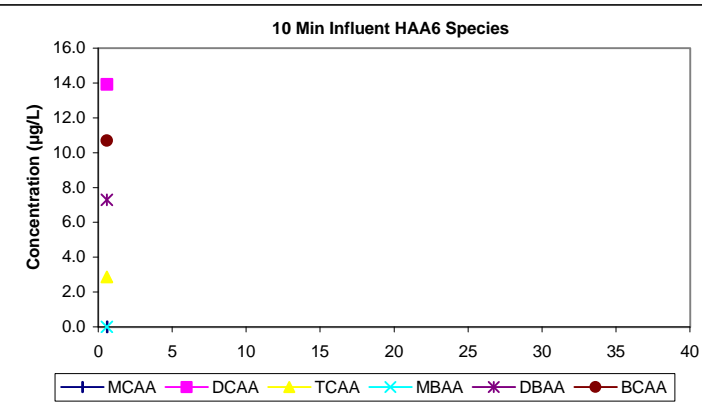
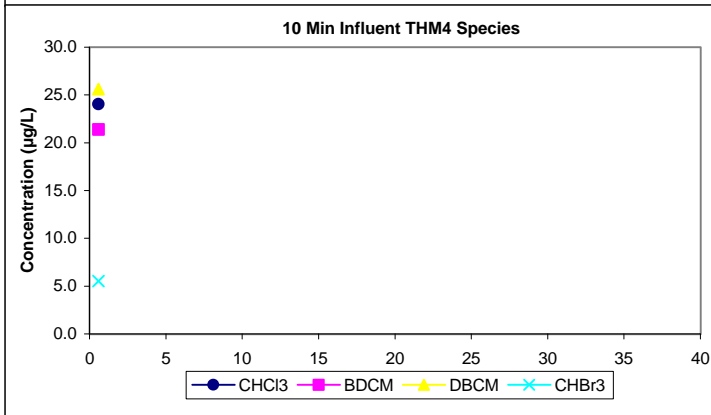
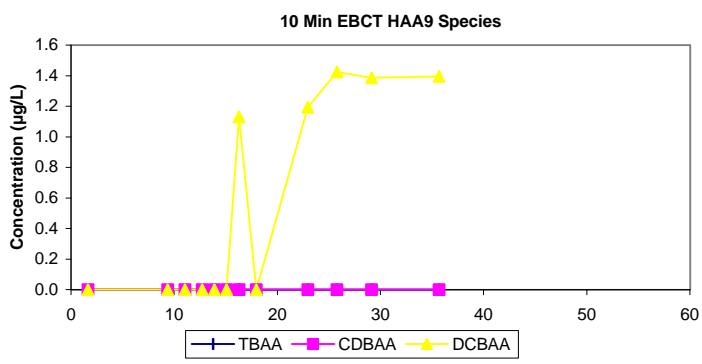
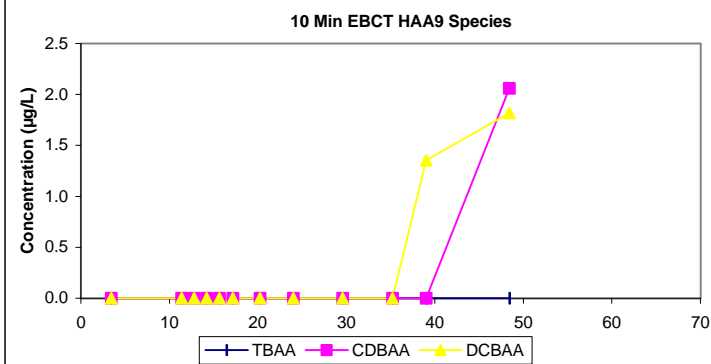
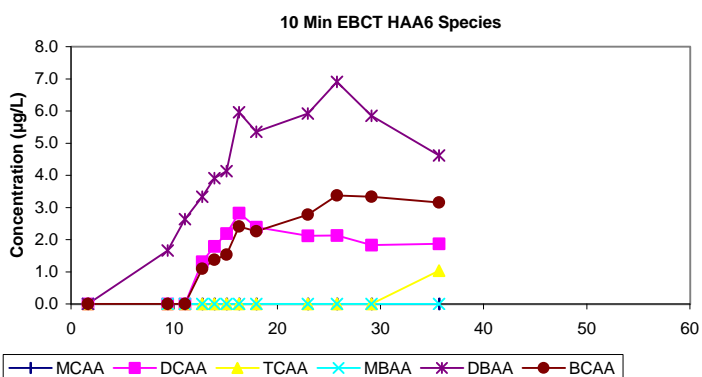
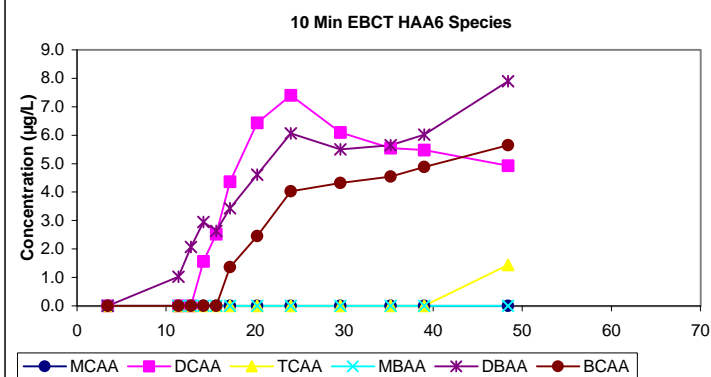
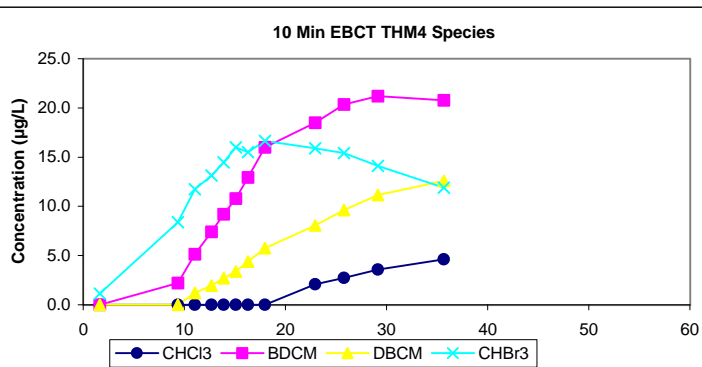
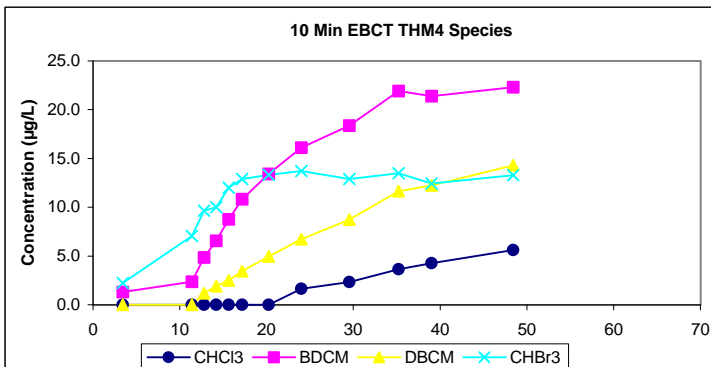
Chart Legend:

- 10 Min EBCT
- 10 Min EBCT
- ▲ 10 Min Influent
- ✕ 10 Min Influent

Water Quality Graphs



Water Quality Graphs (Continued)



ICR Information

ID / ICR#: FL4130871 / 300
 ICR Contact: Raymond Diaz
 Phone No.: (305) 275-3170
 Period: 6/26/98 - 7/3/98 (6 B-S days)

Design Information

Design TOC: 4.1 mg/L
 Col Diameter: 11.0 mm
 Min Reynolds#: 0.51
 Full-Scale Temp: 25.0 C

Full-Scale GAC Size: 12x40 Bituminous
 Bench-Scale GAC Size: 100x200
 Scaling Factor: 9.44
 Meas Dry Bed Density: 0.45 g/cm3

Water Quality Summary

Influent	Mean	SD/RD	Count	Min/Max
TOC	4.0	0.1	4	3.9 - 4.2
pH	9.2	0.0	4	9.2 - 9.2
UV254	0.084	0.001	2	0.083 - 0.084
SUVA	2.02	0.06	2	1.99 - 2.05
Bromide	105	10	2	100 - 110
SDS-TOX	212	31	2	196 - 227
SDS-THM4	82	10	2	77 - 87
SDS-HAA6	23	13	2	16 - 29

Effluent	10 Min EBCT			(7 B-S days)
Effluent pH	8.6	0.1	13	8.4 - 8.9
Effluent Temp	24.3	2.0	13	21.4 - 26.7

Cumulative SDS Conditions

	Mean	SD	Count	Min/Max
Res (0)	1.11	0.37	14	0.68 - 2.11
Temp	27.2	0.1	14	27.2 - 27.3
pH	9.1	0.0	14	9.0 - 9.1
Time	6.1	0.3	14	5.7 - 6.3

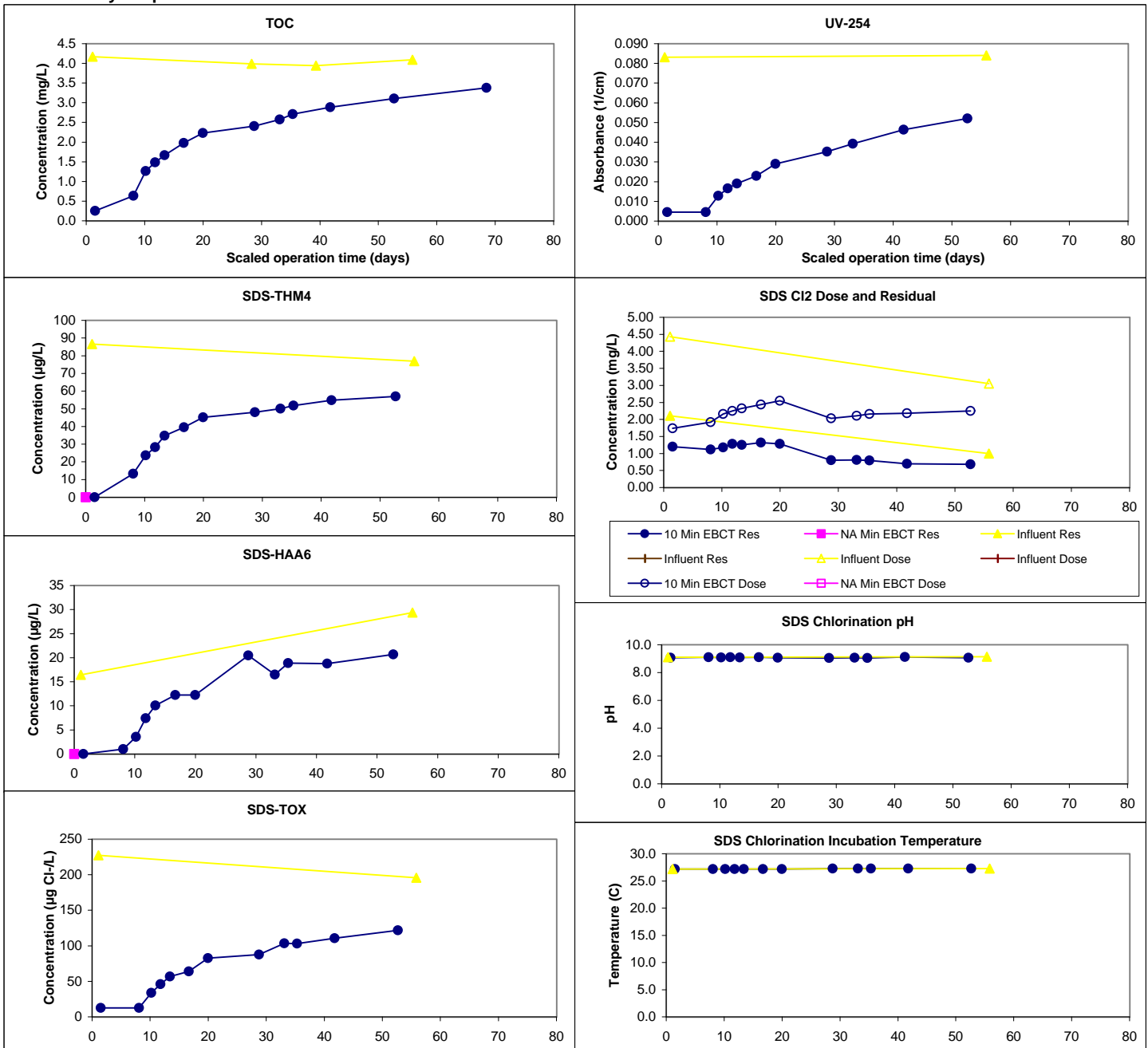
Comments:

Chart

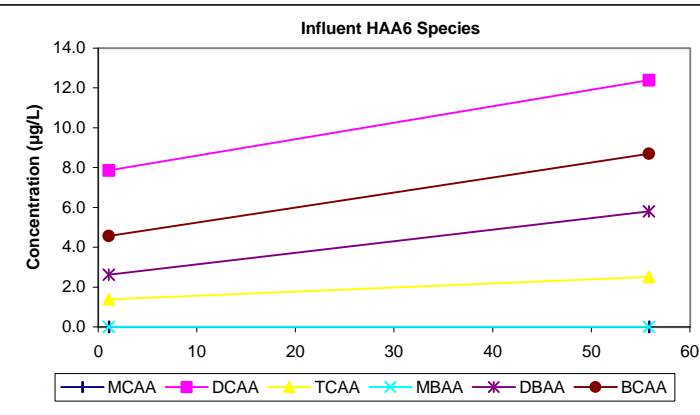
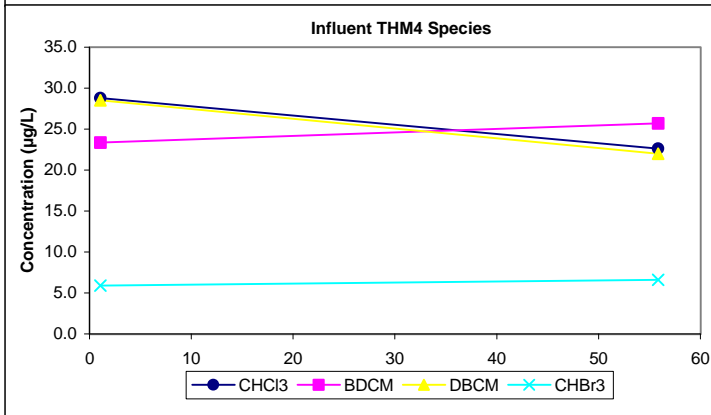
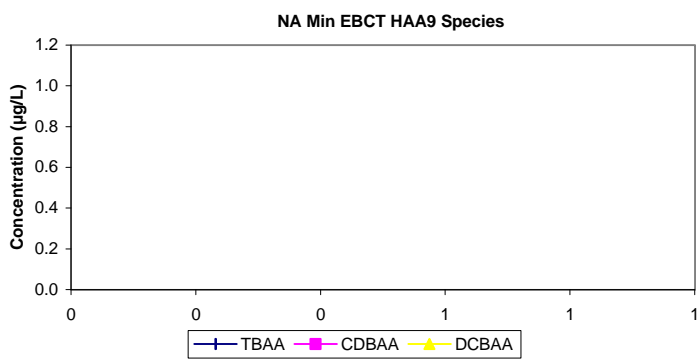
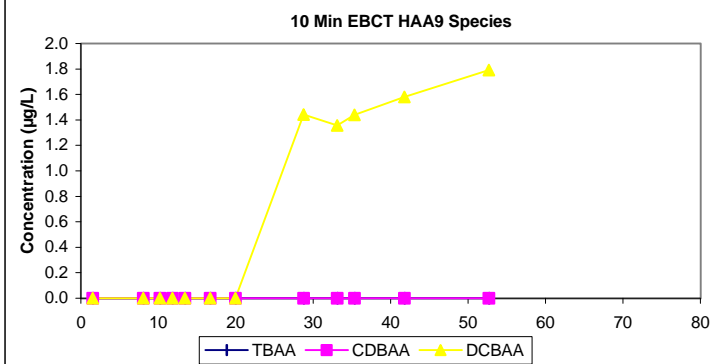
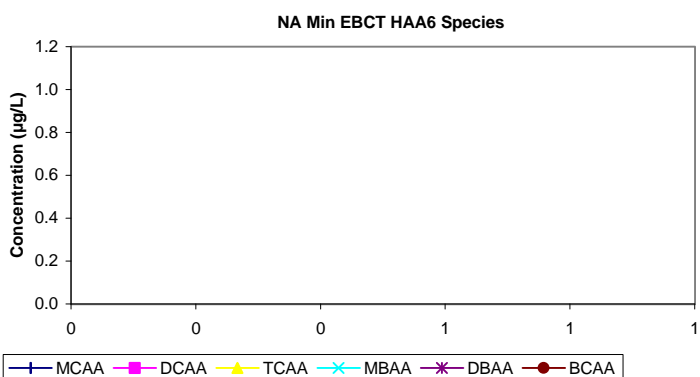
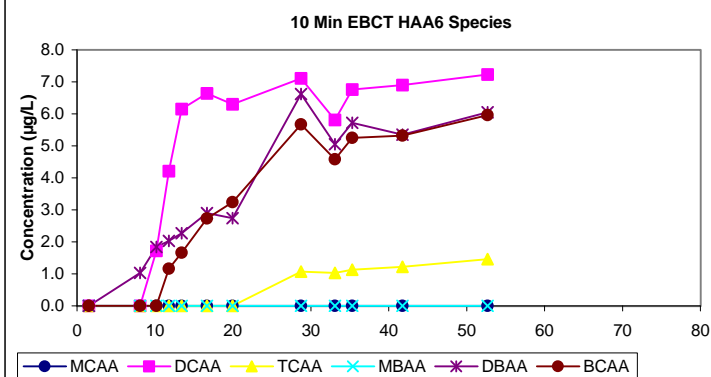
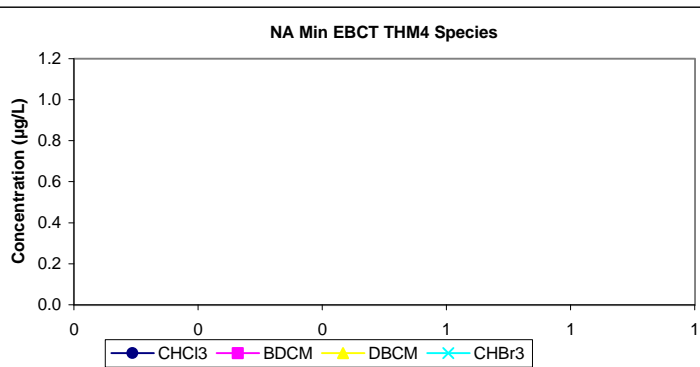
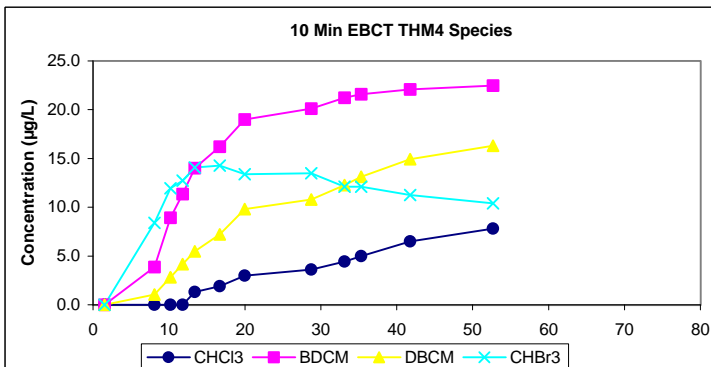
Legend:

- 10 Min EBCT
- NA Min EBCT
- ▲ Influent
- ✕ Influent

Water Quality Graphs



Water Quality Graphs (Continued)



ICR Information

ID / ICR#: FL4130871 / 300
 ICR Contact: Raymond Diaz
 Phone No.: (305) 275-3170
 Period: 8/5/98 - 8/13/98 (8 B-S days)

Design Information

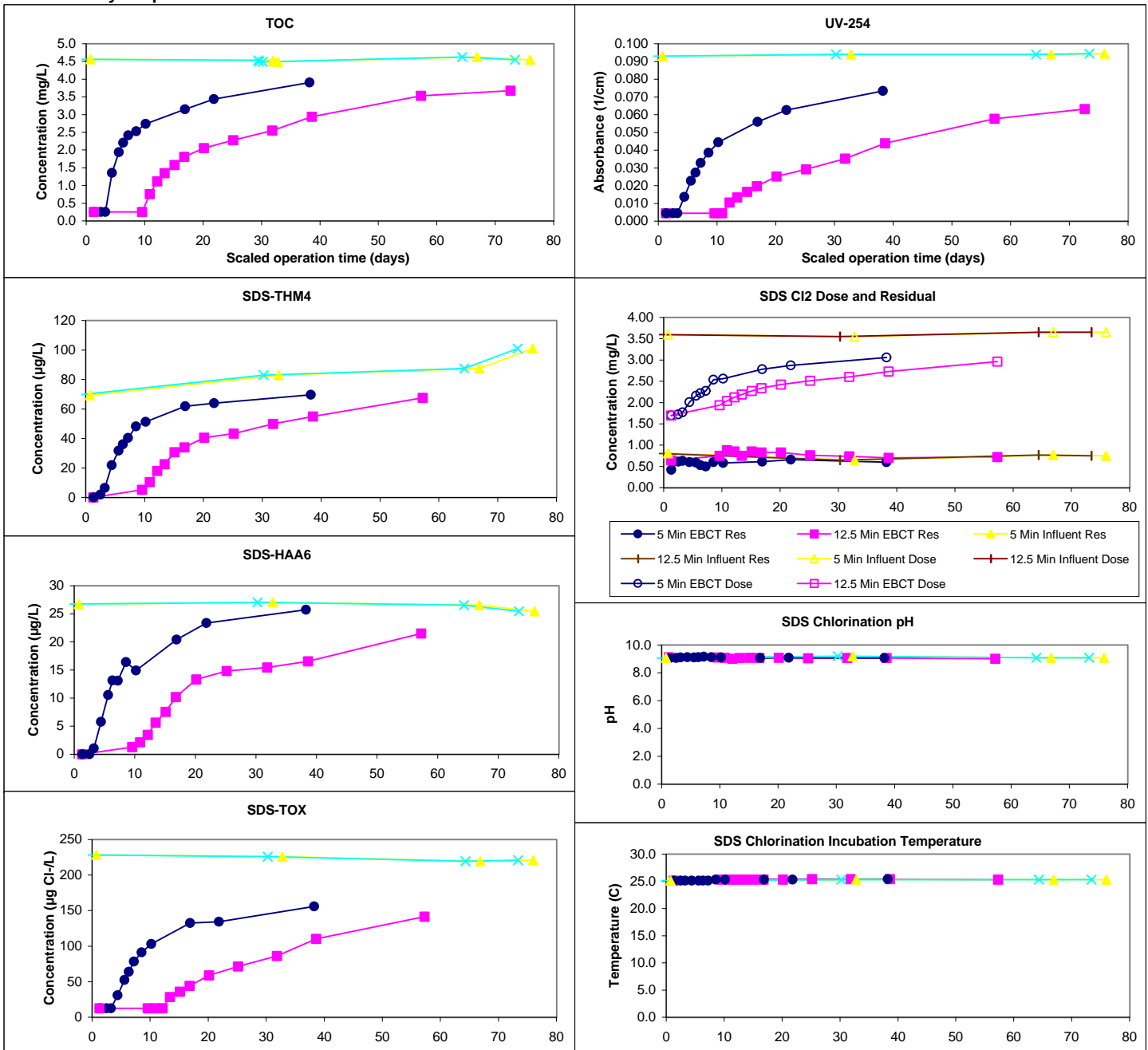
Design TOC: 4.5 mg/L
 Col Diameter: 12.6 mm
 Min Reynolds#: 0.51
 Full-Scale Temp: 25.0 C

Full-Scale GAC Size: 12x40 Bituminous
 Bench-Scale GAC Size: 100x200
 Scaling Factor: 9.44
 Meas Dry Bed Density: 0.46 g/cm3

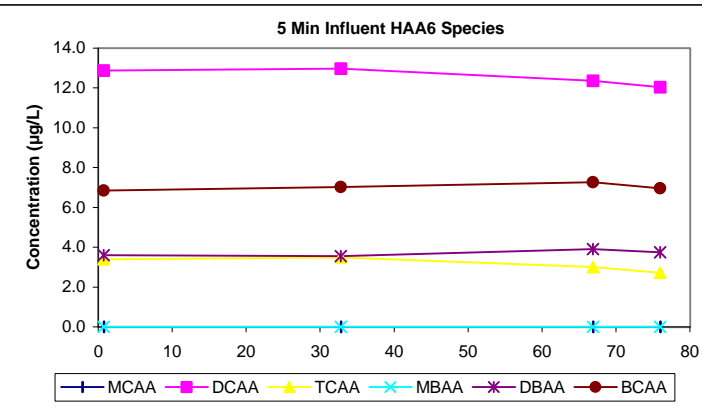
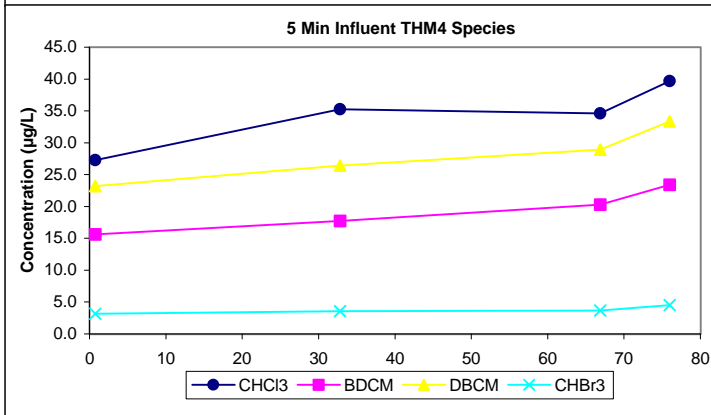
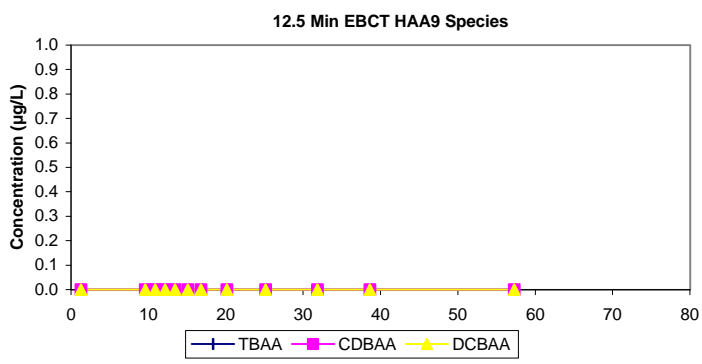
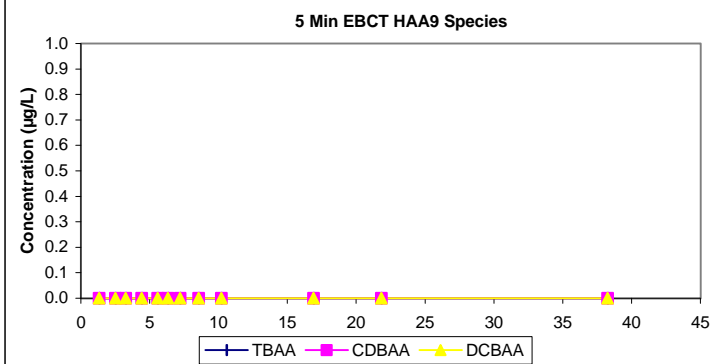
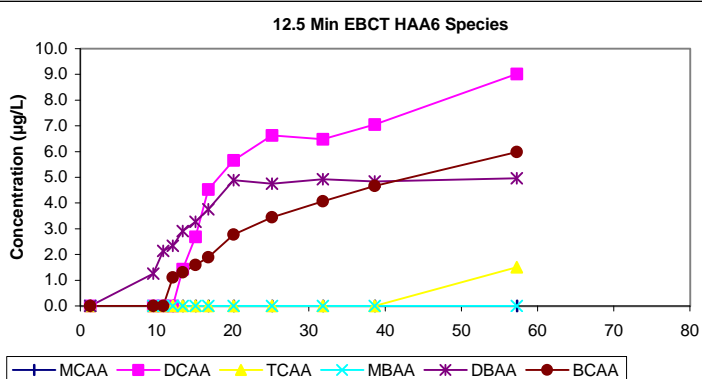
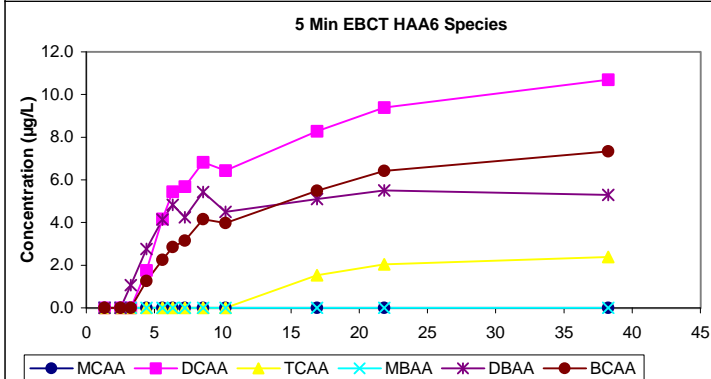
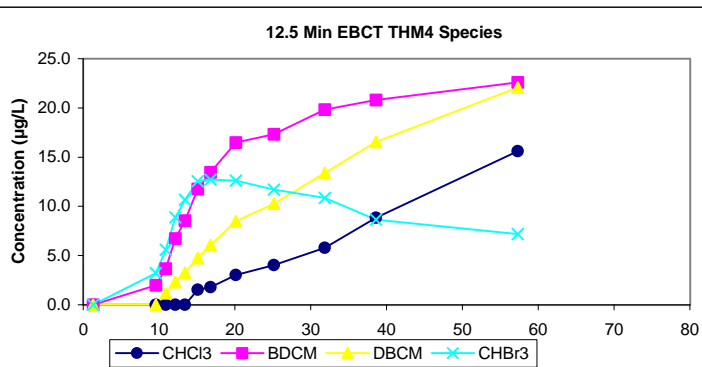
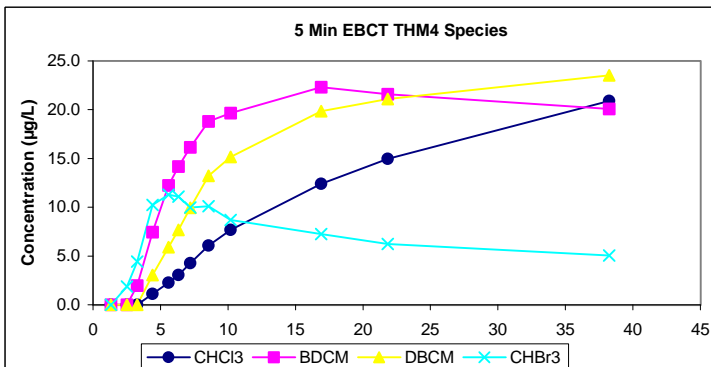
Water Quality Summary

	5 Min Influent				12.5 Min Influent								
Influent	Mean	SD/RD	Count	Min/Max	Mean	SD/RD	Count	Min/Max		Mean	SD	Count	Min/Max
TOC	4.5	0.1	6	4.5 - 4.6	4.5	0.1	6	4.5 - 4.6	Res (0)	0.69	0.11	32	0.42 - 0.88
pH	9.2	0.1	6	9.1 - 9.4	9.2	0.1	6	9.1 - 9.4	Temp	25.3	0.1	32	25.1 - 25.4
UV254	0.094	0.001	4	0.093 - 0.094	0.094	0.001	4	0.093 - 0.094	pH	9.1	0.0	32	9.0 - 9.2
SUVA	2.06	0.03	4	2.03 - 2.09	2.06	0.03	4	2.03 - 2.09	Time	6.0	0.1	32	5.8 - 6.2
Bromide	115	30	2	100 - 130	115	30	2	100 - 130	Comments:				
SDS-TOX	224	4	4	219 - 229	224	4	4	219 - 229					
SDS-THM4	85	13	4	69 - 101	85	13	4	69 - 101					
SDS-HAA6	26	1	4	25 - 27	26	1	4	25 - 27	<div><div></div>5 Min EBCT</div> <div><div></div>12.5 Min EBCT</div> <div><div></div>5 Min Influent</div> <div><div></div>12.5 Min Influent</div> <div>Chart Legend:</div>				
Effluent	5 Min EBCT (4 B-S days)				12.5 Min EBCT (8 B-S days)								
Effluent pH	8.9	0.3	12	8.4 - 9.2	8.8	0.2	13	8.5 - 9.1					
Effluent Temp	22.4	0.5	12	21.6 - 23.2	23.3	0.5	13	22.4 - 24.0					

Water Quality Graphs



Water Quality Graphs (Continued)



ICR Information

ID / ICR#: FL4130871 / 300
 ICR Contact: Raymond Diaz
 Phone No.: (305) 275-3170
 Period: 8/5/98 - 8/13/98 (8 B-S days)

Design Information

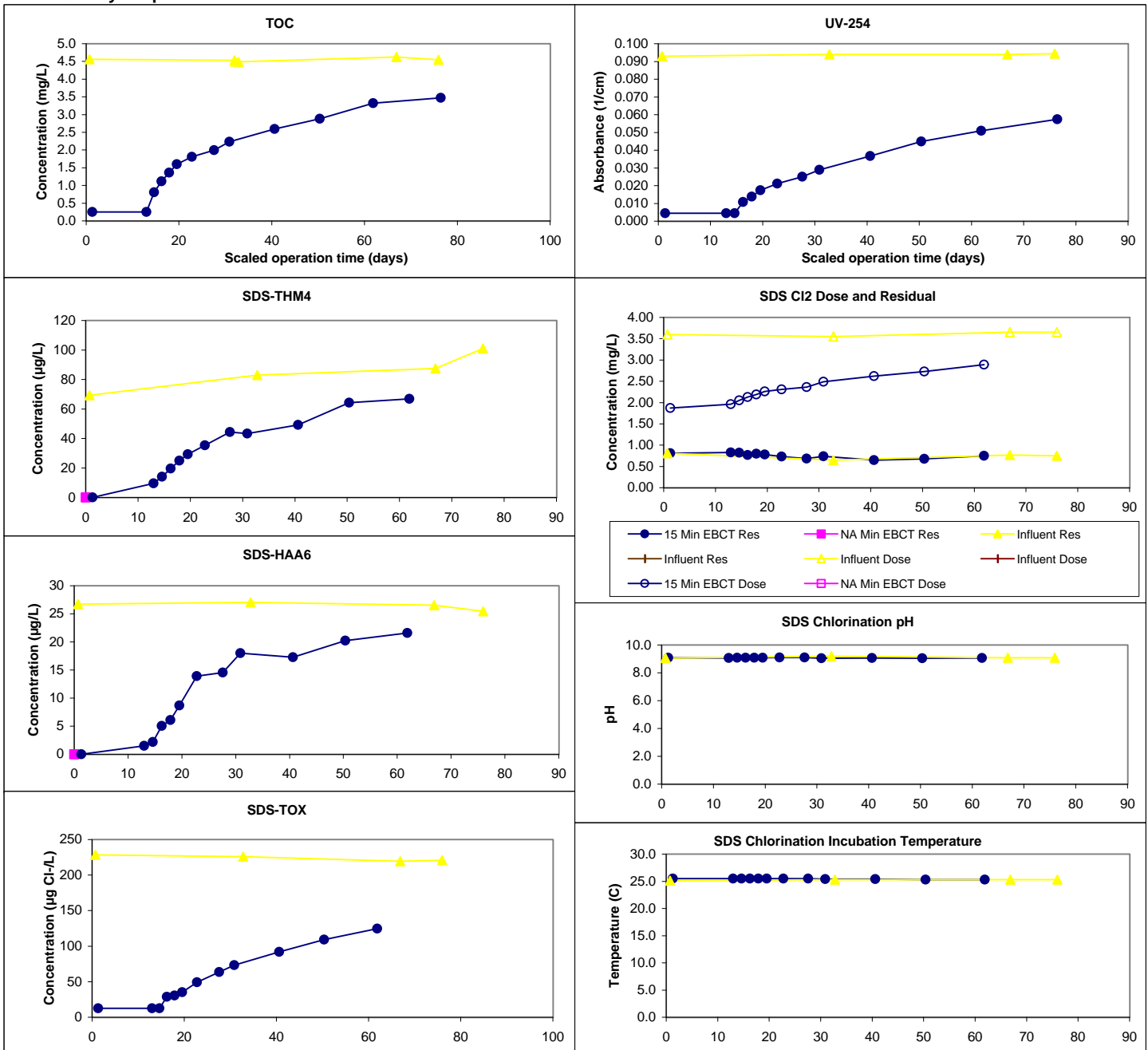
Design TOC: 4.5 mg/L
 Col Diameter: 12.6 mm
 Min Reynolds#: 0.51
 Full-Scale Temp: 25.0 C

Full-Scale GAC Size: 12x40 Bituminous
 Bench-Scale GAC Size: 100x200
 Scaling Factor: 9.44
 Meas Dry Bed Density: 0.46 g/cm3

Water Quality Summary

	Influent				Influent								
Influent	Mean	SD/RD	Count	Min/Max	Mean	SD/RD	Count	Min/Max		Mean	SD	Count	Min/Max
TOC	4.5	0.1	6	4.5 - 4.6					Res (0)	0.75	0.06	16	0.65 - 0.83
pH	9.2	0.1	6	9.1 - 9.4					Temp	25.4	0.1	16	25.1 - 25.5
UV254	0.094	0.001	4	0.093 - 0.094					pH	9.1	0.0	16	9.0 - 9.2
SUVA	2.06	0.03	4	2.03 - 2.09					Time	6.0	0.1	16	5.8 - 6.1
Bromide	115	30	2	100 - 130					Comments:				
SDS-TOX	224	4	4	219 - 229									
SDS-THM4	85	13	4	69 - 101									
SDS-HAA6	26	1	4	25 - 27					<div><div><div></div><div>15 Min EBCT</div></div><div><div></div><div>NA Min EBCT</div></div><div><div></div><div>Influent</div></div><div><div></div><div>Influent</div></div></div> <div>Chart Legend:</div>				
Effluent	15 Min EBCT (8 B-S days)				NA Min EBCT (0 B-S days)								
Effluent pH	8.7	0.2	13	8.2 - 9.3	NA	NA	0	0.0 - 0.0					
Effluent Temp	22.7	0.5	13	22.0 - 23.6	NA	NA	0	0.0 - 0.0					

Water Quality Graphs



Water Quality Graphs (Continued)

