

ICR TREATMENT STUDY ANALYSIS

Base Analysis and Data Review Comments

Treatment Study ID	1028
Study Protocol	GAC RSSCT treatment study
Plant ICR Number	453
PWS Name	Omaha Metropolitan Utilities
City, State, Zip	Omaha, NE 68112

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

Major comments:

1. Measured SDS chlorination conditions (incubation temperature, incubation pH, incubation time) were more highly variable than usual during all four quarters.

General Comments:

1. Quarter 2: Relatively large decreases in influent SDS-DBPs over the course of the run. SDS-THM4 dropped by 26 percent (38 to 28 µg/L); SDS-HAA6 dropped by 36 percent (18 to 11.5 µg/L); SDS-TOX dropped by 58 percent (113 to 48 µg/L as Cl). The decrease in SDS-THM4 was driven by a decrease in the formation of SDS-CF; the decrease in SDS-HAA6 was driven by a decrease in SDS-MBAA, which was measured at 7 µg/L in the first influent sample and was BMRL thereafter. (Next highest formed brominated compound was BCAA at about 2 µg/L.) Similar decreases were not observed in TOC or UV₂₅₄ influent data. SDS free chlorine residuals were below 0.1 mg/L for first and third influent samples (0.00 and 0.05 mg/L, respectively).
2. Quarter 3: Breakthrough behavior for SDS-DCAA during the 10 minute EBCT run is atypical, with a high immediate breakthrough and no significant increase over the course of the run. Effluent levels vary between 3 and 5 µg/L throughout most of the run. In general, THMs, HAAs, and TOX showed relatively high levels of immediate breakthrough for both EBCTs.
3. Quarter 3: Effluent SDS-TOX breakthrough curves are atypical: "peak" curve for 10 minute EBCT, "valley" curve for 20 minute EBCT.
4. Quarter 3: SDS-MCAA measured in GAC influent a 5 µg/L during one sampling point while BMRL during others. Significant formation of MCAA is unusual.

5. Quarter 4: Atypical SDS-DCAA breakthrough curves for both EBCTs: high immediate breakthrough and little to no increase in concentration over run time.
6. Quarter 4: SDS-THM4 breakthrough curves exceed the influent SDS-THM4 concentration.
7. Quarter 4: For 10 samples (both EBCTs), reported SDS incubation pH was more than 0.5 pH units below the target pH of 9.2. Overall average incubation pH was 8.6, range was 7.5-9.3. Target incubation temperature was 13°C, average reported incubation temperature was 6 ± 2 °C.

Outlier Data:

One outlier removed.

Cell: A1

Comment: 1028-SAS.xls 2/10/00 10:42

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

Cell: C5

Comment: 1028-10-01 - Run 1 (CHBr3) 2/10/00 09:42

Original value (CoefA0) = -0.0371 New value = -0.7605

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

Cell: D5

Comment: 1028-10-01 - Run 1 (CHBr3) 2/10/00 09:42

Original value (CoefAf) = 6.15 New value = 9.1139

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

Cell: E5

Comment: 1028-10-01 - Run 1 (CHBr3) 2/10/00 09:42

Original value (CoefB) = 14.2737 New value = 20.8504

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

Cell: F5

Comment: 1028-10-01 - Run 1 (CHBr3) 2/10/00 09:42

Original value (CoefD) = 0.0859 New value = 0.1649

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

Cell: J5

Comment: 1028-10-01 - Run 1 (CHBr3) 2/10/00 09:42

Original value (S) = 0 New value = -0.069

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

Cell: C8

Comment: 1028-10-01 - Run 1 (DBAA) 2/10/00 09:43

Original value (CoefA0) = 0.1784 New value = -0.1495

Poor peak curve fit. Data was refit to type 1 curve fit by iterative curve fit procedure.

Cell: D8

Comment: 1028-10-01 - Run 1 (DBAA) 2/10/00 09:43

Original value (CoefAf) = 1.3225 New value = 1.4608

Poor peak curve fit. Data was refit to type 1 curve fit by iterative curve fit procedure.

Cell: E8

Comment: 1028-10-01 - Run 1 (DBAA) 2/10/00 09:43

Original value (CoefB) = 3519990.37206818 New value = 212.5538

Poor peak curve fit. Data was refit to type 1 curve fit by iterative curve fit procedure.

Cell: F8

Comment: 1028-10-01 - Run 1 (DBAA) 2/10/00 09:43

Original value (CoefD) = 1.0921 New value = 0.4082

Poor peak curve fit. Data was refit to type 1 curve fit by iterative curve fit procedure.

Cell: J8

Comment: 1028-10-01 - Run 1 (DBAA) 2/10/00 09:43
Original value (S) = -0.2034 New value = 0
Poor peak curve fit. Data was refit to type 1 curve fit by iterative curve fit procedure.

Cell: C18

Comment: 1028-10-01 - Run 1 (TCAA) 2/10/00 09:42
Original value (CoefA0) = 0 New value = -0.3268
Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: D18

Comment: 1028-10-01 - Run 1 (TCAA) 2/10/00 09:42
Original value (CoefAf) = 0 New value = 4.1092
Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: E18

Comment: 1028-10-01 - Run 1 (TCAA) 2/10/00 09:42
Original value (CoefB) = 0 New value = 26.7826
Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: F18

Comment: 1028-10-01 - Run 1 (TCAA) 2/10/00 09:42
Original value (CoefD) = 0 New value = 0.056
Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: J18

Comment: 1028-10-01 - Run 1 (TCAA) 2/10/00 09:42
Original value (S) = 0 New value = 0
Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: C22

Comment: 1028-10-01 - Run 1 (TSUVA) 2/10/00 09:37
Original value (CoefA0) = 99999 New value = -0.0048
Fewer than 6 points. Logistic function (type 1) applied.

Cell: D22

Comment: 1028-10-01 - Run 1 (TSUVA) 2/10/00 09:37
Original value (CoefAf) = 99999 New value = 1.572
Fewer than 6 points. Logistic function (type 1) applied.

Cell: E22

Comment: 1028-10-01 - Run 1 (TSUVA) 2/10/00 09:37
Original value (CoefB) = 99999 New value = 240.6624
Fewer than 6 points. Logistic function (type 1) applied.

Cell: F22

Comment: 1028-10-01 - Run 1 (TSUVA) 2/10/00 09:37
Original value (CoefD) = 99999 New value = 0.2245
Fewer than 6 points. Logistic function (type 1) applied.

Cell: J22

Comment: 1028-10-01 - Run 1 (TSUVA) 2/10/00 09:37
Original value (S) = 0 New value = 0
Fewer than 6 points. Logistic function (type 1) applied.

Cell: C27

Comment: 1028-10-02 - Run 3 (CHBr3) 2/10/00 09:50
Original value (CoefA0) = 0 New value = 0
Fewer than 6 points above MRL. Peak curve/step function combination applied.

Cell: D27

Comment: 1028-10-02 - Run 3 (CHBr3) 2/10/00 09:50
Original value (CoefAf) = 0 New value = 2.05
Fewer than 6 points above MRL. Peak curve/step function combination applied.

Cell: E27

Comment: 1028-10-02 - Run 3 (CHBr3) 2/10/00 09:50
Original value (CoefB) = 0 New value = 0
Fewer than 6 points above MRL. Peak curve/step function combination applied.

Cell: F27

Comment: 1028-10-02 - Run 3 (CHBr3) 2/10/00 09:50
Original value (CoefD) = 0 New value = 0
Fewer than 6 points above MRL. Peak curve/step function combination applied.

Cell: J27

Comment: 1028-10-02 - Run 3 (CHBr3) 2/10/00 09:50
Original value (S) = 0 New value = -0.0625
Fewer than 6 points above MRL. Peak curve/step function combination applied.

Cell: C30

Comment: 1028-10-02 - Run 3 (DBAA) 2/9/00 23:19
Original value (CoefA0) = 0 New value = 1.08
Fewer than 6 points above MRL. Step function applied.

Cell: D30

Comment: 1028-10-02 - Run 3 (DBAA) 2/9/00 23:19
Original value (CoefAf) = 0 New value = 0
Fewer than 6 points above MRL. Step function applied.

Cell: E30

Comment: 1028-10-02 - Run 3 (DBAA) 2/9/00 23:19
Original value (CoefB) = 0 New value = 0
Fewer than 6 points above MRL. Step function applied.

Cell: F30

Comment: 1028-10-02 - Run 3 (DBAA) 2/9/00 23:19
Original value (CoefD) = 0 New value = 0
Fewer than 6 points above MRL. Step function applied.

Cell: J30

Comment: 1028-10-02 - Run 3 (DBAA) 2/9/00 23:19

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

Cell: K30

Comment: 1028-10-02 - Run 3 (DBAA) 2/9/00 23:19
Original value (t0) = 0 New value = 18.8083
Fewer than 6 points above MRL. Step function applied.

Cell: C34

Comment: 1028-10-02 - Run 3 (HAA5) 2/10/00 09:48
Original value (CoefA0) = 0 New value = -0.2198
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

Cell: D34

Comment: 1028-10-02 - Run 3 (HAA5) 2/10/00 09:48
Original value (CoefAf) = 7.2 New value = 5.2701
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

Cell: E34

Comment: 1028-10-02 - Run 3 (HAA5) 2/10/00 09:48
Original value (CoefB) = 10 New value = 584.7894
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

Cell: F34

Comment: 1028-10-02 - Run 3 (HAA5) 2/10/00 09:48
Original value (CoefD) = 0.15 New value = 0.8069
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

Cell: J34

Comment: 1028-10-02 - Run 3 (HAA5) 2/10/00 09:48
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: C35

Comment: 1028-10-02 - Run 3 (HAA6) 2/10/00 09:53
Original value (CoefA0) = 0 New value = -0.1588
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

Cell: D35

Comment: 1028-10-02 - Run 3 (HAA6) 2/10/00 09:53
Original value (CoefAf) = 8.2 New value = 6.2714
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

Cell: E35

Comment: 1028-10-02 - Run 3 (HAA6) 2/10/00 09:53
Original value (CoefB) = 10 New value = 297.1887
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

Cell: F35

Comment: 1028-10-02 - Run 3 (HAA6) 2/10/00 09:53
Original value (CoefD) = 0.15 New value = 0.6596

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

Cell: J35

Comment: 1028-10-02 - Run 3 (HAA6) 2/10/00 09:53

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: C38

Comment: 1028-10-02 - Run 3 (MCAA) 2/10/00 09:52

Original value (CoefA0) = 0 New value = 0

Fewer than 6 points above MRL. Peak curve/step function combination applied.

Cell: D38

Comment: 1028-10-02 - Run 3 (MCAA) 2/10/00 09:52

Original value (CoefAf) = 0 New value = 3.7

Fewer than 6 points above MRL. Peak curve/step function combination applied.

Cell: E38

Comment: 1028-10-02 - Run 3 (MCAA) 2/10/00 09:52

Original value (CoefB) = 0 New value = 0

Fewer than 6 points above MRL. Peak curve/step function combination applied.

Cell: F38

Comment: 1028-10-02 - Run 3 (MCAA) 2/10/00 09:52

Original value (CoefD) = 0 New value = 0

Fewer than 6 points above MRL. Peak curve/step function combination applied.

Cell: J38

Comment: 1028-10-02 - Run 3 (MCAA) 2/10/00 09:52

Original value (S) = 0 New value = -0.4077

Fewer than 6 points above MRL. Peak curve/step function combination applied.

Cell: C49

Comment: 1028-10-03 - Run 5 (CHBr3) 2/10/00 09:57

Original value (CoefA0) = 2 New value = 2.2817

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

Cell: D49

Comment: 1028-10-03 - Run 5 (CHBr3) 2/10/00 09:57

Original value (CoefAf) = 1.0699 New value = 3.476

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

Cell: E49

Comment: 1028-10-03 - Run 5 (CHBr3) 2/10/00 09:57

Original value (CoefB) = 2.4113 New value = 20.0471

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

Cell: F49

Comment: 1028-10-03 - Run 5 (CHBr3) 2/10/00 09:57

Original value (CoefD) = 0 New value = 0.1251

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

Cell: J49

Comment: 1028-10-03 - Run 5 (CHBr3) 2/10/00 09:57
Original value (S) = 0 New value = -0.0531
Poor peak curve fit. Data was refit by iterative curve fit procedure.

Cell: C52

Comment: 1028-10-03 - Run 5 (DBAA) 2/9/00 23:24
Original value (CoefA0) = 0 New value = 1.18
Fewer than 6 points above MRL. Step function applied.

Cell: D52

Comment: 1028-10-03 - Run 5 (DBAA) 2/9/00 23:24
Original value (CoefAf) = 0 New value = 0
Fewer than 6 points above MRL. Step function applied.

Cell: E52

Comment: 1028-10-03 - Run 5 (DBAA) 2/9/00 23:24
Original value (CoefB) = 0 New value = 0
Fewer than 6 points above MRL. Step function applied.

Cell: F52

Comment: 1028-10-03 - Run 5 (DBAA) 2/9/00 23:24
Original value (CoefD) = 0 New value = 0
Fewer than 6 points above MRL. Step function applied.

Cell: J52

Comment: 1028-10-03 - Run 5 (DBAA) 2/9/00 23:24
Original value (S) = 0 New value = 0
Fewer than 6 points above MRL. Step function applied.

Cell: K52

Comment: 1028-10-03 - Run 5 (DBAA) 2/9/00 23:24
Original value (t0) = 0 New value = 22.3542
Fewer than 6 points above MRL. Step function applied.

Cell: C62

Comment: 1028-10-03 - Run 5 (TCAA) 2/9/00 23:23
Original value (CoefA0) = 0 New value = 1
Fewer than 6 points above MRL. Step function applied.

Cell: D62

Comment: 1028-10-03 - Run 5 (TCAA) 2/9/00 23:23
Original value (CoefAf) = 0 New value = 0
Fewer than 6 points above MRL. Step function applied.

Cell: E62

Comment: 1028-10-03 - Run 5 (TCAA) 2/9/00 23:23
Original value (CoefB) = 0 New value = 0
Fewer than 6 points above MRL. Step function applied.

Cell: F62

Comment: 1028-10-03 - Run 5 (TCAA) 2/9/00 23:23
Original value (CoefD) = 0 New value = 0
Fewer than 6 points above MRL. Step function applied.

Cell: J62

Comment: 1028-10-03 - Run 5 (TCAA) 2/9/00 23:23
Original value (S) = 0 New value = 0
Fewer than 6 points above MRL. Step function applied.

Cell: K62

Comment: 1028-10-03 - Run 5 (TCAA) 2/9/00 23:23
Original value (t0) = 0 New value = 0.6167
Fewer than 6 points above MRL. Step function applied.

Cell: C71

Comment: 1028-10-04 - Run 7 (CHBr3) 2/10/00 10:01
Original value (CoefA0) = -1.35 New value = -0.1808
Poor peak curve fit. Data was refit by iterative curve fit procedure.

Cell: D71

Comment: 1028-10-04 - Run 7 (CHBr3) 2/10/00 10:01
Original value (CoefAf) = 4.05 New value = 15.2224
Poor peak curve fit. Data was refit by iterative curve fit procedure.

Cell: E71

Comment: 1028-10-04 - Run 7 (CHBr3) 2/10/00 10:01
Original value (CoefB) = 0.7496 New value = 17.9072
Poor peak curve fit. Data was refit by iterative curve fit procedure.

Cell: F71

Comment: 1028-10-04 - Run 7 (CHBr3) 2/10/00 10:01
Original value (CoefD) = 0.0113 New value = 0.0578
Poor peak curve fit. Data was refit by iterative curve fit procedure.

Cell: J71

Comment: 1028-10-04 - Run 7 (CHBr3) 2/10/00 10:01
Original value (S) = 0 New value = -0.0664
Poor peak curve fit. Data was refit by iterative curve fit procedure.

Cell: C84

Comment: 1028-10-04 - Run 7 (TCAA) 2/10/00 10:02
Original value (CoefA0) = -0.0018 New value = -0.108
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

Cell: D84

Comment: 1028-10-04 - Run 7 (TCAA) 2/10/00 10:02
Original value (CoefAf) = 1.442 New value = 1.6231
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

Cell: E84

Comment: 1028-10-04 - Run 7 (TCAA) 2/10/00 10:02

Original value (CoefB) = 2119353872.23971 New value = 103.8305
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

Cell: F84

Comment: 1028-10-04 - Run 7 (TCAA) 2/10/00 10:02
Original value (CoefD) = 1.0092 New value = 0.2
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

Cell: J84

Comment: 1028-10-04 - Run 7 (TCAA) 2/10/00 10:02
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: C90

Comment: 1028-20-01 - Run 2 (BCAA) 2/10/00 09:45
Original value (CoefA0) = 0 New value = -0.9457
Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: D90

Comment: 1028-20-01 - Run 2 (BCAA) 2/10/00 09:45
Original value (CoefAf) = 0 New value = 12.7083
Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: E90

Comment: 1028-20-01 - Run 2 (BCAA) 2/10/00 09:45
Original value (CoefB) = 0 New value = 28.5932
Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: F90

Comment: 1028-20-01 - Run 2 (BCAA) 2/10/00 09:45
Original value (CoefD) = 0 New value = 0.0322
Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: J90

Comment: 1028-20-01 - Run 2 (BCAA) 2/10/00 09:45
Original value (S) = 0 New value = 0
Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: C93

Comment: 1028-20-01 - Run 2 (CHBr3) 2/10/00 09:46
Original value (CoefA0) = 0.047 New value = -0.4062
Poor peak curve fit. Data was refit by iterative curve fit procedure.

Cell: D93

Comment: 1028-20-01 - Run 2 (CHBr3) 2/10/00 09:46
Original value (CoefAf) = 3.8884 New value = 5.5718
Poor peak curve fit. Data was refit by iterative curve fit procedure.

Cell: E93

Comment: 1028-20-01 - Run 2 (CHBr3) 2/10/00 09:46
Original value (CoefB) = 21.694 New value = 53.9111

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

Cell: F93

Comment: 1028-20-01 - Run 2 (CHBr3) 2/10/00 09:46

Original value (CoefD) = 0.1021 New value = 0.1657

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

Cell: J93

Comment: 1028-20-01 - Run 2 (CHBr3) 2/10/00 09:46

Original value (S) = -0.0133 New value = -0.0697

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

Cell: C96

Comment: 1028-20-01 - Run 2 (DBAA) 2/10/00 09:47

Original value (CoefA0) = 0 New value = -0.6609

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

Cell: D96

Comment: 1028-20-01 - Run 2 (DBAA) 2/10/00 09:47

Original value (CoefAf) = 0 New value = 10.0642

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

Cell: E96

Comment: 1028-20-01 - Run 2 (DBAA) 2/10/00 09:47

Original value (CoefB) = 0 New value = 25.9719

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

Cell: F96

Comment: 1028-20-01 - Run 2 (DBAA) 2/10/00 09:47

Original value (CoefD) = 0 New value = 0.0346

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

Cell: J96

Comment: 1028-20-01 - Run 2 (DBAA) 2/10/00 09:47

Original value (S) = 0 New value = 0

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

Cell: C98

Comment: 1028-20-01 - Run 2 (DCAA) 2/10/00 09:44

Original value (CoefA0) = 0 New value = -0.111

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

Cell: D98

Comment: 1028-20-01 - Run 2 (DCAA) 2/10/00 09:44

Original value (CoefAf) = 0 New value = 2.1343

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

Cell: E98

Comment: 1028-20-01 - Run 2 (DCAA) 2/10/00 09:44

Original value (CoefB) = 0 New value = 20.8956

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

Cell: F98

Comment: 1028-20-01 - Run 2 (DCAA) 2/10/00 09:44
Original value (CoefD) = 0 New value = 0.0601
Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: J98

Comment: 1028-20-01 - Run 2 (DCAA) 2/10/00 09:44
Original value (S) = 0 New value = 0
Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: C112

Comment: 1028-20-02 - Run 4 (BCAA) 2/9/00 23:20
Original value (CoefA0) = 0 New value = 1.3667
Fewer than 6 points above MRL. Step function applied.

Cell: D112

Comment: 1028-20-02 - Run 4 (BCAA) 2/9/00 23:20
Original value (CoefAf) = 0 New value = 0
Fewer than 6 points above MRL. Step function applied.

Cell: E112

Comment: 1028-20-02 - Run 4 (BCAA) 2/9/00 23:20
Original value (CoefB) = 0 New value = 0
Fewer than 6 points above MRL. Step function applied.

Cell: F112

Comment: 1028-20-02 - Run 4 (BCAA) 2/9/00 23:20
Original value (CoefD) = 0 New value = 0
Fewer than 6 points above MRL. Step function applied.

Cell: J112

Comment: 1028-20-02 - Run 4 (BCAA) 2/9/00 23:20
Original value (S) = 0 New value = 0
Fewer than 6 points above MRL. Step function applied.

Cell: K112

Comment: 1028-20-02 - Run 4 (BCAA) 2/9/00 23:20
Original value (t0) = 0 New value = 59.6625
Fewer than 6 points above MRL. Step function applied.

Cell: C117

Comment: 1028-20-02 - Run 4 (CI2-D) 2/10/00 09:55
Original value (CoefA0) = 0.1784 New value = 0.5011
Poor peak curve fit. Data was refit to type 1 curve fit by iterative curve fit procedure.

Cell: D117

Comment: 1028-20-02 - Run 4 (CI2-D) 2/10/00 09:55
Original value (CoefAf) = 1.77 New value = 0.5205
Poor peak curve fit. Data was refit to type 1 curve fit by iterative curve fit procedure.

Cell: E117

Comment: 1028-20-02 - Run 4 (CI2-D) 2/10/00 09:55
Original value (CoefB) = 4.1155 New value = 1264.548
Poor peak curve fit. Data was refit to type 1 curve fit by iterative curve fit procedure.

Cell: F117

Comment: 1028-20-02 - Run 4 (CI2-D) 2/10/00 09:55
Original value (CoefD) = 0.0083 New value = 0.0904
Poor peak curve fit. Data was refit to type 1 curve fit by iterative curve fit procedure.

Cell: J117

Comment: 1028-20-02 - Run 4 (CI2-D) 2/10/00 09:55
Original value (S) = -0.0008 New value = 0
Poor peak curve fit. Data was refit to type 1 curve fit by iterative curve fit procedure.

Cell: C118

Comment: 1028-20-02 - Run 4 (DBAA) 2/9/00 23:22
Original value (CoefA0) = 0 New value = 1.22
Fewer than 6 points above MRL. Step function applied.

Cell: D118

Comment: 1028-20-02 - Run 4 (DBAA) 2/9/00 23:22
Original value (CoefAf) = 0 New value = 0
Fewer than 6 points above MRL. Step function applied.

Cell: E118

Comment: 1028-20-02 - Run 4 (DBAA) 2/9/00 23:22
Original value (CoefB) = 0 New value = 0
Fewer than 6 points above MRL. Step function applied.

Cell: F118

Comment: 1028-20-02 - Run 4 (DBAA) 2/9/00 23:22
Original value (CoefD) = 0 New value = 0
Fewer than 6 points above MRL. Step function applied.

Cell: J118

Comment: 1028-20-02 - Run 4 (DBAA) 2/9/00 23:22
Original value (S) = 0 New value = 0
Fewer than 6 points above MRL. Step function applied.

Cell: K118

Comment: 1028-20-02 - Run 4 (DBAA) 2/9/00 23:22
Original value (t0) = 0 New value = 7.5542
Fewer than 6 points above MRL. Step function applied.

Cell: C120

Comment: 1028-20-02 - Run 4 (DCAA) 2/10/00 09:54
Original value (CoefA0) = 0 New value = -0.4106
Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: D120

Comment: 1028-20-02 - Run 4 (DCAA) 2/10/00 09:54

Original value (CoefAf) = 0 New value = 7.0646
Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: E120

Comment: 1028-20-02 - Run 4 (DCAA) 2/10/00 09:54
Original value (CoefB) = 0 New value = 18.853
Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: F120

Comment: 1028-20-02 - Run 4 (DCAA) 2/10/00 09:54
Original value (CoefD) = 0 New value = 0.0365
Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: J120

Comment: 1028-20-02 - Run 4 (DCAA) 2/10/00 09:54
Original value (S) = 0 New value = 0
Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: C134

Comment: 1028-20-03 - Run 6 (BCAA) 2/10/00 09:57
Original value (CoefA0) = 0 New value = -0.149
Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: D134

Comment: 1028-20-03 - Run 6 (BCAA) 2/10/00 09:57
Original value (CoefAf) = 0 New value = 3.1105
Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: E134

Comment: 1028-20-03 - Run 6 (BCAA) 2/10/00 09:57
Original value (CoefB) = 0 New value = 91.4025
Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: F134

Comment: 1028-20-03 - Run 6 (BCAA) 2/10/00 09:57
Original value (CoefD) = 0 New value = 0.0433
Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: J134

Comment: 1028-20-03 - Run 6 (BCAA) 2/10/00 09:57
Original value (S) = 0 New value = 0
Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: C137

Comment: 1028-20-03 - Run 6 (CHBr3) 2/10/00 10:00
Original value (CoefA0) = -2.5 New value = -0.4239
Poor peak curve fit. Data was refit by iterative curve fit procedure.

Cell: D137

Comment: 1028-20-03 - Run 6 (CHBr3) 2/10/00 10:00
Original value (CoefAf) = 7.5 New value = 4.5228

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

Cell: E137

Comment: 1028-20-03 - Run 6 (CHBr3) 2/10/00 10:00

Original value (CoefB) = 0.6227 New value = 12.1324

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

Cell: F137

Comment: 1028-20-03 - Run 6 (CHBr3) 2/10/00 10:00

Original value (CoefD) = 0.0126 New value = 0.4296

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

Cell: J137

Comment: 1028-20-03 - Run 6 (CHBr3) 2/10/00 10:00

Original value (S) = 0 New value = -0.0192

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

Cell: C139

Comment: 1028-20-03 - Run 6 (Cl2-D) 2/10/00 09:58

Original value (CoefA0) = 0.48 New value = 0.4687

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

Cell: D139

Comment: 1028-20-03 - Run 6 (Cl2-D) 2/10/00 09:58

Original value (CoefAf) = 1.44 New value = 0.3889

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

Cell: E139

Comment: 1028-20-03 - Run 6 (Cl2-D) 2/10/00 09:58

Original value (CoefB) = 241.8301 New value = 20.0154

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

Cell: F139

Comment: 1028-20-03 - Run 6 (Cl2-D) 2/10/00 09:58

Original value (CoefD) = 0.037 New value = 0.0321

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

Cell: J139

Comment: 1028-20-03 - Run 6 (Cl2-D) 2/10/00 09:58

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: C159

Comment: 1028-20-04 - Run 8 (CHBr3) 2/10/00 10:05

Original value (CoefA0) = 0.0049 New value = -0.4582

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

Cell: D159

Comment: 1028-20-04 - Run 8 (CHBr3) 2/10/00 10:05

Original value (CoefAf) = 4.2 New value = 5.6691

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

Cell: E159

Comment: 1028-20-04 - Run 8 (CHBr3) 2/10/00 10:05
Original value (CoefB) = 53.398 New value = 20.5395
Poor peak curve fit. Data was refit by iterative curve fit procedure.

Cell: F159

Comment: 1028-20-04 - Run 8 (CHBr3) 2/10/00 10:05
Original value (CoefD) = 0.1474 New value = 0.1464
Poor peak curve fit. Data was refit by iterative curve fit procedure.

Cell: J159

Comment: 1028-20-04 - Run 8 (CHBr3) 2/10/00 10:05
Original value (S) = 0 New value = -0.0169
Poor peak curve fit. Data was refit by iterative curve fit procedure.

Cell: C161

Comment: 1028-20-04 - Run 8 (Cl2-D) 2/10/00 10:04
Original value (CoefA0) = 0.57 New value = 1.0799
Poor peak curve fit. Data was refit by iterative curve fit procedure.

Cell: D161

Comment: 1028-20-04 - Run 8 (Cl2-D) 2/10/00 10:04
Original value (CoefAf) = 1.71 New value = 1.1937
Poor peak curve fit. Data was refit by iterative curve fit procedure.

Cell: E161

Comment: 1028-20-04 - Run 8 (Cl2-D) 2/10/00 10:04
Original value (CoefB) = 10 New value = 19.9971
Poor peak curve fit. Data was refit by iterative curve fit procedure.

Cell: F161

Comment: 1028-20-04 - Run 8 (Cl2-D) 2/10/00 10:04
Original value (CoefD) = 0.15 New value = 0.1269
Poor peak curve fit. Data was refit by iterative curve fit procedure.

Cell: J161

Comment: 1028-20-04 - Run 8 (Cl2-D) 2/10/00 10:04
Original value (S) = -0.0016 New value = -0.0035
Poor peak curve fit. Data was refit by iterative curve fit procedure.

Cell: C172

Comment: 1028-20-04 - Run 8 (TCAA) 2/10/00 10:06
Original value (CoefA0) = 0 New value = 0.2451
Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: D172

Comment: 1028-20-04 - Run 8 (TCAA) 2/10/00 10:06
Original value (CoefAf) = 0 New value = 1.5385
Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: E172

Comment: 1028-20-04 - Run 8 (TCAA) 2/10/00 10:06
Original value (CoefB) = 0 New value = 20.6921
Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: F172

Comment: 1028-20-04 - Run 8 (TCAA) 2/10/00 10:06
Original value (CoefD) = 0 New value = 0.0258
Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: J172

Comment: 1028-20-04 - Run 8 (TCAA) 2/10/00 10:06
Original value (S) = 0 New value = 0
Fewer than 6 points above MRL. Logistic function (type 1) applied.

Cell: C176

Comment: 1028-20-04 - Run 8 (TSUVA) 2/10/00 10:03
Original value (CoefA0) = -0.8077 New value = -0.0925
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

Cell: D176

Comment: 1028-20-04 - Run 8 (TSUVA) 2/10/00 10:03
Original value (CoefAf) = 2.343 New value = 1.3877
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

Cell: E176

Comment: 1028-20-04 - Run 8 (TSUVA) 2/10/00 10:03
Original value (CoefB) = 1.8116 New value = 11.715
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

Cell: F176

Comment: 1028-20-04 - Run 8 (TSUVA) 2/10/00 10:03
Original value (CoefD) = 0.0579 New value = 0.1352
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

Cell: J176

Comment: 1028-20-04 - Run 8 (TSUVA) 2/10/00 10:03
Original value (S) = 0 New value = 0
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

ICR Information

ID / ICR#: NE 3105507 / 453
 ICR Contact: Zoltan Kerekes
 Phone No.: 402-449-8181
 Period: 5/20/98 - 6/10/98 (21 B-S days)

Design Information

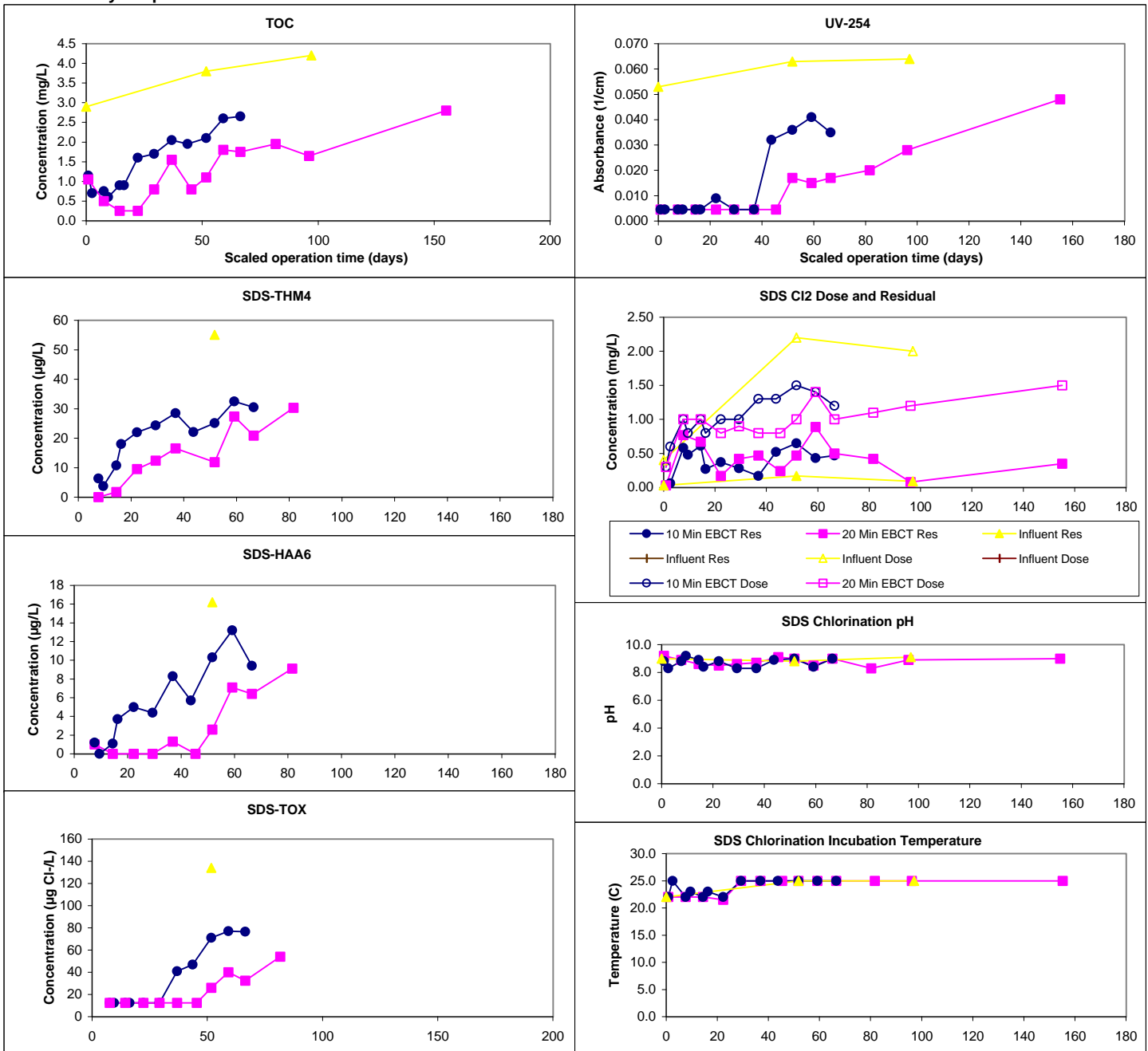
Design TOC: 3.6 mg/L
 Col Diameter: 11.0 mm
 Min Reynolds#: 0.50
 Full-Scale Temp: 19.6 C

Full-Scale GAC Size: 8x30 Bituminous coal
 Bench-Scale GAC Size: 60x100
 Scaling Factor: 7.40
 Meas Dry Bed Density: 0.50 g/cm3

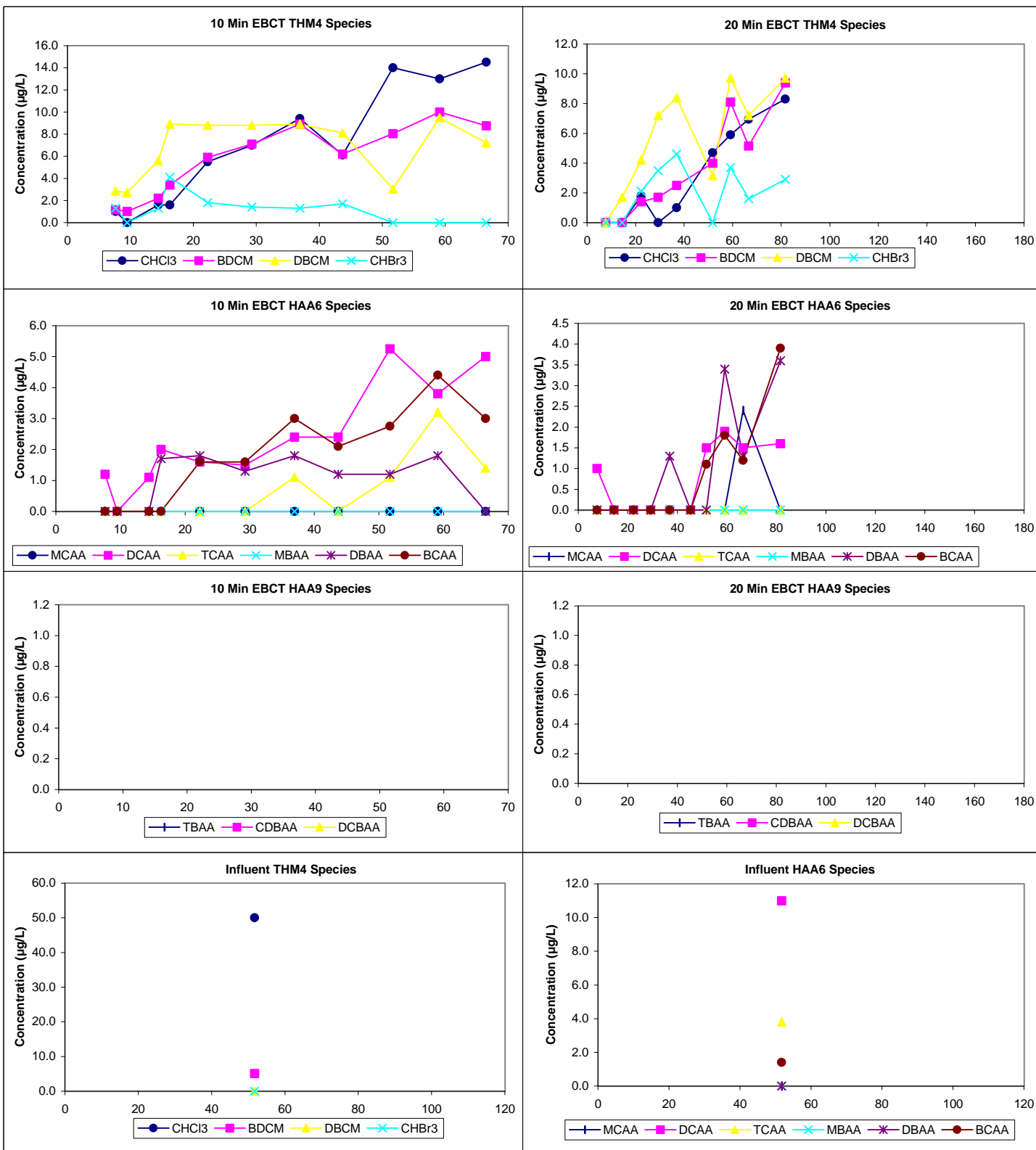
Water Quality Summary

Influent	Influent				Influent				Res (6)	Mean	SD	Count	Min/Max
	Mean	SD/RD	Count	Min/Max	Mean	SD/RD	Count	Min/Max					
TOC	3.6	0.7	3	2.9 - 4.2									
pH	8.8	0.0	3	8.8 - 8.8					Temp	23.9	1.4	29	21.5 - 25.0
UV254	0.060	0.006	3	0.053 - 0.064					pH	8.8	0.3	29	8.3 - 9.2
SUVA	1.67	0.15	3	1.52 - 1.83					Time	4.6	0.4	29	4.0 - 5.0
Bromide	34	1	2	33 - 34					Comments:				
SDS-TOX	134	0	1	134 - 134									
SDS-THM4	55	0	1	55 - 55									
SDS-HAA6	16	0	1	16 - 16									
Effluent	10 Min EBCT (9 B-S days)				20 Min EBCT (21 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	8.3	0.3	13	7.6 - 8.8	8.3	0.4	13	7.6 - 9.3					
Effluent Temp	24.7	0.8	13	23.0 - 25.0	24.0	1.4	13	22.0 - 25.0					

Water Quality Graphs



Water Quality Graphs (Continued)



ICR Information

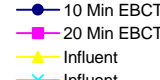
ID / ICR#: NE 3105507 / 453
 ICR Contact: Zoltan Kerekes
 Phone No.: 402-449-8181
 Period: 8/27/98 - 9/21/98 (25 B-S days)

Design Information

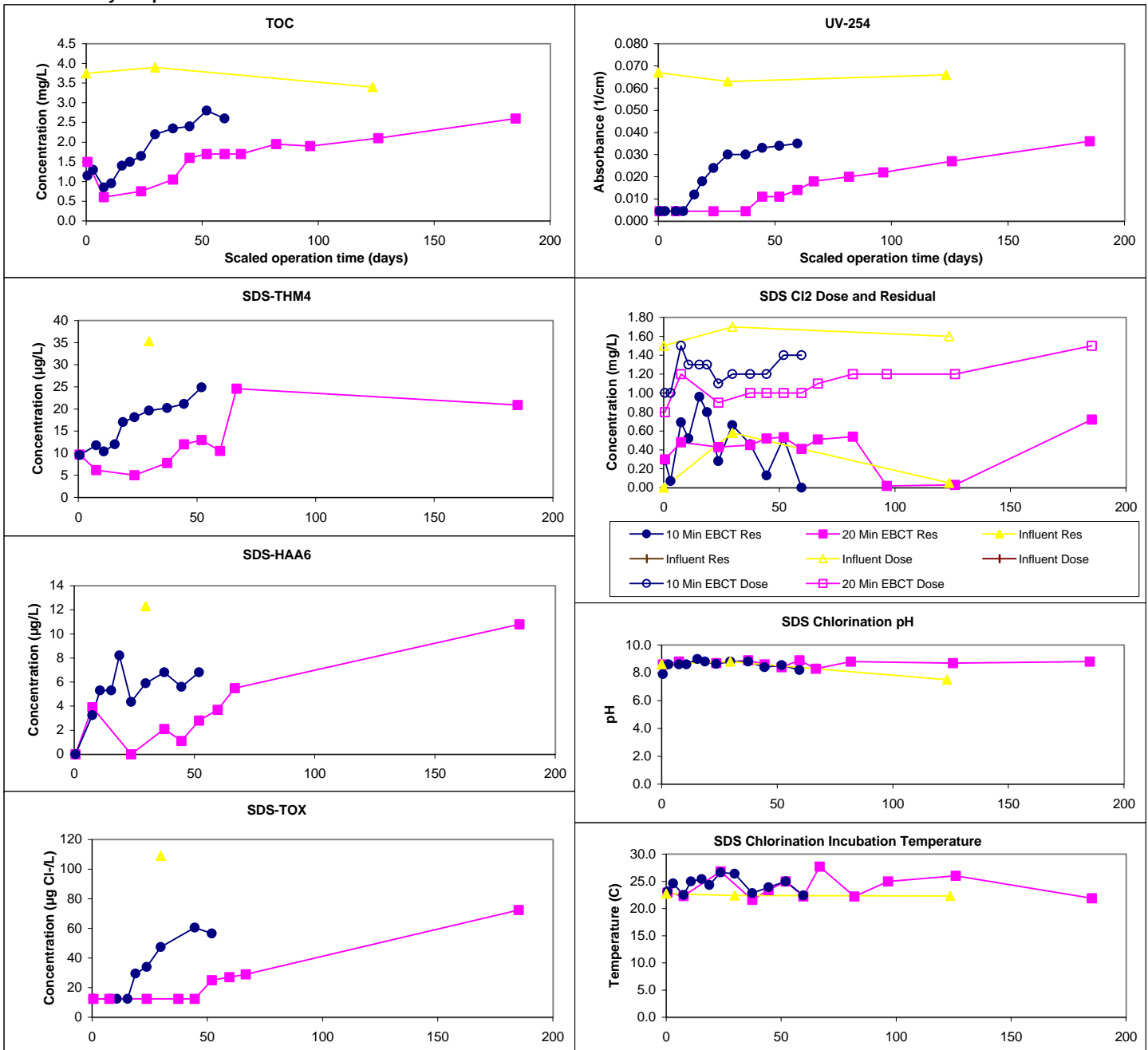
Design TOC: 3.7 mg/L
 Col Diameter: 11.0 mm
 Min Reynolds#: 0.50
 Full-Scale Temp: 26.9 C

Full-Scale GAC Size: 8x30 Bituminous coal
 Bench-Scale GAC Size: 60x100
 Scaling Factor: 7.40
 Meas Dry Bed Density: 0.50 g/cm3

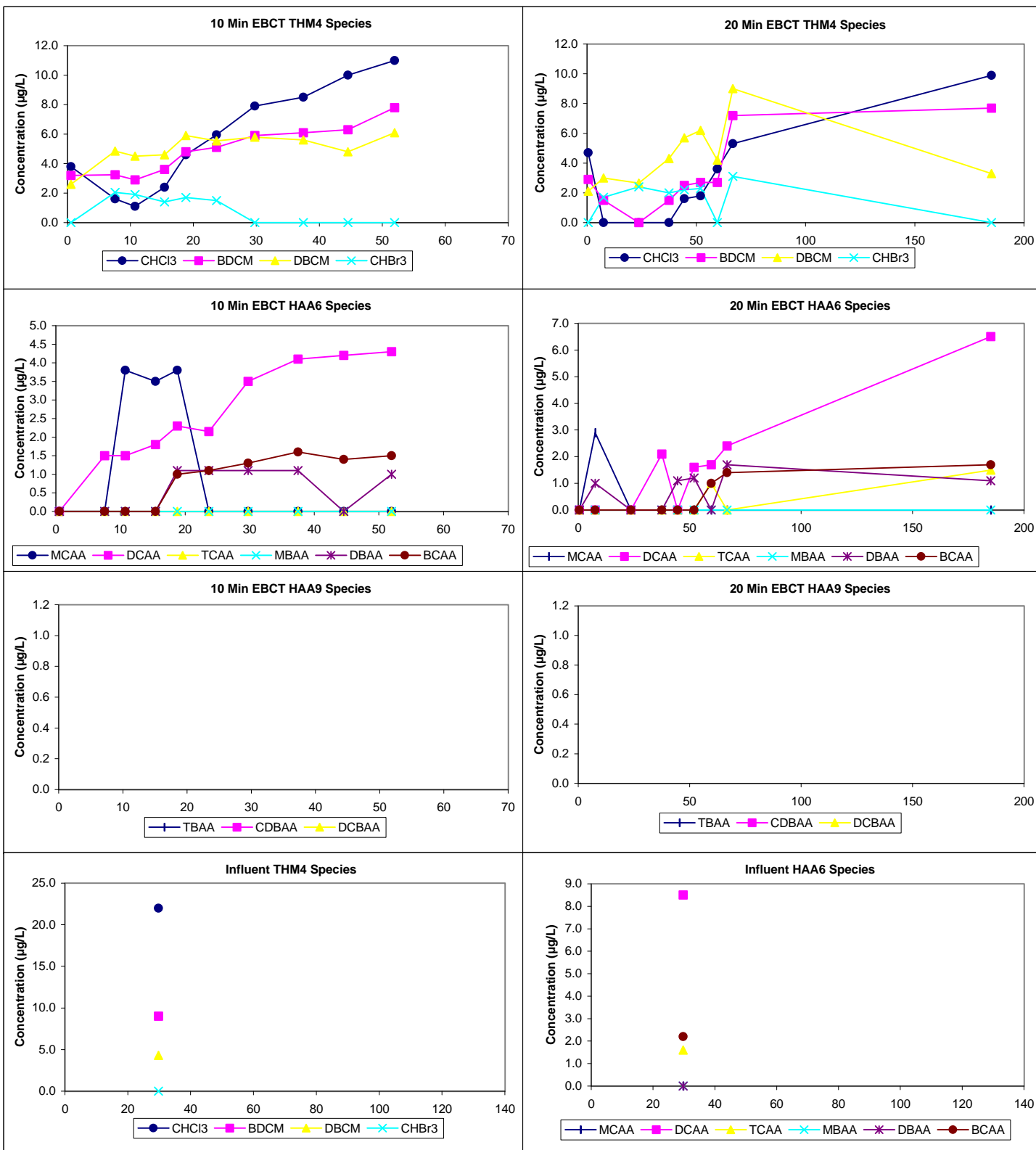
Water Quality Summary

Influent	Influent					Influent											
	Mean	SD/RD	Count	Min/Max		Mean	SD/RD	Count	Min/Max			Mean	SD	Count	Min/Max		
TOC	3.7	0.3	3	3.4 - 3.9						Res (6)	0.41	0.26	27	0.00 - 0.96			
pH	7.9	0.3	3	7.7 - 8.2						Temp	23.9	1.8	27	21.6 - 27.7			
UV254	0.065	0.002	3	0.063 - 0.067						pH	8.6	0.3	26	7.5 - 9.0			
SUVA	1.78	0.16	3	1.62 - 1.94						Time	3.4	0.4	27	3.0 - 5.0			
Bromide	51	4	2	49 - 53						Comments:							
SDS-TOX	109	0	1	109 - 109													
SDS-THM4	35	0	1	35 - 35													
SDS-HAA6	12	0	1	12 - 12													
Effluent	10 Min EBCT (8 B-S days)				20 Min EBCT (25 B-S days)					Chart Legend:							
Effluent pH	7.8	0.2	12	7.5 - 8.4	7.8						0.3	12	7.3 - 8.5				
Effluent Temp	21.9	0.1	12	21.7 - 22.3	22.4						1.2	12	21.7 - 25.0				

Water Quality Graphs



Water Quality Graphs (Continued)



ICR Information

ID / ICR#: NE 3105507 / 453
 ICR Contact: Zoltan Kerekes
 Phone No.: 402-449-8181
 Period: 10/21/98 - 11/20/98 (30 B-S days)

Design Information

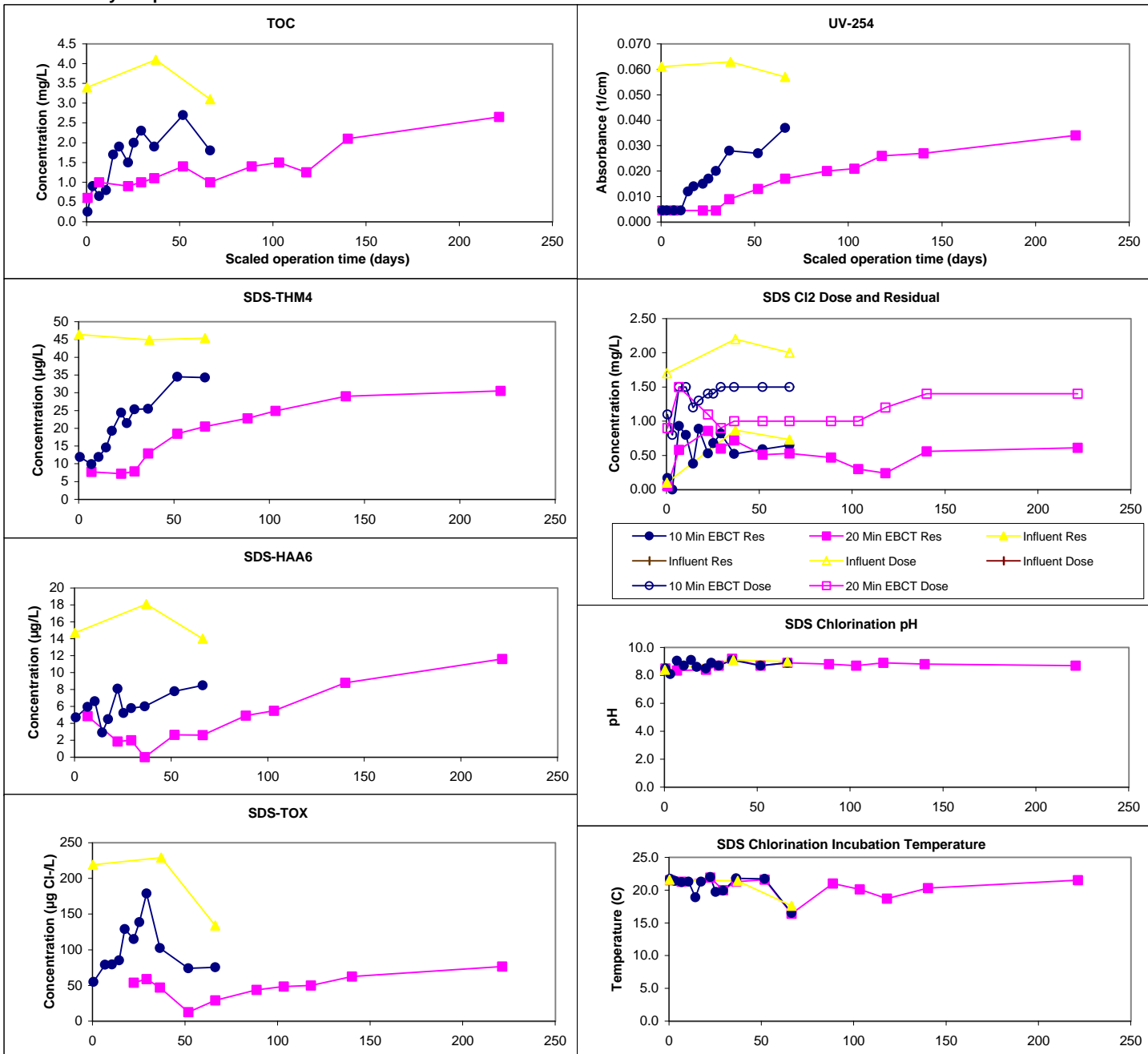
Design TOC: 3.5 mg/L
 Col Diameter: 11.0 mm
 Min Reynolds#: 0.50
 Full-Scale Temp: 16.3 C

Full-Scale GAC Size: 8x30 Bituminous coal
 Bench-Scale GAC Size: 60x100
 Scaling Factor: 7.40
 Meas Dry Bed Density: 0.50 g/cm3

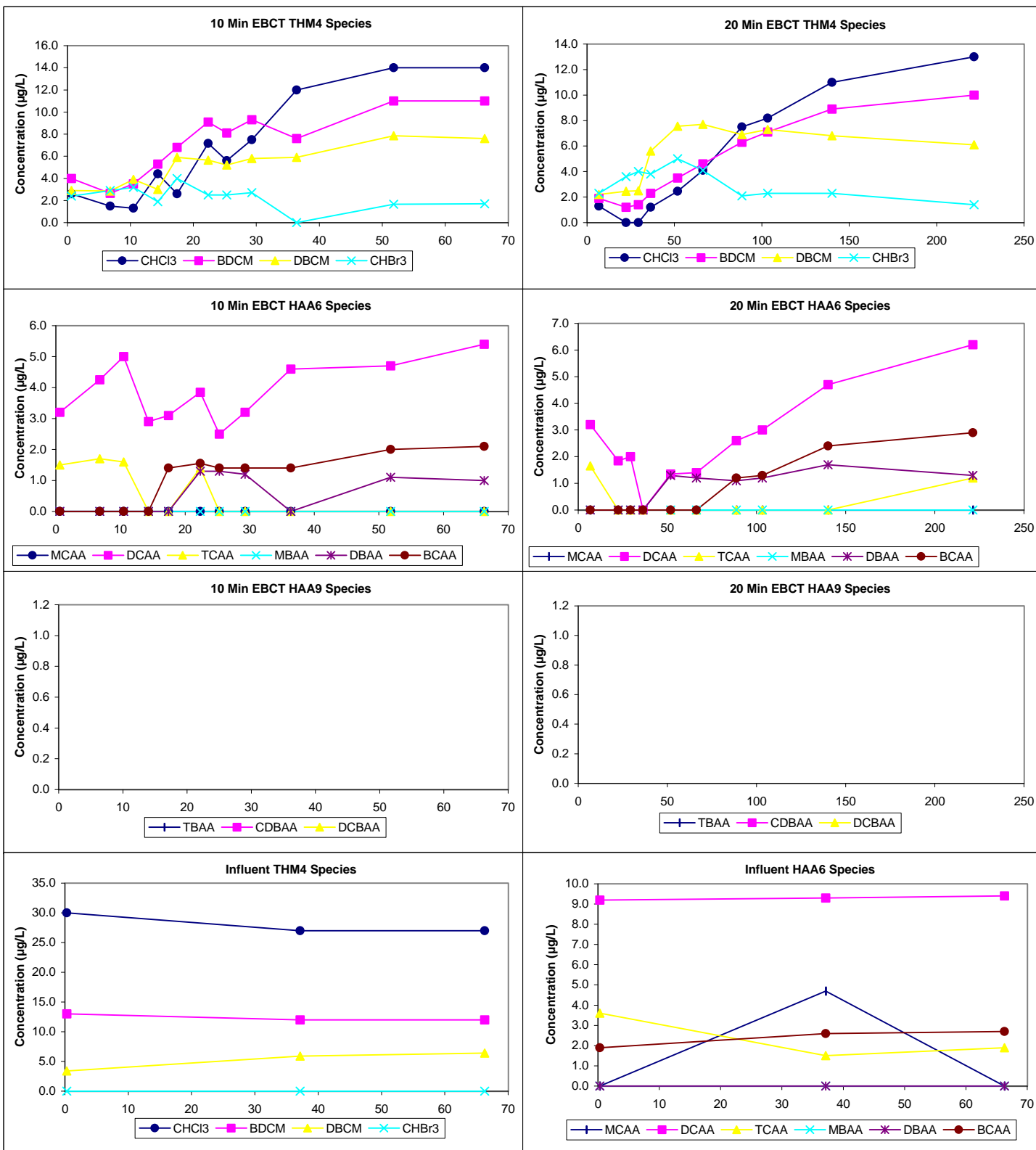
Water Quality Summary

Influent	Influent				Influent				Res (2)	Mean	SD	Count	Min/Max
	Mean	SD/RD	Count	Min/Max	Mean	SD/RD	Count	Min/Max					
TOC	3.5	0.5	3	3.1 - 4.1									
pH	8.0	0.3	3	7.7 - 8.2					Temp	20.5	1.6	27	16.4 - 22.0
UV254	0.060	0.003	3	0.057 - 0.063					pH	8.7	0.3	27	8.1 - 9.2
SUVA	1.72	0.16	3	1.54 - 1.84					Time	7.8	0.3	27	7.4 - 9.0
Bromide	41	2	2	40 - 42					Comments:				
SDS-TOX	194	52	3	134 - 229									
SDS-THM4	46	1	3	45 - 46					<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>				
SDS-HAA6	16	2	3	14 - 18									
Effluent	10 Min EBCT (9 B-S days)				20 Min EBCT (30 B-S days)				Chart Legend:				
Effluent pH	8.0	0.3	12	7.6 - 8.6	8.0	0.3	12	7.6 - 8.8					
Effluent Temp	20.6	0.4	12	19.8 - 21.1	20.6	0.4	12	19.8 - 21.3					

Water Quality Graphs



Water Quality Graphs (Continued)



ICR Information

ID / ICR#: NE 3105507 / 453
 ICR Contact: Zoltan Kerekes
 Phone No.: 402-449-8181
 Period: 2/17/99 - 3/12/99 (23 B-S days)

Design Information

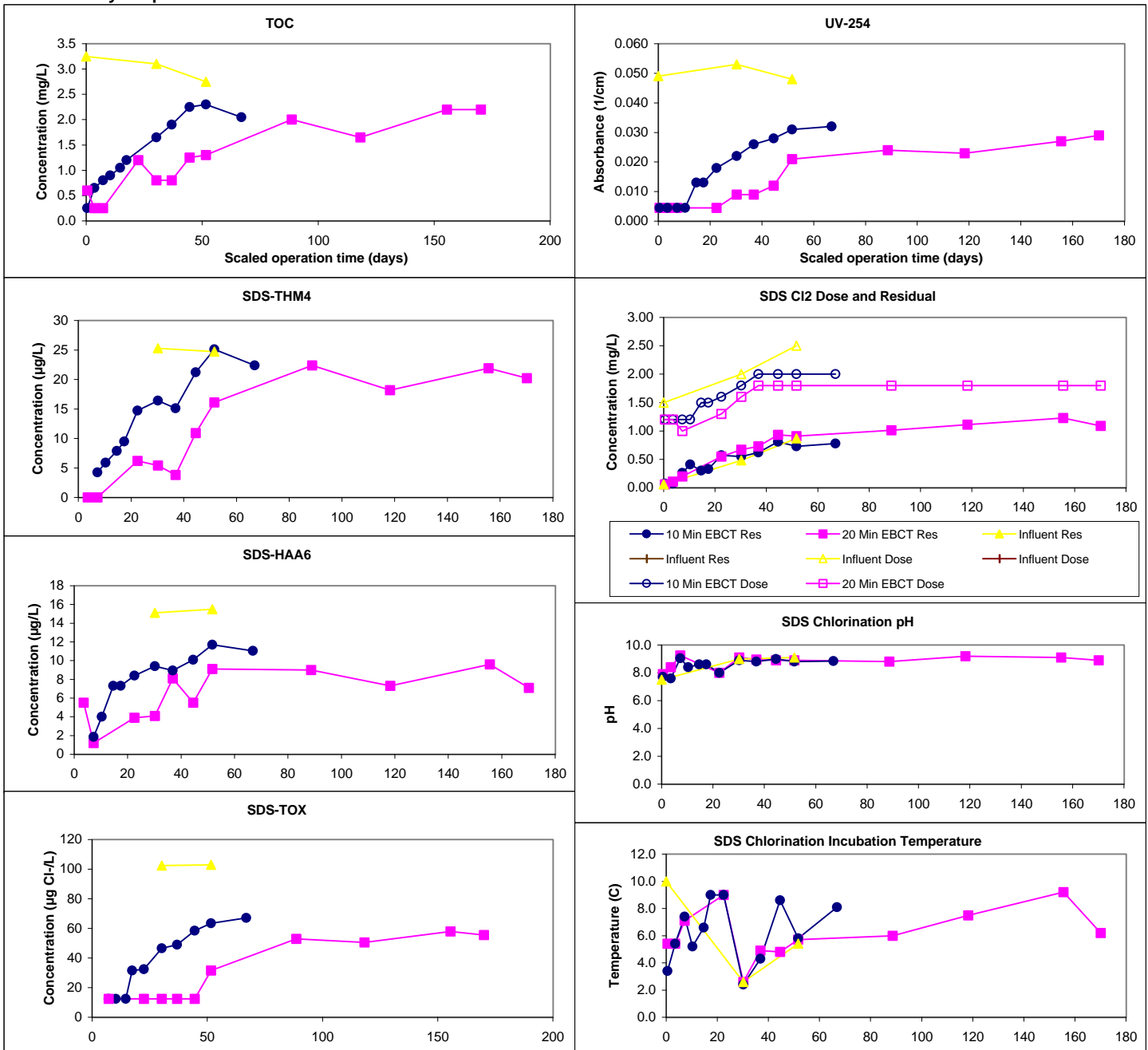
Design TOC: 3.0 mg/L
 Col Diameter: 11.0 mm
 Min Reynolds#: 0.50
 Full-Scale Temp: 16.3 C

Full-Scale GAC Size: 8x30 Bituminous coal
 Bench-Scale GAC Size: 60x100
 Scaling Factor: 7.40
 Meas Dry Bed Density: 0.50 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	3.0	0.3	3	2.8 - 3.3					Res (4)	0.57	0.36	27	0.06 - 1.23
pH	9.1	0.1	3	9.0 - 9.2					Temp	6.2	2.1	27	2.4 - 10.0
UV254	0.050	0.003	3	0.048 - 0.053					pH	8.6	0.5	27	7.5 - 9.3
SUVA	1.65	0.13	3	1.51 - 1.75					Time	12.9	0.3	27	12.2 - 13.5
Bromide	47	0	2	47 - 47					Comments:				
SDS-TOX	103	1	2	103 - 103									
SDS-THM4	25	1	2	25 - 25									
SDS-HAA6	15	0	2	15 - 16									
Effluent	10 Min EBCT (9 B-S days)				20 Min EBCT (23 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	8.9	0.4	12	7.6 - 9.4	8.9	0.3	12	8.0 - 9.3					
Effluent Temp	19.7	0.5	12	18.5 - 20.5	19.3	0.5	12	18.5 - 20.2					

Water Quality Graphs



Water Quality Graphs (Continued)

