

ICR TREATMENT STUDY ANALYSIS

Base Analysis and Data Review Comments

Treatment Study ID	1055
Study Protocol	GAC pilot-scale treatment study
Plant ICR Number	617
PWS Name	North Texas Municipal Water District
City, State, Zip	Wylie, Texas 75098

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

Major comments:

None.

General Comments:

1. Uniform formation conditions (UFC) were used for DBP formation assessment (24 hours, pH 8.0, 20°C, 1.0 mg/L free chlorine residual). These conditions were similar to plant SDS conditions. Note that because of the use of UFC, the SDS chlorination temperature was held constant at 20°C throughout the pilot study.
2. The GAC contactors were operated in post-filter adsorber mode, following dual media sand filtration. The contactors were backwashed twice during the treatment study, as a preventive measure against excessive headloss. According to the Summary Report (page 16) "pressure drop through the columns increased over the study period but not significantly."
3. As explained in the Summary Report (page 11) the pilot plant was shut down between January 4, 1999 and February 5, 1999 for routine cleaning and repairs to the full-scale treatment process train that provided water for the pilot plant. This down time was accounted for in the Data Collection Spreadsheets.

Outlier Data:

Two outliers removed.

Cell: A1

Comment: 1055-SAS.xls 2/13/00 14:49

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

Cell: C2

Comment: 1055-10-01 - Run 1 (BCAA) 2/13/00 14:36
Original value (CoefA0) = 0.0668 New value = -0.5965
Poor peak curve fit. Data was refit by iterative curve fit procedure.

Cell: D2

Comment: 1055-10-01 - Run 1 (BCAA) 2/13/00 14:36
Original value (CoefAf) = 6.0946 New value = 8.9581
Poor peak curve fit. Data was refit by iterative curve fit procedure.

Cell: E2

Comment: 1055-10-01 - Run 1 (BCAA) 2/13/00 14:36
Original value (CoefB) = 9.8085 New value = 22.8021
Poor peak curve fit. Data was refit by iterative curve fit procedure.

Cell: F2

Comment: 1055-10-01 - Run 1 (BCAA) 2/13/00 14:36
Original value (CoefD) = 0.0545 New value = 0.1006
Poor peak curve fit. Data was refit by iterative curve fit procedure.

Cell: J2

Comment: 1055-10-01 - Run 1 (BCAA) 2/13/00 14:36
Original value (S) = -0.008 New value = -0.0496
Poor peak curve fit. Data was refit by iterative curve fit procedure.

Cell: C3

Comment: 1055-10-01 - Run 1 (BDCM) 2/13/00 14:38
Original value (CoefA0) = -9 New value = -12.0062
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

Cell: D3

Comment: 1055-10-01 - Run 1 (BDCM) 2/13/00 14:38
Original value (CoefAf) = 27 New value = 27.1685
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

Cell: E3

Comment: 1055-10-01 - Run 1 (BDCM) 2/13/00 14:38
Original value (CoefB) = 1.5701 New value = 1.1954
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

Cell: F3

Comment: 1055-10-01 - Run 1 (BDCM) 2/13/00 14:38
Original value (CoefD) = 0.0329 New value = 0.0468
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

Cell: J3

Comment: 1055-10-01 - Run 1 (BDCM) 2/13/00 14:38
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: C5

Comment: 1055-10-01 - Run 1 (CHBr3) 2/13/00 14:39
Original value (CoefA0) = -3.55 New value = -0.6386
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

Cell: D5

Comment: 1055-10-01 - Run 1 (CHBr3) 2/13/00 14:39
Original value (CoefAf) = 8.2008 New value = 5.2961
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

Cell: E5

Comment: 1055-10-01 - Run 1 (CHBr3) 2/13/00 14:39
Original value (CoefB) = 3.6442 New value = 11.411
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

Cell: F5

Comment: 1055-10-01 - Run 1 (CHBr3) 2/13/00 14:39
Original value (CoefD) = 0.2067 New value = 0.2481
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

Cell: J5

Comment: 1055-10-01 - Run 1 (CHBr3) 2/13/00 14:39
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: C8

Comment: 1055-10-01 - Run 1 (DBAA) 2/13/00 14:44
Original value (CoefA0) = 0.0165 New value = -1.0208
Poor peak curve fit. Data was refit by iterative curve fit procedure.

Cell: D8

Comment: 1055-10-01 - Run 1 (DBAA) 2/13/00 14:44
Original value (CoefAf) = 4.8263 New value = 9.685
Poor peak curve fit. Data was refit by iterative curve fit procedure.

Cell: E8

Comment: 1055-10-01 - Run 1 (DBAA) 2/13/00 14:44
Original value (CoefB) = 16.8762 New value = 7.6156
Poor peak curve fit. Data was refit by iterative curve fit procedure.

Cell: F8

Comment: 1055-10-01 - Run 1 (DBAA) 2/13/00 14:44
Original value (CoefD) = 0.0787 New value = 0.0656
Poor peak curve fit. Data was refit by iterative curve fit procedure.

Cell: J8

Comment: 1055-10-01 - Run 1 (DBAA) 2/13/00 14:44
Original value (S) = -0.0146 New value = -0.0459
Poor peak curve fit. Data was refit by iterative curve fit procedure.

Cell: C12

Comment: 1055-10-01 - Run 1 (HAA5) 2/13/00 14:37
Original value (CoefA0) = -7.65 New value = -12.1903
Poor peak curve fit. Data was refit by iterative curve fit procedure.

Cell: D12

Comment: 1055-10-01 - Run 1 (HAA5) 2/13/00 14:37
Original value (CoefAf) = 22.95 New value = 26.5348
Poor peak curve fit. Data was refit by iterative curve fit procedure.

Cell: E12

Comment: 1055-10-01 - Run 1 (HAA5) 2/13/00 14:37
Original value (CoefB) = 1.3932 New value = 1.1351
Poor peak curve fit. Data was refit by iterative curve fit procedure.

Cell: F12

Comment: 1055-10-01 - Run 1 (HAA5) 2/13/00 14:37

Original value (CoefD) = 0.0183 New value = 0.0297
Poor peak curve fit. Data was refit by iterative curve fit procedure.

Cell: J12

Comment: 1055-10-01 - Run 1 (HAA5) 2/13/00 14:37
Original value (S) = 0 New value = -0.0801
Poor peak curve fit. Data was refit by iterative curve fit procedure.

Cell: C13

Comment: 1055-10-01 - Run 1 (HAA6) 2/13/00 14:45
Original value (CoefA0) = -0.0667 New value = -3.5273
Poor peak curve fit. Data was refit by iterative curve fit procedure.

Cell: D13

Comment: 1055-10-01 - Run 1 (HAA6) 2/13/00 14:45
Original value (CoefAf) = 17.504 New value = 68.0906
Poor peak curve fit. Data was refit by iterative curve fit procedure.

Cell: E13

Comment: 1055-10-01 - Run 1 (HAA6) 2/13/00 14:45
Original value (CoefB) = 29.3816 New value = 17.0497
Poor peak curve fit. Data was refit by iterative curve fit procedure.

Cell: F13

Comment: 1055-10-01 - Run 1 (HAA6) 2/13/00 14:45
Original value (CoefD) = 0.0939 New value = 0.0459
Poor peak curve fit. Data was refit by iterative curve fit procedure.

Cell: J13

Comment: 1055-10-01 - Run 1 (HAA6) 2/13/00 14:45
Original value (S) = -0.0211 New value = -0.0987
Poor peak curve fit. Data was refit by iterative curve fit procedure.

Cell: C18

Comment: 1055-10-01 - Run 1 (TCAA) 2/13/00 14:42
Original value (CoefA0) = 0.0172 New value = -1.2826
Poor peak curve fit. Data was refit by iterative curve fit procedure.

Cell: D18

Comment: 1055-10-01 - Run 1 (TCAA) 2/13/00 14:42
Original value (CoefAf) = 4.6955 New value = 98.5795
Poor peak curve fit. Data was refit by iterative curve fit procedure.

Cell: E18

Comment: 1055-10-01 - Run 1 (TCAA) 2/13/00 14:42
Original value (CoefB) = 43.0933 New value = 131.3426
Poor peak curve fit. Data was refit by iterative curve fit procedure.

Cell: F18

Comment: 1055-10-01 - Run 1 (TCAA) 2/13/00 14:42
Original value (CoefD) = 0.0747 New value = 0.0433
Poor peak curve fit. Data was refit by iterative curve fit procedure.

Cell: J18

Comment: 1055-10-01 - Run 1 (TCAA) 2/13/00 14:42
Original value (S) = -0.0064 New value = -0.0348
Poor peak curve fit. Data was refit by iterative curve fit procedure.

Cell: C22

Comment: 1055-10-01 - Run 1 (TSUVA) 2/13/00 14:35
Original value (CoefA0) = -0.697 New value = -1.2953
Poor peak curve fit. Data was refit by iterative curve fit procedure.

Cell: D22

Comment: 1055-10-01 - Run 1 (TSUVA) 2/13/00 14:35
Original value (CoefAf) = 2.0884 New value = 2.7563
Poor peak curve fit. Data was refit by iterative curve fit procedure.

Cell: E22

Comment: 1055-10-01 - Run 1 (TSUVA) 2/13/00 14:35
Original value (CoefB) = 1.5372 New value = 1.0599
Poor peak curve fit. Data was refit by iterative curve fit procedure.

Cell: F22

Comment: 1055-10-01 - Run 1 (TSUVA) 2/13/00 14:35
Original value (CoefD) = 0.0515 New value = 0.0497
Poor peak curve fit. Data was refit by iterative curve fit procedure.

Cell: J22

Comment: 1055-10-01 - Run 1 (TSUVA) 2/13/00 14:35
Original value (S) = 0 New value = -0.004
Poor peak curve fit. Data was refit by iterative curve fit procedure.

Cell: C95

Comment: 1055-20-01 - Run 2 (CI2-D) 2/13/00 14:47
Original value (CoefA0) = 0.451 New value = 0.3179
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

Cell: D95

Comment: 1055-20-01 - Run 2 (CI2-D) 2/13/00 14:47
Original value (CoefAf) = 0.7013 New value = 0.8946
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

Cell: E95

Comment: 1055-20-01 - Run 2 (CI2-D) 2/13/00 14:47
Original value (CoefB) = 327.1561 New value = 11.808
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

Cell: F95

Comment: 1055-20-01 - Run 2 (CI2-D) 2/13/00 14:47
Original value (CoefD) = 0.0496 New value = 0.0247
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

Cell: J95

Comment: 1055-20-01 - Run 2 (CI2-D) 2/13/00 14:47
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: C111

Comment: 1055-20-01 - Run 2 (UV254) 2/13/00 14:46
Original value (CoefA0) = -0.0185 New value = -0.0007
Poor type -1 or 1 curve fit. Data was refit by iterative curve fit procedure.

Cell: D111

Comment: 1055-20-01 - Run 2 (UV254) 2/13/00 14:46
Original value (CoefAf) = 0.0555 New value = 0.0624
Poor type -1 or 1 curve fit. Data was refit by iterative curve fit procedure.

Cell: E111

Comment: 1055-20-01 - Run 2 (UV254) 2/13/00 14:46
Original value (CoefB) = 0.8284 New value = 20.0003
Poor type -1 or 1 curve fit. Data was refit by iterative curve fit procedure.

Cell: F111

Comment: 1055-20-01 - Run 2 (UV254) 2/13/00 14:46

Original value (CoefD) = 0 New value = 0.0115
Poor type -1 or 1 curve fit. Data was refit by iterative curve fit procedure.

Cell: J111

Comment: 1055-20-01 - Run 2 (UV254) 2/13/00 14:46
Original value (S) = 0 New value = 0
Poor type -1 or 1 curve fit. Data was refit by iterative curve fit procedure.

ICR Information

ID / ICR#: TX0430044 / 617
 ICR Contact: Mr. Steve Long
 Phone No.: (972) 442-5405
 Period: 4/14/98 - 9/14/98 (153 days)

Design Information

Design TOC: 3.74 mg/L
 Col Diameter: 155.6 mm

Full-Scale GAC Size: 12x40 US Std Mesh
 Full-Scale particle dia.: 1.053 mm
 Meas Dry Bed Density: 434.40 kg/m3

Water Quality Summary

Influent	Mean	SD	Count	Min/Max
TOC	3.4	0.4	23	2.8 - 4.2
pH	8.2	0.3	24	7.7 - 8.6
UV254	0.060	0.007	23	0.046 - 0.071
SUVA	NA	NA	0	0.0 - 0.0
Bromide	60	13	21	39 - 79
SDS-TOX	213	26	20	171 - 268
SDS-THM4	79	20	21	25 - 123
SDS-HAA6	38	10	20	27 - 72
Ammonia	0.00	0.00	24	0.00 - 0.00

Cumulative SDS Conditions

	Mean	SD	Count	Min/Max
Res (2)	1.09	0.39	71	0.00 - 2.00
Temp	20.4	0.6	71	20.0 - 23.0
pH	8.2	0.1	71	7.7 - 8.5
Time	24.1	0.6	71	23.0 - 25.5

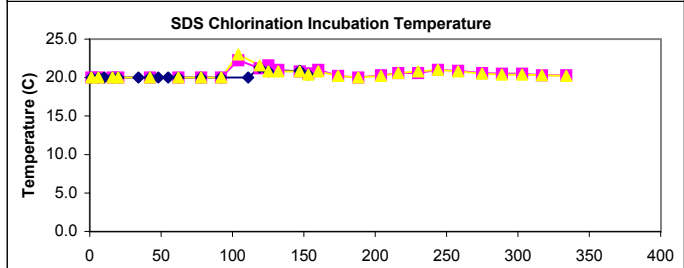
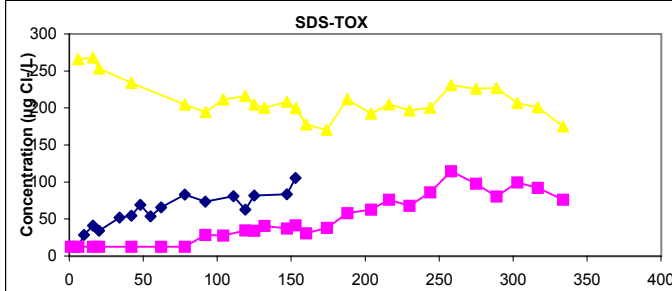
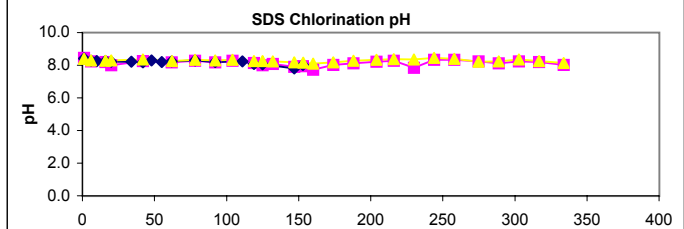
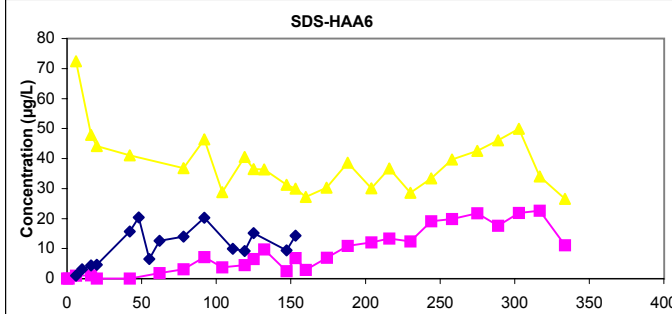
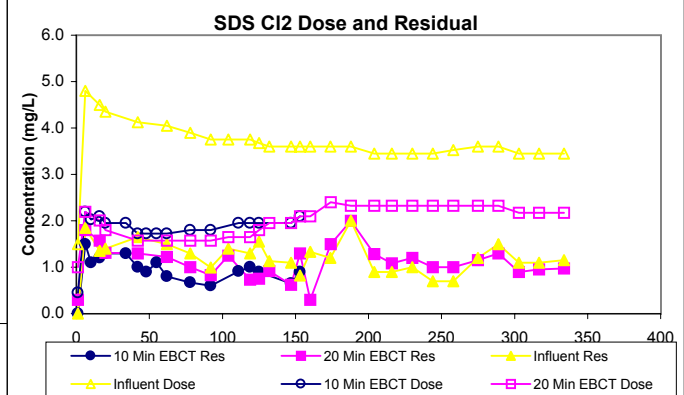
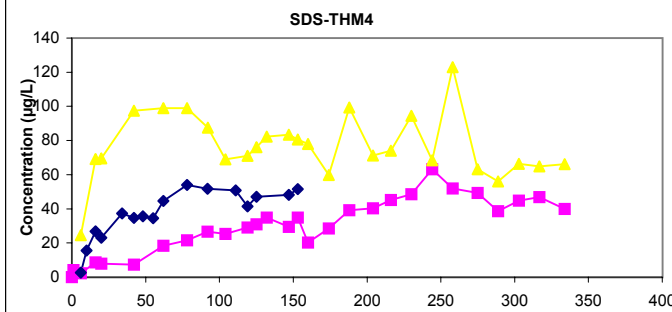
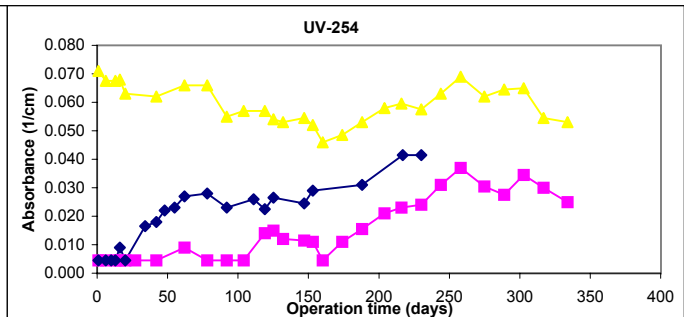
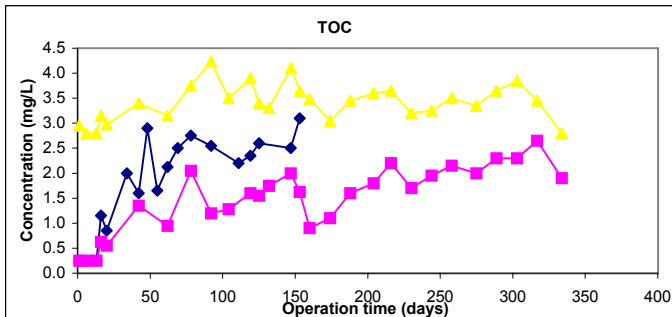
Comments:

Effluent	10 Min EBCT (230 days)			
Effluent pH	7.8	0.4	20	7.2 - 8.9
Effluent Temp	24.0	3.1	20	18.8 - 28.5

20 Min EBCT			(307 days)
7.7	0.3	25	7.3 - 8.6
23.0	3.8	25	14.4 - 28.9

Chart
 Legend: 10 Min EBCT
 20 Min EBCT
 Influent

Water Quality Parameter Graphs



Water Quality Parameter Graphs (Continued)

