ICR TREATMENT STUDY ANALYSIS

Base Analysis and Data Review Comments

Treatment Study ID 1023

Study Protocol Pilot-Scale GAC Treatment Study

Plant ICR Number 315

PWS Name Pasco County Utilities

City, State, Zip New Port Richie, FL 34654

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

Major comments:

(none)

General Comments:

1. For a groundwater, influent SDS-THM4 and SDS-HAA6 show somewhat high variability: mean SDS-THM4 is 76 ± 26 µg/L, RSD=33%; mean SDS-HAA6 is 90 ± 32 µg/L, RSD=35%. Similar variability was not observed in the influent SDS-TOX data, which averaged 336 ± 31 µg/L as Cl^-, RSD=9%.

2. High immediate breakthrough of TOC: >50% in 10 minute EBCT contactor (although UV_{254} did not show similar high immediate breakthrough levels), and relatively short run times to 70% TOC breakthrough.

3. GAC influent SUVA values high, averaging : 4.2 L/mg-m.

Outlier Data:

One outlier removed.

Cell: A1
Comment: 1023-SAS.xls 2/9/00 21:54

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

1023-SAS.xls 2/9/00 21:59

Curve fit review updated and approved. See below for log of refit datasets.

Cell: C2
Comment: 1023-10-01 - Run 1 (BCAA) 2/9/00 21:42
Original value (CoefA0) = -2.15 New value = 1.5518
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

Cell: D2
Comment: 1023-10-01 - Run 1 (BCAA) 2/9/00 21:42
Original value (CoefAf) = 5.2056 New value = 4.6154
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

Cell: E2
Comment: 1023-10-01 - Run 1 (BCAA) 2/9/00 21:42
Original value (CoefB) = 0.7116 New value = 19.9126
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

Cell: F2
Comment: 1023-10-01 - Run 1 (BCAA) 2/9/00 21:42
Original value (CoefD) = 0.0323 New value = 0.0142
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

Cell: J2
Comment: 1023-10-01 - Run 1 (BCAA) 2/9/00 21:42
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: C7
Comment: 1023-10-01 - Run 1 (Cl2-D) 2/9/00 21:44
Original value (CoefA0) = 0.7787 New value = 0.8454
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

Cell: D7
Comment: 1023-10-01 - Run 1 (Cl2-D) 2/9/00 21:44
Original value (CoefAf) = 5.85 New value = 2.2632
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

Cell: E7
Comment: 1023-10-01 - Run 1 (Cl2-D) 2/9/00 21:44
Original value (CoefB) = 34.9187 New value = 95.4568

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

Cell: F7
Comment: 1023-10-01 - Run 1 (Cl2-D) 2/9/00 21:44
Original value (CoefD) = 0.0879 New value = 0.1976
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

Cell: J7
Comment: 1023-10-01 - Run 1 (Cl2-D) 2/9/00 21:44
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: C9
Comment: 1023-10-01 - Run 1 (DBCM) 2/9/00 21:41
Original value (CoefA0) = 0.1127 New value = 1.3314
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

Cell: D9
Comment: 1023-10-01 - Run 1 (DBCM) 2/9/00 21:41
Original value (CoefAf) = 9.45 New value = 4.1739
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

Cell: E9
Comment: 1023-10-01 - Run 1 (DBCM) 2/9/00 21:41
Original value (CoefB) = 33.2957 New value = 17.9244
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

Cell: F9
Comment: 1023-10-01 - Run 1 (DBCM) 2/9/00 21:41
Original value (CoefD) = 0.0472 New value = 0.0119
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

Cell: J9
Comment: 1023-10-01 - Run 1 (DBCM) 2/9/00 21:41
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: C12
Comment: 1023-10-01 - Run 1 (HAA5) 2/9/00 21:43
Original value (CoefA0) = -19.8311 New value = -7.5548
Poor peak curve fit. Data was refit by iterative curve fit procedure.

Cell: D12
Comment: 1023-10-01 - Run 1 (HAA5) 2/9/00 21:43
Original value (CoefAf) = 111.9 New value = 120.1429
Poor peak curve fit. Data was refit by iterative curve fit procedure.

Cell: E12
Comment: 1023-10-01 - Run 1 (HAA5) 2/9/00 21:43
Original value (CoefB) = 2.0841 New value = 5.1982
Poor peak curve fit. Data was refit by iterative curve fit procedure.

Cell: F12
Comment: 1023-10-01 - Run 1 (HAA5) 2/9/00 21:43
Original value (CoefD) = 0.0329 New value = 0.0457
Poor peak curve fit. Data was refit by iterative curve fit procedure.

Cell: J12
Comment: 1023-10-01 - Run 1 (HAA5) 2/9/00 21:43
Original value (S) = 0 New value = -0.4281
Poor peak curve fit. Data was refit by iterative curve fit procedure.

Cell: C13
Comment: 1023-10-01 - Run 1 (HAA6) 2/9/00 21:45
Original value (CoefA0) = -1.9716 New value = -4.6954
Poor peak curve fit. Data was refit by iterative curve fit procedure.

Cell: D13
Comment: 1023-10-01 - Run 1 (HAA6) 2/9/00 21:45
Original value (CoefAf) = 90.6817 New value = 115.5684
Poor peak curve fit. Data was refit by iterative curve fit procedure.

Cell: E13
Comment: 1023-10-01 - Run 1 (HAA6) 2/9/00 21:45
Original value (CoefB) = 5.1067 New value = 6.0246
Poor peak curve fit. Data was refit by iterative curve fit procedure.

Cell: F13
Comment: 1023-10-01 - Run 1 (HAA6) 2/9/00 21:45
Original value (CoefD) = 0.057 New value = 0.0516
Poor peak curve fit. Data was refit by iterative curve fit procedure.

Cell: J13
Comment: 1023-10-01 - Run 1 (HAA6) 2/9/00 21:45
Original value (S) = 0 New value = -0.4678
Poor peak curve fit. Data was refit by iterative curve fit procedure.

Cell: C20
Comment: 1023-10-01 - Run 1 (TOC) 2/9/00 21:58
Original value (CoefA0) = 1.7657 New value = 1.67
Poor type -1 or 1 curve fit. Data was refit by iterative curve fit procedure.

Cell: D20
Comment: 1023-10-01 - Run 1 (TOC) 2/9/00 21:58
Original value (CoefAf) = 1.0489 New value = 1.1916
Poor type -1 or 1 curve fit. Data was refit by iterative curve fit procedure.

Cell: E20
Comment: 1023-10-01 - Run 1 (TOC) 2/9/00 21:58
Original value (CoefB) = 89158.7503 New value = 20.084
Poor type -1 or 1 curve fit. Data was refit by iterative curve fit procedure.

Cell: F20

Comment: 1023-10-01 - Run 1 (TOC) 2/9/00 21:58
Original value (CoefD) = 0.6304 New value = 0.1544
Poor type -1 or 1 curve fit. Data was refit by iterative curve fit procedure.

Cell: J20
Comment: 1023-10-01 - Run 1 (TOC) 2/9/00 21:58
Original value (S) = 0 New value = 0
Poor type -1 or 1 curve fit. Data was refit by iterative curve fit procedure.

Cell: C94
Comment: 1023-20-01 - Run 2 (CHCl3) 2/9/00 21:47
Original value (CoefA0) = -20.8556 New value = -4.8294
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

Cell: D94
Comment: 1023-20-01 - Run 2 (CHCl3) 2/9/00 21:47
Original value (CoefAf) = 91.5 New value = 50.5878
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

Cell: E94
Comment: 1023-20-01 - Run 2 (CHCl3) 2/9/00 21:47
Original value (CoefB) = 3.3853 New value = 11.2955
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

Cell: F94
Comment: 1023-20-01 - Run 2 (CHCl3) 2/9/00 21:47
Original value (CoefD) = 0.0276 New value = 0.067
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

Cell: J94
Comment: 1023-20-01 - Run 2 (CHCl3) 2/9/00 21:47
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: C104
Comment: 1023-20-01 - Run 2 (MCAA) 2/9/00 21:38
Original value (CoefA0) = 0 New value = 3.38
Fewer than 6 points above MRL. Step function applied.

1023-20-01 - Run 2 (MCAA) 2/9/00 21:38
Original value (CoefA0) = 3.38 New value = 2
Fewer than 6 points above MRL. Step function applied.

Cell: D104
Comment: 1023-20-01 - Run 2 (MCAA) 2/9/00 21:38
Original value (CoefAf) = 0 New value = 0
Fewer than 6 points above MRL. Step function applied.

1023-20-01 - Run 2 (MCAA) 2/9/00 21:38
Original value (CoefAf) = 0 New value = 0
Fewer than 6 points above MRL. Step function applied.

Cell: E104
Comment: 1023-20-01 - Run 2 (MCAA) 2/9/00 21:38
Original value (CoefB) = 0 New value = 0
Fewer than 6 points above MRL. Step function applied.

1023-20-01 - Run 2 (MCAA) 2/9/00 21:38
Original value (CoefB) = 0 New value = 0
Fewer than 6 points above MRL. Step function applied.

Cell: F104
Comment: 1023-20-01 - Run 2 (MCAA) 2/9/00 21:38
Original value (CoefD) = 0 New value = 0
Fewer than 6 points above MRL. Step function applied.

1023-20-01 - Run 2 (MCAA) 2/9/00 21:38
Original value (CoefD) = 0 New value = 0
Fewer than 6 points above MRL. Step function applied.

Cell: J104
Comment: 1023-20-01 - Run 2 (MCAA) 2/9/00 21:38
Original value (S) = 0 New value = 0
Fewer than 6 points above MRL. Step function applied.

1023-20-01 - Run 2 (MCAA) 2/9/00 21:38
Original value (S) = 0 New value = 0
Fewer than 6 points above MRL. Step function applied.

Cell: K104
Comment: 1023-20-01 - Run 2 (MCAA) 2/9/00 21:38
Original value (t0) = 0 New value = 1
Fewer than 6 points above MRL. Step function applied.

1023-20-01 - Run 2 (MCAA) 2/9/00 21:38
Original value (t0) = 1 New value = 1
Fewer than 6 points above MRL. Step function applied.

Cell: C106
Comment: 1023-20-01 - Run 2 (TCAA) 2/9/00 21:48
Original value (CoefA0) = -14.75 New value = -1.9439
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

Cell: D106
Comment: 1023-20-01 - Run 2 (TCAA) 2/9/00 21:48
Original value (CoefAf) = 44.25 New value = 22.1137
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

Cell: E106
Comment: 1023-20-01 - Run 2 (TCAA) 2/9/00 21:48
Original value (CoefB) = 1.8167 New value = 7.1791
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

Cell: F106
Comment: 1023-20-01 - Run 2 (TCAA) 2/9/00 21:48
Original value (CoefD) = 0.0261 New value = 0.08
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

Cell: J106
Comment: 1023-20-01 - Run 2 (TCAA) 2/9/00 21:48
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: C109
Comment: 1023-20-01 - Run 2 (TOX) 2/9/00 21:52
Original value (CoefA0) = -101.5 New value = -213.759
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

Cell: D109
Comment: 1023-20-01 - Run 2 (TOX) 2/9/00 21:52
Original value (CoefAf) = 304.5 New value = 399.5157
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

Cell: E109
Comment: 1023-20-01 - Run 2 (TOX) 2/9/00 21:52
Original value (CoefB) = 1.5541 New value = 0.7804
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

Cell: F109
Comment: 1023-20-01 - Run 2 (TOX) 2/9/00 21:52
Original value (CoefD) = 0.0347 New value = 0.0354
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

Cell: J109
Comment: 1023-20-01 - Run 2 (TOX) 2/9/00 21:52
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: C110
Comment: 1023-20-01 - Run 2 (TSUVA) 2/9/00 21:46
Original value (CoefA0) = -0.0124 New value = 3.3558
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

Cell: D110
Comment: 1023-20-01 - Run 2 (TSUVA) 2/9/00 21:46
Original value (CoefAf) = 9.0589 New value = 8.0667
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

Cell: E110
Comment: 1023-20-01 - Run 2 (TSUVA) 2/9/00 21:46
Original value (CoefB) = 18.3099 New value = 19.983
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

Cell: F110

Comment: 1023-20-01 - Run 2 (TSUVA) 2/9/00 21:46
Original value (CoefD) = 0.0862 New value = 0.0102
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

Cell: J110
Comment: 1023-20-01 - Run 2 (TSUVA) 2/9/00 21:46
Original value (S) = 0 New value = 0
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

Pasco County Utilities | **Pilot-Scale GAC Treatment Study Summary** | **Session:** 1

ICR Information

ID / ICR#: FL6511361 / 315
ICR Contact: Candia Mulhern
Phone No.: (727) 847-8902
Period: 3/2/98 - 6/16/98 (106 days)

Design Information

Design TOC: 3.3 mg/L
Col Diameter: 147.0 mm
Full-Scale GAC Size: 8x16 US Std Mesh
Full-Scale particle dia.: 1.770 mm
Meas Dry Bed Density: 450.0 kg/m3

Water Quality Summary

Influent	Mean	SD	Count	Min/Max
TOC	3.3	0.3	16	2.9 - 3.9
pH	7.5	0.1	16	7.3 - 7.6
UV254	0.139	0.013	16	0.123 - 0.174
SUVA	4.23	0.47	16	3.2 - 4.8
Bromide	31	13	15	22 - 75
SDS-TOX	336	31	14	255 - 381
SDS-THM4	73	28	11	25 - 137
SDS-HAA6	96	34	11	37 - 150
Ammonia	0.28	0.14	16	0.08 - 0.51

Effluent	10 Min EBCT			(106 days)	20 Min EBCT			(106 days)
Effluent pH	7.5	0.1	16	7.3 - 7.6	7.5	0.1	16	7.3 - 7.8
Effluent Temp	25.9	1.7	16	22.3 - 28.7	26.1	2.2	16	21.0 - 29.8

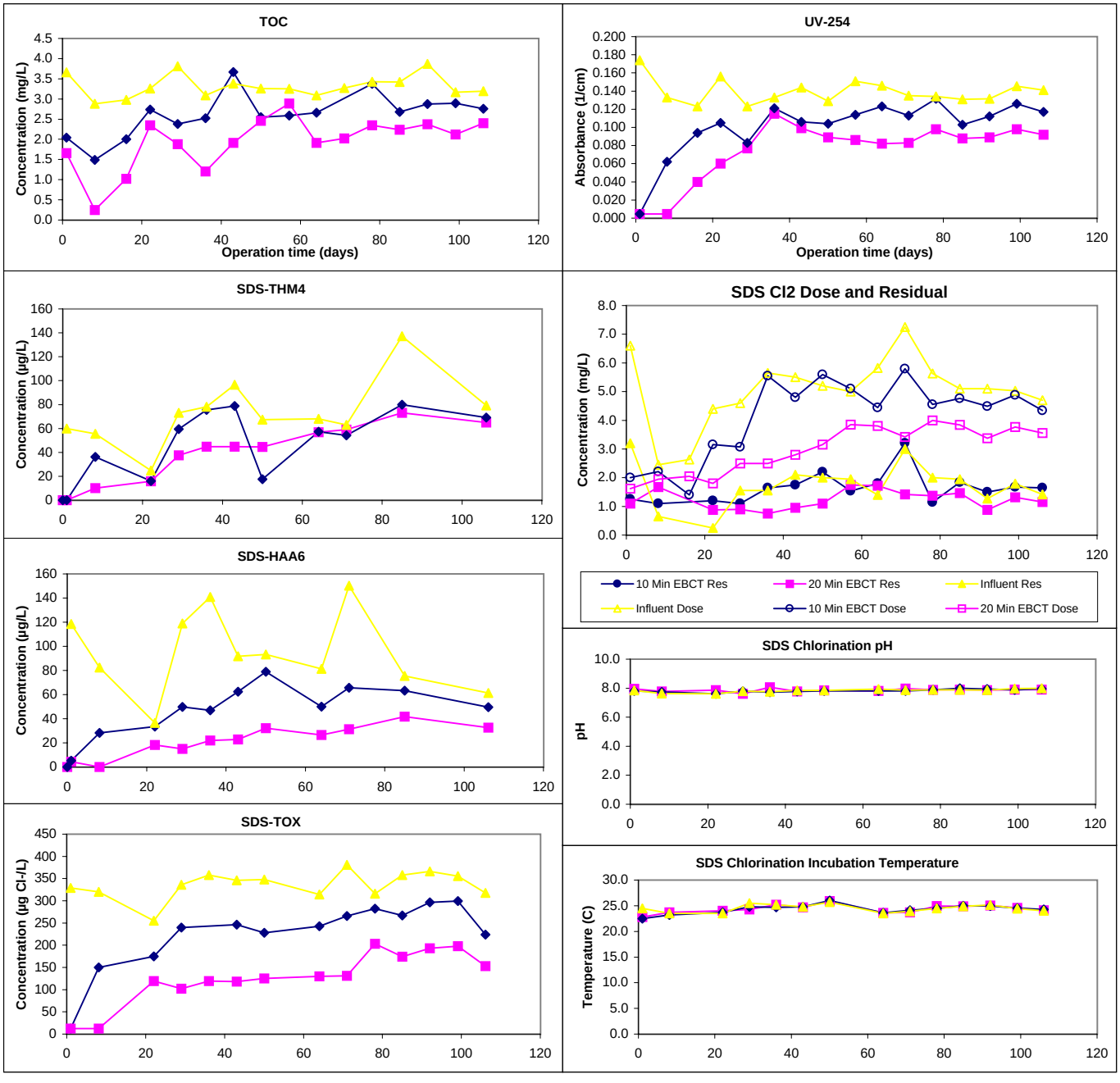
Cumulative SDS Conditions

	Mean	SD	Count	Min/Max
Res (0)	1.54	0.60	45	0.25 - 3.21
Temp	24.4	0.8	42	22.5 - 26.0
pH	7.8	0.1	42	7.6 - 8.1
Time	24.0	0.0	42	24.0 - 24.0

Comments:

Chart Legend: 10 Min EBCT; 20 Min EBCT; Influent

Water Quality Parameter Graphs



Water Quality Parameter Graphs (Continued)