

# ICR TREATMENT STUDY ANALYSIS

## Base Analysis and Data Review Comments

<b>Treatment Study ID</b>	1009
<b>Study Protocol</b>	GAC pilot-scale treatment study
<b>Plant ICR Number</b>	528
<b>PWS Name</b>	City of Columbus
<b>City, State, Zip</b>	Columbus, OH 43215

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

### Major comments:

None.

### General Comments:

1. Units for bromide in Table 1 of the Summary Report should be mg/L, not µg/L.

### Outlier Data:

One outlier removed.

**Cell:** A1

**Comment:** 1009-sas.xls 2/9/00 21:23

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

**Cell:** C6

**Comment:** 1009-10-01 - Run 1 (CHCl3) 2/9/00 21:03  
Original value (CoefA0) = -15.2 New value = 3.3385  
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

**Cell:** D6

**Comment:** 1009-10-01 - Run 1 (CHCl3) 2/9/00 21:03  
Original value (CoefAf) = 45.6 New value = 16.8088  
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

**Cell:** E6

**Comment:** 1009-10-01 - Run 1 (CHCl3) 2/9/00 21:03  
Original value (CoefB) = 0.989 New value = 219.2877  
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

**Cell:** F6

**Comment:** 1009-10-01 - Run 1 (CHCl3) 2/9/00 21:03  
Original value (CoefD) = 0.015 New value = 0.2097  
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

**Cell:** J6

**Comment:** 1009-10-01 - Run 1 (CHCl3) 2/9/00 21:03  
Original value (S) = 0 New value = 0  
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

**Cell:** C7

**Comment:** 1009-10-01 - Run 1 (Cl2-D) 2/9/00 21:13  
Original value (CoefA0) = 0.1084 New value = 1.8001  
Poor peak curve fit. Data was refit by iterative curve fit procedure.

**Cell:** D7

**Comment:** 1009-10-01 - Run 1 (Cl2-D) 2/9/00 21:13  
Original value (CoefAf) = 2.3205 New value = 0.2662  
Poor peak curve fit. Data was refit by iterative curve fit procedure.

**Cell:** E7

**Comment:** 1009-10-01 - Run 1 (Cl2-D) 2/9/00 21:13  
Original value (CoefB) = 10.5452 New value = 19.9504  
Poor peak curve fit. Data was refit by iterative curve fit procedure.

**Cell:** F7

**Comment:** 1009-10-01 - Run 1 (Cl2-D) 2/9/00 21:13  
Original value (CoefD) = 0.1011 New value = 0.2818  
Poor peak curve fit. Data was refit by iterative curve fit procedure.

**Cell:** J7

**Comment:** 1009-10-01 - Run 1 (CI2-D) 2/9/00 21:13  
Original value (S) = -0.0074 New value = -0.0076  
Poor peak curve fit. Data was refit by iterative curve fit procedure.

**Cell:** C8

**Comment:** 1009-10-01 - Run 1 (DBAA) 2/9/00 20:56  
Original value (CoefA0) = 0 New value = 1.24  
Fewer than 6 points above MRL. Step function applied.

**Cell:** D8

**Comment:** 1009-10-01 - Run 1 (DBAA) 2/9/00 20:56  
Original value (CoefAf) = 0 New value = 0  
Fewer than 6 points above MRL. Step function applied.

**Cell:** E8

**Comment:** 1009-10-01 - Run 1 (DBAA) 2/9/00 20:56  
Original value (CoefB) = 0 New value = 0  
Fewer than 6 points above MRL. Step function applied.

**Cell:** F8

**Comment:** 1009-10-01 - Run 1 (DBAA) 2/9/00 20:56  
Original value (CoefD) = 0 New value = 0  
Fewer than 6 points above MRL. Step function applied.

**Cell:** J8

**Comment:** 1009-10-01 - Run 1 (DBAA) 2/9/00 20:56  
Original value (S) = 0 New value = 0  
Fewer than 6 points above MRL. Step function applied.

**Cell:** K8

**Comment:** 1009-10-01 - Run 1 (DBAA) 2/9/00 20:56  
Original value (t0) = 0 New value = 112.0417  
Fewer than 6 points above MRL. Step function applied.

**Cell:** C16

**Comment:** 1009-10-01 - Run 1 (MCAA) 2/9/00 21:14  
Original value (CoefA0) = 0.0269 New value = -0.2971  
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

**Cell:** D16

**Comment:** 1009-10-01 - Run 1 (MCAA) 2/9/00 21:14  
Original value (CoefAf) = 4.05 New value = 3.2957  
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

**Cell:** E16

**Comment:** 1009-10-01 - Run 1 (MCAA) 2/9/00 21:14  
Original value (CoefB) = 682.9681 New value = 23.5373  
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

**Cell:** F16

**Comment:** 1009-10-01 - Run 1 (MCAA) 2/9/00 21:14  
Original value (CoefD) = 0.0537 New value = 0.0293  
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

**Cell:** J16

**Comment:** 1009-10-01 - Run 1 (MCAA) 2/9/00 21:14  
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:** C22

**Comment:** 1009-10-01 - Run 1 (TSUVA) 2/9/00 21:01  
Original value (CoefA0) = -0.9821 New value = -1.2009  
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

**Cell:** D22

**Comment:** 1009-10-01 - Run 1 (TSUVA) 2/9/00 21:01  
Original value (CoefAf) = 2.4187 New value = 2.6515  
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

**Cell:** E22

**Comment:** 1009-10-01 - Run 1 (TSUVA) 2/9/00 21:01  
Original value (CoefB) = 3.1956 New value = 20.0702  
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

**Cell:** F22

**Comment:** 1009-10-01 - Run 1 (TSUVA) 2/9/00 21:01  
Original value (CoefD) = 0.8664 New value = 2.3258  
Peak curve fit with S = 0. Refit to type 1 curve fit by iterative curve fit procedure.

**Cell:** J22

**Comment:** 1009-10-01 - Run 1 (TSUVA) 2/9/00 21:01  
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:** C27

**Comment:** 1009-20-01 - Run 2 (CHBr3) 2/9/00 21:18  
Original value (CoefA0) = 0 New value = 0  
Fewer than 6 points above MRL. Peak curve/step function combination applied.

**Cell:** D27

**Comment:** 1009-20-01 - Run 2 (CHBr3) 2/9/00 21:18  
Original value (CoefAf) = 0 New value = 1.4  
Fewer than 6 points above MRL. Peak curve/step function combination applied.

**Cell:** E27

**Comment:** 1009-20-01 - Run 2 (CHBr3) 2/9/00 21:18  
Original value (CoefB) = 0 New value = 0  
Fewer than 6 points above MRL. Peak curve/step function combination applied.

**Cell:** F27

**Comment:** 1009-20-01 - Run 2 (CHBr3) 2/9/00 21:18

Original value (CoefD) = 0 New value = 0

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

**Cell:** J27

**Comment:** 1009-20-01 - Run 2 (CHBr3) 2/9/00 21:18

Original value (S) = 0 New value = -0.046

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

**Cell:** C29

**Comment:** 1009-20-01 - Run 2 (Cl2-D) 2/9/00 21:15

Original value (CoefA0) = -0.95 New value = 0.6865

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

**Cell:** D29

**Comment:** 1009-20-01 - Run 2 (Cl2-D) 2/9/00 21:15

Original value (CoefAf) = 1.9204 New value = 0.3623

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

**Cell:** E29

**Comment:** 1009-20-01 - Run 2 (Cl2-D) 2/9/00 21:15

Original value (CoefB) = 0.496 New value = 19.9712

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

**Cell:** F29

**Comment:** 1009-20-01 - Run 2 (Cl2-D) 2/9/00 21:15

Original value (CoefD) = 0.7893 New value = 0.2522

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

**Cell:** J29

**Comment:** 1009-20-01 - Run 2 (Cl2-D) 2/9/00 21:15

Original value (S) = 0 New value = 0

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

**Cell:** C44

**Comment:** 1009-20-01 - Run 2 (TSUVA) 2/9/00 21:14

Original value (CoefA0) = -0.8696 New value = -0.2405

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

**Cell:** D44

**Comment:** 1009-20-01 - Run 2 (TSUVA) 2/9/00 21:14

Original value (CoefAf) = 2.6087 New value = 1.4748

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

**Cell:** E44

**Comment:** 1009-20-01 - Run 2 (TSUVA) 2/9/00 21:14

Original value (CoefB) = 1.4636 New value = 19.9999

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

**Cell:** F44

**Comment:** 1009-20-01 - Run 2 (TSUVA) 2/9/00 21:14

Original value (CoefD) = 0.0137 New value = 0.0595

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

**Cell:** J44

**Comment:** 1009-20-01 - Run 2 (TSUVA) 2/9/00 21:14

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#: OH2500411 / 528  
 ICR Contact: Mr. Kenneth S. Button  
 Phone No.: (614) 645-7691  
 Period: 2/16/98 - 6/15/98 (119 days)

## Design Information

Design TOC: 2.3 mg/L  
 Col Diameter: 75.0 mm

Full-Scale GAC Size: 8x30 US Std Mesh  
 Full-Scale particle dia.: 1.480 mm  
 Meas Dry Bed Density: 500.0 kg/m3

## Water Quality Summary

Influent	Mean	SD	Count	Min/Max
TOC	2.5	0.3	24	1.8 - 3.0
pH	7.2	0.6	24	6.5 - 9.1
UV254	0.046	0.006	24	0.032 - 0.059
SUVA	1.87	0.18	24	1.5 - 2.2
Bromide	12	14	23	0 - 33
SDS-TOX	200	34	22	112 - 274
SDS-THM4	65	17	23	35 - 102
SDS-HAA6	45	10	23	27 - 63
Ammonia	0.02	0.03	24	0.00 - 0.12

## Cumulative SDS Conditions

	Mean	SD	Count	Min/Max
Res (0)	1.00	0.48	50	0.20 - 3.20
Temp	16.7	6.0	49	8.5 - 26.0
pH	8.1	0.5	46	7.1 - 9.1
Time	47.8	1.1	49	45.0 - 49.0

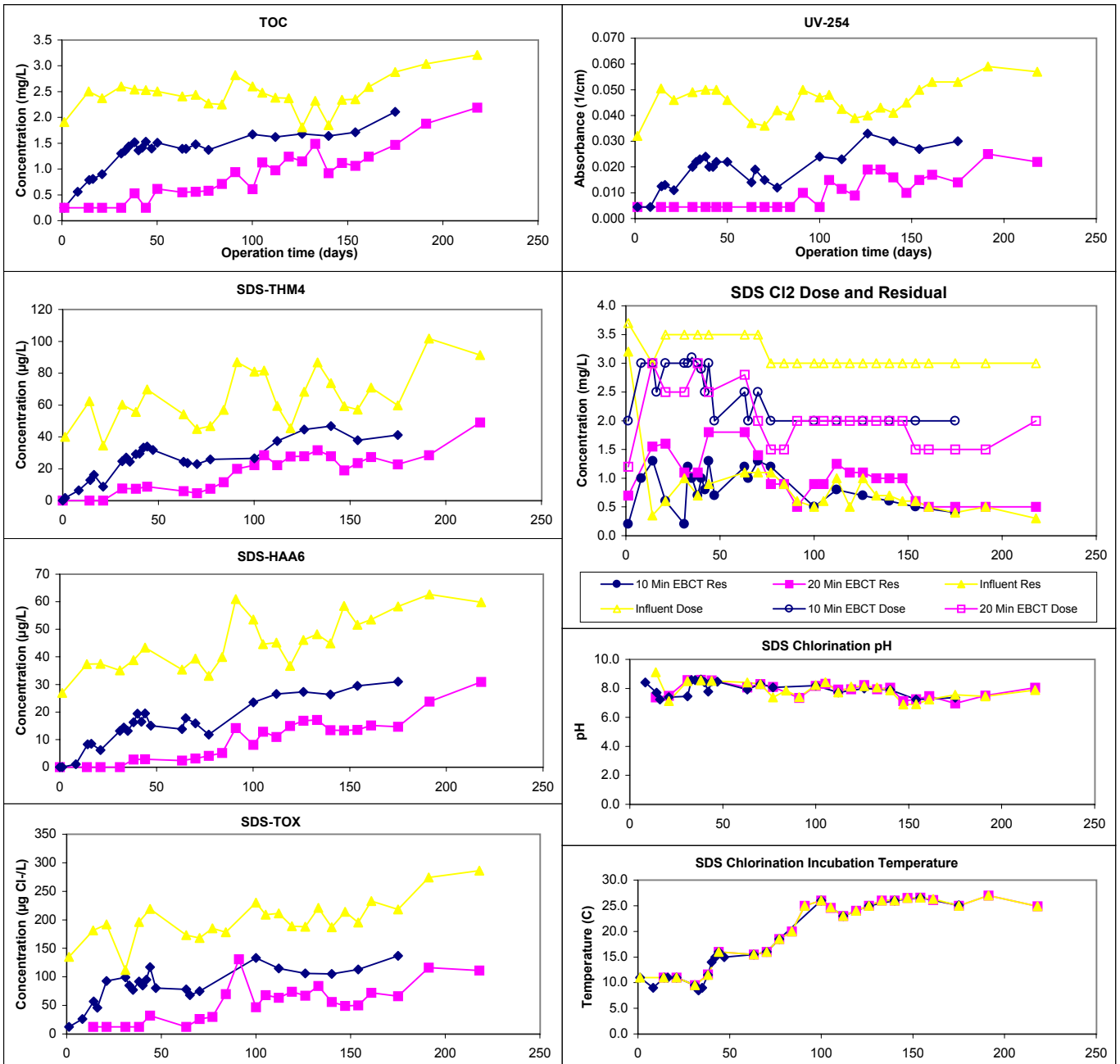
Comments:

Chart Legend:

10 Min EBCT  
 20 Min EBCT  
 Influent

Effluent	10 Min EBCT	(175 days)	20 Min EBCT	(218 days)
Effluent pH	7.3	0.4	24	6.5 - 8.1
Effluent Temp	15.6	5.8	24	9.0 - 26.2
	19.8	6.5	25	7.0 - 27.0

## Water Quality Parameter Graphs



Water Quality Parameter Graphs (Continued)

