

ICR TREATMENT STUDY ANALYSIS

Base Analysis and Data Review Comments

Treatment Study ID	1058
Study Protocol	Short-Term Single-Element Bench-Scale Study
Plant ICR Number	1093
PWS Name	Green Meadows WTP
City, State, Zip	West Palm Beach, FL 33407

General Comments:

1. This Green Meadows WTP was purchased by different utilities several times between the start of this treatment study and the review of the Summary Report. Originally the plant was owned by Florida Cities Water Company; however, during the study it was purchased by Avatar Utilities, and then ultimately by Lee County. The entire study was conducted by Kimley-Horn and Associates, Inc.
2. Two membranes were evaluated over four quarters: the Fluid Systems TFC 4921S and the FilmTec NF70-4040. During these studies microfiltration and acid addition was used to pretreat this ground water. The experimental design for this study is discussed in Section 3 and listed in Table 4 of the Summary Report.
3. No additional cost information was provided in the Summary.

Water Quality Comments:

1. Forty-four water quality outliers were identified and removed prior to base analysis.
2. The target SDS conditions during this study were: 1 mg/L free chlorine residual (after quarter two), at a pH of ~ 8 after incubation time of 83 hours at 20°C.
3. There were several problems during the SDS chlorinations of the permeate and feed samples. First, during the first two quarters of this study, the lab performing the SDS testing measured the total chlorine residual, rather than the free chlorine residual. During this time it is suspected that the feed samples were not adequately dosed, based on the reported TOC and ammonia concentrations and the reported SDS incubation time. This resulted in a non-detectable free chlorine residual at the end of the test. Also, the formed DBPs in these feed samples were correspondingly low (and were ultimately reported as NR). During the subsequent quarters the permeate samples were often dosed as high as, or higher than, the

feed samples and yielded similar chlorine residuals – even though the feed TOC was ~ 6 mg/L higher. The consultant reported that the feed and permeate samples had high (but not measured) hydrogen sulfide concentrations, possibly resulting in a high inorganic chlorine demand.

Productivity Comments:

1. Forty-one productivity outliers were identified and removed prior to base analysis.
2. The TFC4921S membrane was cleaned once during the first week of the study (due to scaling problems) and subsequently at the end of each operational session, for a total of five cleaning events. The NF-70 was cleaned at the end of each operational cycle (four cleaning events).
3. The consultant reported some problems with the membrane data collected by the plant staff, which may have resulted in erratic reported temperatures of the membrane feed, and erratic operational data (i.e., pressures, MTC_w, etc.).
4. A summary of membrane productivity observed during each quarter, for each membrane, is given on Table 10. It is not clear, however, how some of these slopes were calculated, as there are often large discrepancies between the projected slopes in the Summary Report and those calculated by EPA during data analysis. During data analysis the EPA calculated an average specific flux decline of -6.41×10^{-4} gfd/psi/day and -1.05×10^{-3} gfd/psi/day for the Fluid Systems and FilmTec membranes, respectively.

ICR Information

ID / ICR#: FL 5360313 / 1093
 ICR Contact: Julie O'Neal, P.E.
 Phone No.: (561) 840-0853
 Period: 6/11/98 - 7/14/98 (33 days)

Membrane Information

Manufacturer: FilmTec Corp. Mfr. MTC_w: 0.410 (gfd/psi)
 Trade Name: FILMTEC Mfr. Temp: 25.0 °C
 Membrane Model: NF70-4040 Max Flow: 16.0 gpm
 MWCO: 200 Daltons Min Flow: 3.0 gpm
 Element Size: 4" x 40" Total Width: 13.2 ft
 Element Area: 80.0 ft² Feed Sp Thickness: 0.0030 ft
 Design Flux: 28.7 gfd 840 Element Area: 400.0 ft²
 Mfr. NDP: 70.0 psi 840 Purchase Price: \$700

Design Parameters

Norm Temp: 22.5 °C Recycle Ratio: 3.95
 Temp Norm MTC-w: 0.381 TavGC Manuf rep Re_{JTDS}: 80%
 Design Recovery: 0.75 TDS_F: 440.0 mg/L
 Design Flux: 15.0 gfd

Water Quality Summary

	Mean	SD	Feed Count	Min/Max	Mean	SD	Permeate Count	Min/Max	Mean	SD	Concentrate Count	Min/Max
pH	7.3	0.2	4	7.1 - 7.6	5.3	0.3	4	5.0 - 5.7	NA	NA	0	0.0 - 0.0
Temp	27.5	0.7	4	26.7 - 28.2	27.5	0.7	4	26.7 - 28.2	NA	NA	0	0.0 - 0.0
Alk	245	6	4	240 - 250	19	8	4	12 - 28	NA	NA	0	0 - 0
TDS	455	31	4	430 - 500	125	65	4	66 - 210	NA	NA	0	0 - 0
TotHard	274	5	4	270 - 280	27	15	4	13 - 44	NA	NA	0	0 - 0
CaHard	215	6	4	210 - 220	20	12	4	10 - 36	NA	NA	0	0 - 0
Turb	5.46	4.49	4	0.84 - 11.00	0.08	0.05	4	0.00 - 0.10	NA	NA	0	0.00 - 0.00
Amm	0.5	0.1	4	0.4 - 0.6	0.4	0.1	4	0.3 - 0.5	NA	NA	0	0.0 - 0.0
TOC	5.6	0.4	4	5.0 - 5.9	0.7	0.0	4	0.7 - 0.7	NA	NA	0	0.0 - 0.0
UV254	0.246	0.0	4	0.225 - 0.260	0.010	0.0	4	0.005 - 0.016	NA	NA	0	0.000 - 0.000
SUVA	4.39	0.35	4	3.95 - 4.80	1.38	0.68	4	0.64 - 2.29	NA	NA	0	NA
Bromide	205	10	4	200 - 220	79	27	4	54 - 117				
TOX	NA	NA	0	0 - 0	51	43	4	13 - 112				
CHCl3	NA	NA	0	NA	23.4	34.2	4	1.5 - 74.0	Mass Balance			
BDCM	NA	NA	0	NA	4.5	2.6	4	1.5 - 7.7	Closure Errors (%)			
DBCM	NA	NA	0	NA	7.6	6.5	4	2.1 - 17.0	WQP	Count	Avg	SD/RD
CHBr3	NA	NA	0	NA	3.0	5.4	4	0.0 - 11.0	Alk	0	n/a	n/a
THM4	NA	NA	0	NA	38.6	38.0	4	5.1 - 86.9	TDS	0	n/a	n/a
MCAA	NA	NA	0	NA	0.5	1.0	4	0.0 - 2.0	TotHard	0	n/a	n/a
DCAA	NA	NA	0	NA	0.8	1.0	4	0.0 - 2.0	CaHard	0	n/a	n/a
TCAA	NA	NA	0	NA	0.7	0.9	4	0.0 - 1.9	Turb	0	n/a	n/a
MBAA	NA	NA	0	NA	0.3	0.5	4	0.0 - 1.0	Amm	0	n/a	n/a
DBAA	NA	NA	0	NA	1.3	1.9	4	0.0 - 4.1	TOC	0	n/a	n/a
BCAA	NA	NA	0	NA	0.9	1.2	4	0.0 - 2.6	UV254	0	n/a	n/a
TBAA	NA	NA	0	NA	NA	NA	0	NA	TDS _t 83 7 29			
CDBAA	NA	NA	0	NA	NA	NA	0	NA				
DCBAA	NA	NA	0	NA	NA	NA	0	NA	Comments:			
HAA5	NA	NA	0	NA	3.5	4.1	4	0.0 - 8.0				
HAA6	NA	NA	0	NA	4.4	5.3	4	0.0 - 10.6				
HAA9	NA	NA	0	NA	NA	NA	0	NA				

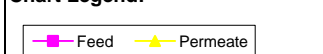
SDS Conditions

WQP	Avg	SD	Count	Min - Max
Res (0)	0.87	0.24	4	0.65 - 1.20
Temp (°C)	20.0	0.0	4	20.0 - 20.0
pH (unit)	8.0	0.0	4	8.0 - 8.0
Time (hr)	83.0	0.0	4	83.0 - 83.0

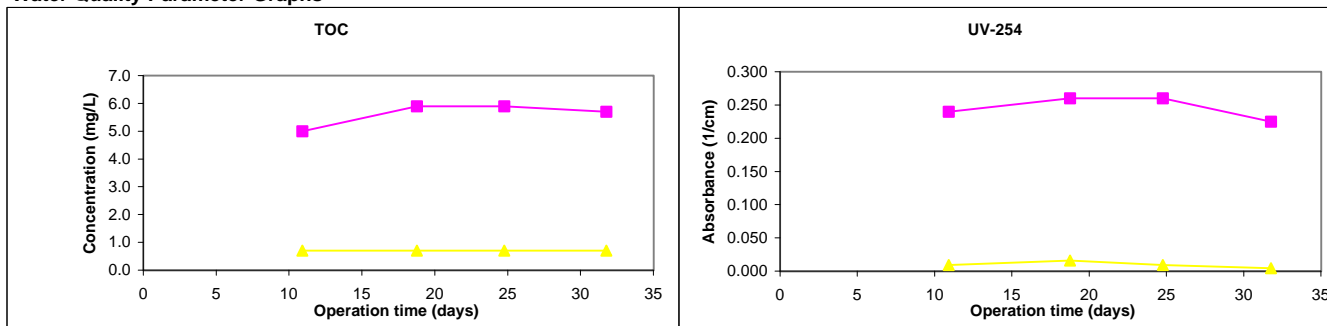
Pretreatment Information

Process	Description	Scale
Hydrochloric acid addition	pH = 6.4	Pilot-scale

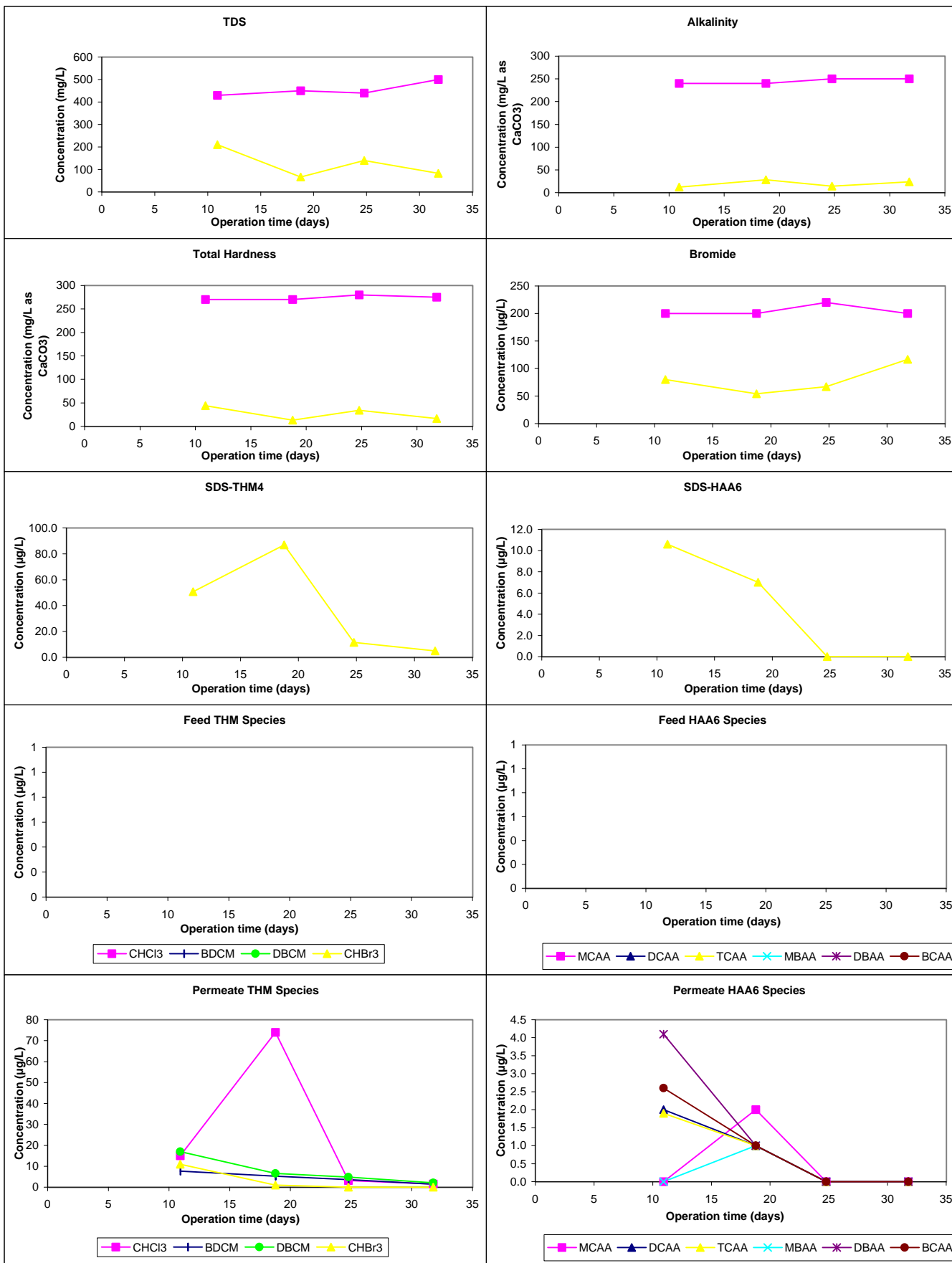
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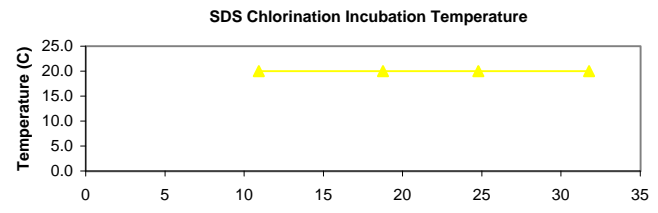
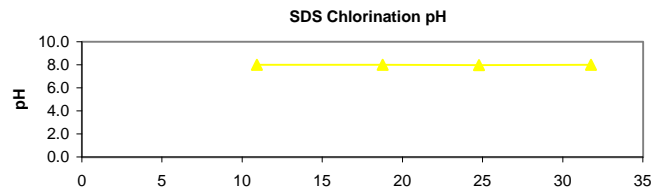
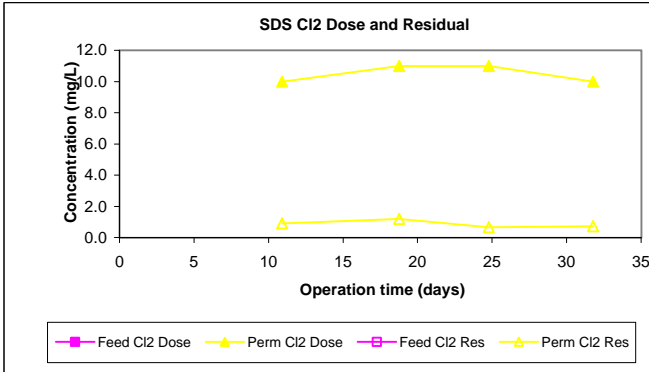
Water Quality Parameter Graphs



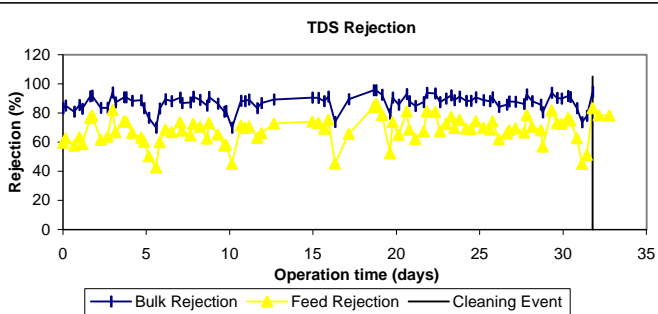
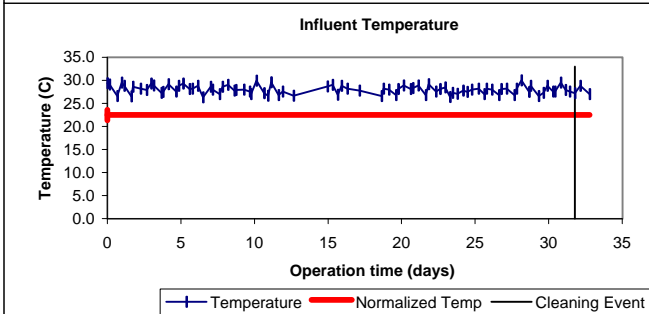
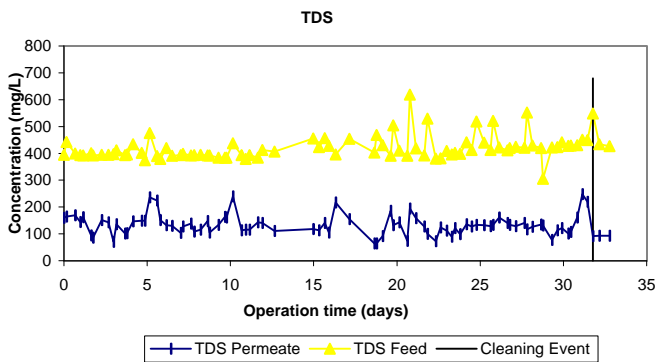
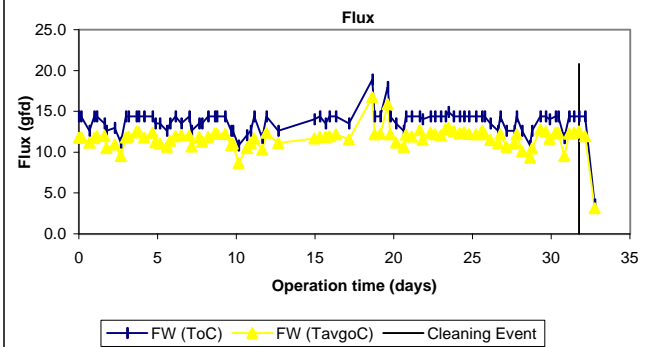
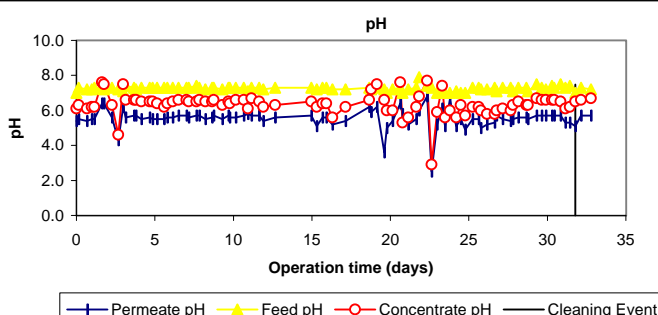
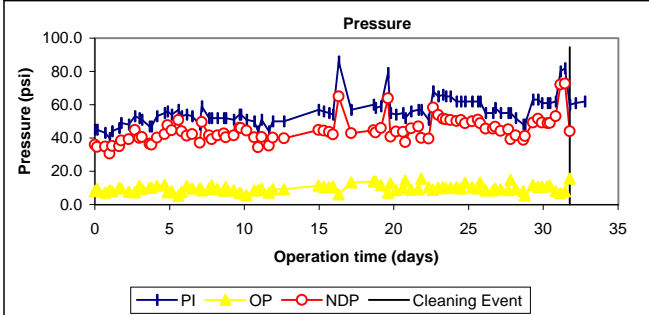
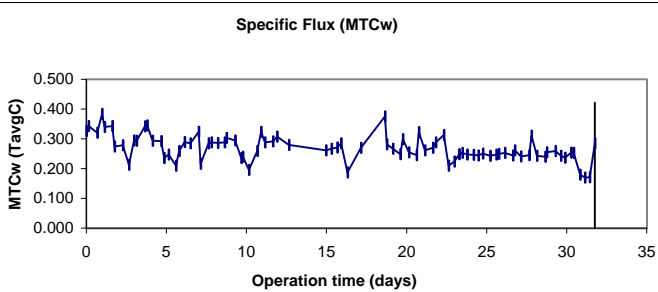
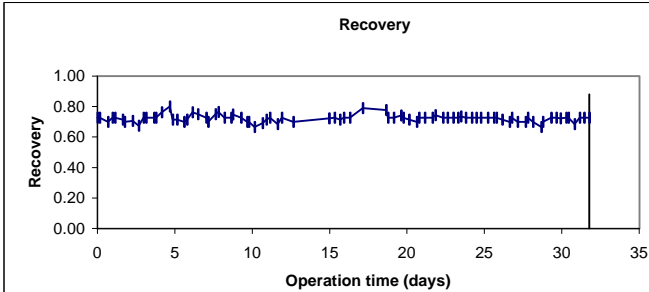
Water Quality Parameter Graphs (Continued)



Water Quality Parameter Graphs (Continued)



Productivity Graphs



ICR Information

ID / ICR#: FL 5360313 / 1093
 ICR Contact: Julie O'Neal, P.E.
 Phone No.: (561) 840-0853
 Period: 9/2/98 - 9/30/98 (28 days)

Membrane Information

Manufacturer: FilmTec Corp.	Mfr. MTC_w: 0.410 (gfd/psi)
Trade Name: FILMTEC	Mfr. Temp: 25.0 °C
Membrane Model: NF70-4040	Max Flow: 16.0 gpm
MWCO: 200 Daltons	Min Flow: 3.0 gpm
Element Size: 4" x 40"	Total Width : 13.2 ft
Element Area: 80.0 ft ²	Feed Sp Thickness: 0.0030 ft
Design Flux: 28.7 gfd	840 Element Area 400.0 ft ²
Mfr. NDP: 70.0 psi	840 Purchase Price: \$700

Design Parameters

Norm Temp: 22.5 °C	Recycle Ratio: 3.95
Temp Norm MTC-w: 0.381 TavGC	Manuf rep Rej_{TDS}: 80%
Design Recovery: 0.75	TDS_F: 440.0 mg/L
Design Flux: 15.0 gfd	

Water Quality Summary

	Mean	SD	Feed Count	Min/Max	Mean	SD	Permeate Count	Min/Max	Mean	SD	Concentrate Count	Min/Max
pH	6.3	0.3	2	6.1 - 6.5	5.8	0.0	2	5.8 - 5.8	NA	NA	0	0.0 - 0.0
Temp	27.7	0.8	2	27.1 - 28.3	27.7	0.8	2	27.1 - 28.3	NA	NA	0	0.0 - 0.0
Alk	116	63	2	71 - 160	29	1	2	28 - 30	NA	NA	0	0 - 0
TDS	610	71	2	560 - 660	152	97	2	83 - 220	NA	NA	0	0 - 0
TotHard	275	7	2	270 - 280	42	30	2	20 - 63	NA	NA	0	0 - 0
CaHard	215	7	2	210 - 220	33	25	2	15 - 50	NA	NA	0	0 - 0
Turb	0.42	0.25	2	0.24 - 0.60	0.05	0.07	2	0.00 - 0.10	NA	NA	0	0.00 - 0.00
Amm	0.3	0.0	2	0.2 - 0.3	0.2	0.0	2	0.1 - 0.2	NA	NA	0	0.0 - 0.0
TOC	6.1	0.6	2	5.7 - 6.5	0.6	0.5	2	0.3 - 1.0	NA	NA	0	0.0 - 0.0
UV254	0.240	0.0	2	0.220 - 0.260	0.021	0.0	2	0.005 - 0.038	NA	NA	0	0.000 - 0.000
SUVA	NA	NA	2	NA	NA	NA	2	NA	NA	NA	0	NA
Bromide	325	64	2	280 - 370	102	54	2	64 - 140				
TOX	NA	NA	0	0 - 0	79	71	2	28 - 129				
CHCl3	NA	NA	0	NA	10.3	8.1	2	4.5 - 16.0	Mass Balance			
BDCM	NA	NA	0	NA	13.5	16.3	2	2.0 - 25.0	Closure Errors (%)			
DBCM	NA	NA	0	NA	12.8	13.1	2	3.5 - 22.0	WQP	Count	Avg	SD/RD
CHBr3	NA	NA	0	NA	2.5	3.5	2	0.0 - 4.9	Alk	0	n/a	n/a
THM4	NA	NA	0	NA	39.0	40.9	2	10.0 - 67.9	TDS	0	n/a	n/a
MCAA	NA	NA	0	NA	0.0	0.0	2	0.0 - 0.0	TotHard	0	n/a	n/a
DCAA	NA	NA	0	NA	2.7	3.7	2	0.0 - 5.3	CaHard	0	n/a	n/a
TCAA	NA	NA	0	NA	1.6	2.3	2	0.0 - 3.2	Turb	0	n/a	n/a
MBAA	NA	NA	0	NA	0.0	0.0	2	0.0 - 0.0	Amm	0	n/a	n/a
DBAA	NA	NA	0	NA	2.1	3.0	2	0.0 - 4.2	TOC	0	n/a	n/a
BCAA	NA	NA	0	NA	2.2	3.1	2	0.0 - 4.4	UV254	0	n/a	n/a
TBAA	NA	NA	0	NA	NA	NA	0	NA	Comments:			
CDBAA	NA	NA	0	NA	NA	NA	0	NA				
DCBAA	NA	NA	0	NA	NA	NA	0	NA	TDS	63	-2	16
HAA5	NA	NA	0	NA	6.4	9.0	2	0.0 - 12.7				
HAA6	NA	NA	0	NA	8.6	12.1	2	0.0 - 17.1				
HAA9	NA	NA	0	NA	NA	NA	0	NA				

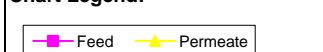
SDS Conditions

WQP	Avg	SD	Count	Min - Max
Res (0)	0.68	0.01	2	0.67 - 0.69
Temp (°C)	20.0	0.0	2	20.0 - 20.0
pH (unit)	8.0	0.1	2	8.0 - 8.1
Time (hr)	83.0	0.0	2	83.0 - 83.0

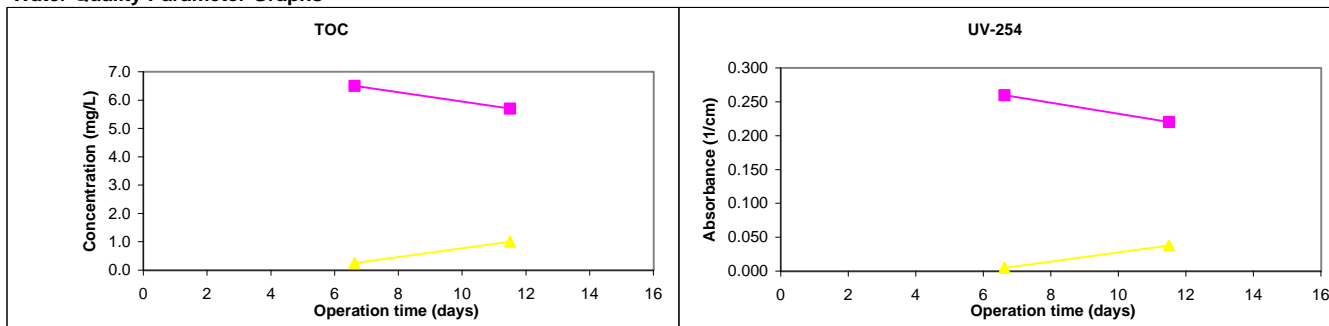
Pretreatment Information

Process	Description	Scale
Hydrochloric acid addition	pH = 6.4	Pilot-scale

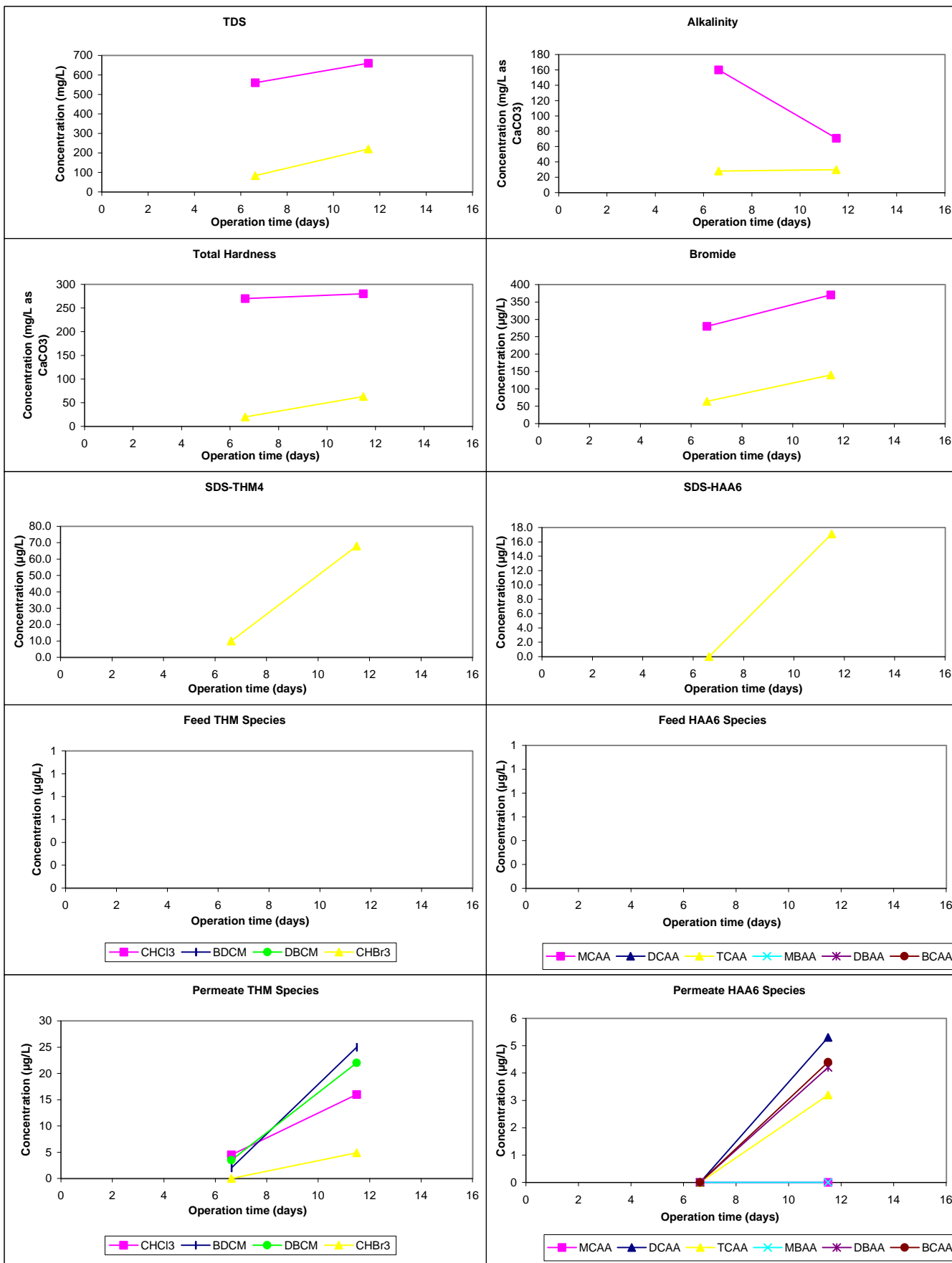
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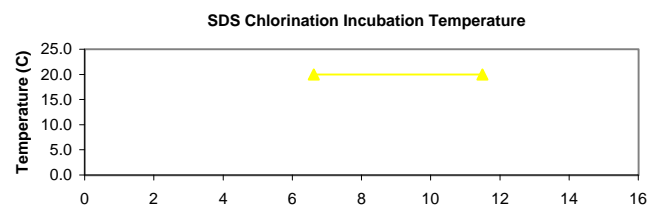
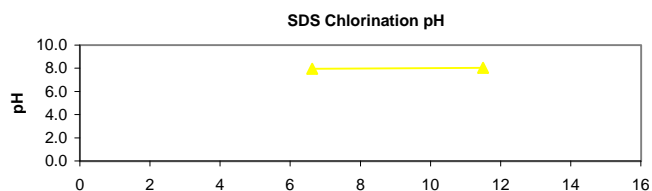
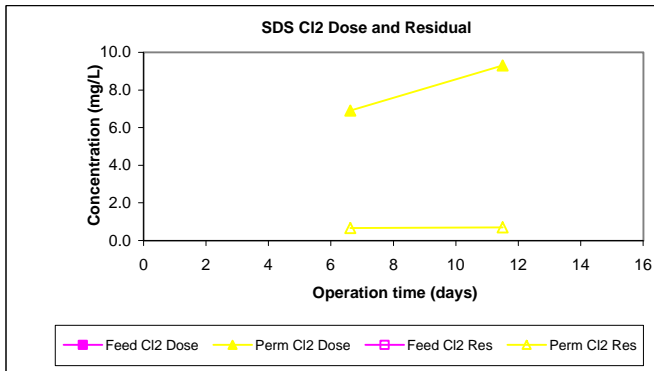
Water Quality Parameter Graphs



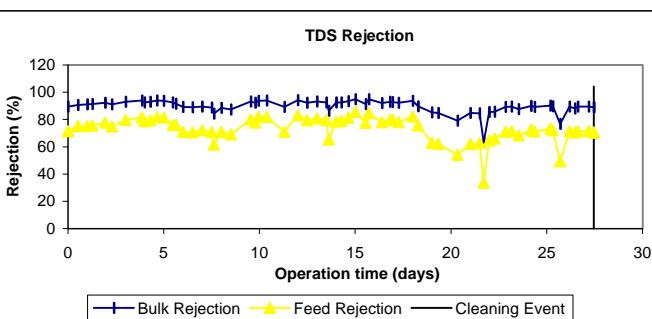
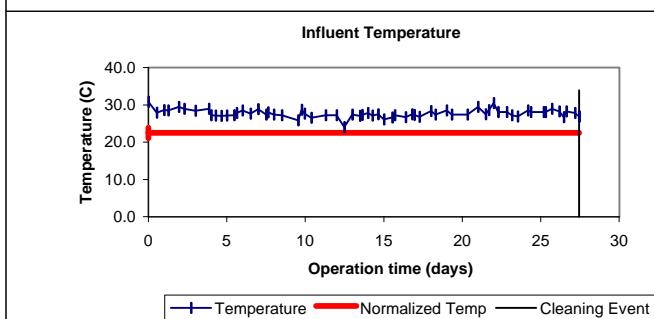
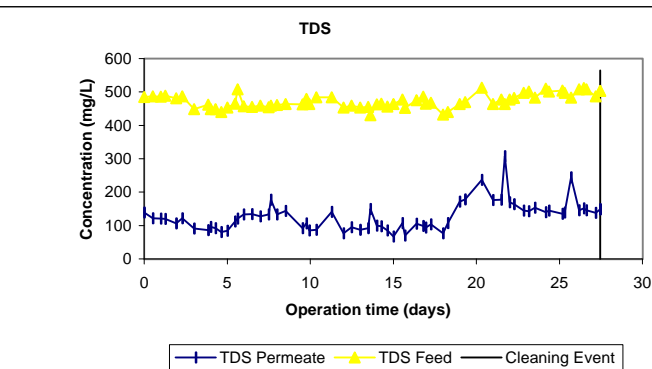
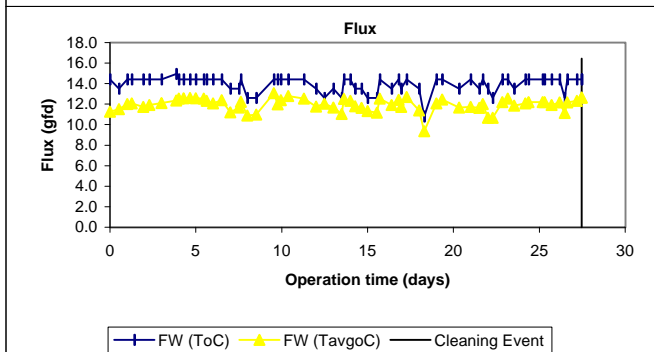
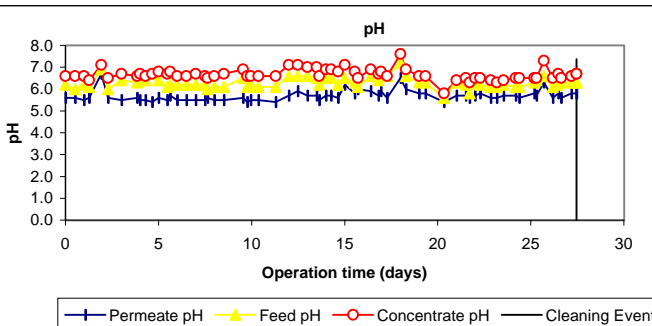
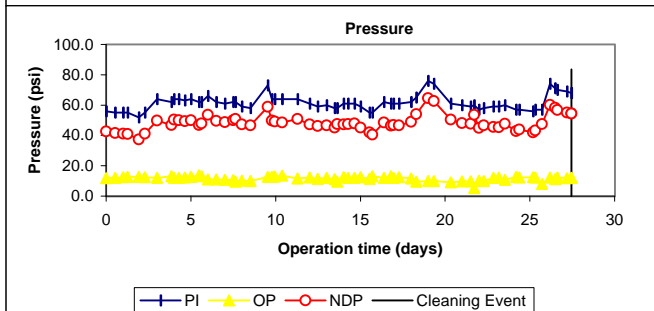
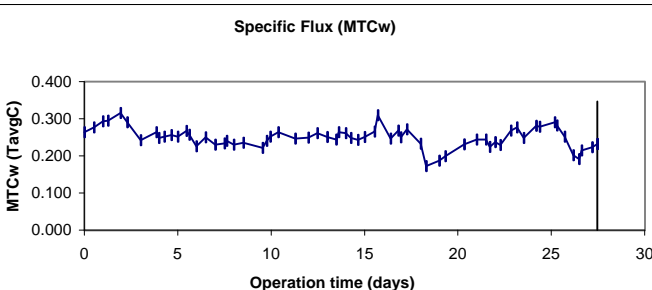
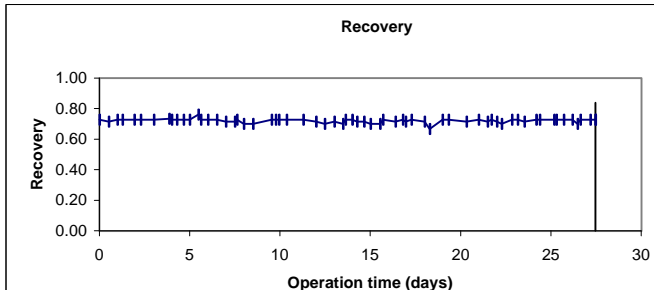
Water Quality Parameter Graphs (Continued)



Water Quality Parameter Graphs (Continued)



Productivity Graphs



ICR Information

ID / ICR#: FL 5360313 / 1093
 ICR Contact: Julie O'Neal, P.E.
 Phone No.: (561) 840-0853
 Period: 11/16/98 - 12/16/98 (30 days)

Membrane Information

Manufacturer: FilmTec Corp. Mfr. MTC_w: 0.410 (gfd/psi)
 Trade Name: FILMTEC Mfr. Temp: 25.0 °C
 Membrane Model: NF70-4040 Max Flow: 16.0 gpm
 MWCO: 200 Daltons Min Flow: 3.0 gpm
 Element Size: 4" x 40" Total Width: 13.2 ft
 Element Area: 80.0 ft² Feed Sp Thickness: 0.0030 ft
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 Temp Norm MTC-w: 0.381 TavG Manuf rep Rej_{TDS}: 80%
 Design Recovery: 0.75 TDS_F: 440.0 mg/L
 Design Flux: 15.0 gfd

Water Quality Summary

	Mean	SD	Feed Count	Min/Max	Mean	SD	Permeate Count	Min/Max	Mean	SD	Concentrate Count	Min/Max
pH	6.6	0.2	4	6.4 - 6.8	5.9	0.1	4	5.8 - 6.0	6.8	0.1	4	6.6 - 6.9
Temp	26.5	2.0	4	24.0 - 28.6	26.5	2.0	4	24.0 - 28.6	26.5	2.0	4	24.0 - 28.6
Alk	168	15	4	150 - 180	32	1	4	32 - 33	393	50	4	340 - 460
TDS	564	44	4	520 - 620	90	11	4	79 - 100	1450	289	4	1100 - 1800
TotHard	281	10	4	270 - 295	35	3	4	31 - 38	713	75	4	660 - 820
CaHard	214	11	4	200 - 225	25	3	4	22 - 28	565	52	4	520 - 640
Turb	17.25	7.54	4	12.00 - 28.00	0.00	0.00	4	0.00 - 0.00	28.28	33.24	4	9.10 - 78.00
Amm	0.5	0.1	4	0.4 - 0.6	0.2	0.1	4	0.0 - 0.3	0.8	0.1	4	0.7 - 1.0
TOC	5.7	0.4	3	5.3 - 6.0	0.5	0.3	4	0.3 - 0.9	19.5	2.9	4	16.0 - 23.0
UV254	0.258	0.0	4	0.220 - 0.310	0.018	0.0	4	0.017 - 0.019	0.595	0.0	4	0.540 - 0.650
SUVA	NA	NA	3	NA	4.53	2.52	4	2.13 - 6.80	3.09	0.41	4	2.48 - 3.38
Bromide	239	6	4	230 - 245	60	6	4	52 - 66				
TOX	879	87	4	794 - 972	82	28	4	62 - 123				
CHCl3	136.3	36.4	4	110.0 - 190.0	9.0	2.0	4	7.7 - 12.0	Mass Balance			
BDCM	81.8	14.3	4	65.0 - 100.0	9.9	2.0	4	7.8 - 12.0	Closure Errors (%)			
DBCM	25.5	4.9	4	20.0 - 31.0	8.3	1.9	4	6.2 - 10.9	WQP	Count	Avg	SD/RD
CHBr3	0.3	0.7	4	0.0 - 1.4	1.9	0.6	4	1.2 - 2.5	Alk	4	-25	25
THM4	243.8	43.1	4	195.0 - 300.0	29.0	4.6	4	23.1 - 32.8	TDS	4	-22	14
MCAA	0.9	1.7	4	0.0 - 3.4	0.0	0.0	4	0.0 - 0.0	TotHard	4	-20	9
DCAA	54.8	18.9	4	34.0 - 74.0	3.2	1.5	4	2.2 - 5.4	CaHard	4	-16	11
TCAA	68.8	26.3	3	50.5 - 99.0	2.6	1.3	4	1.8 - 4.5	Turb	0	n/a	n/a
MBAA	0.0	0.0	4	0.0 - 0.0	0.0	0.0	4	0.0 - 0.0	Amm	3	-40	54
DBAA	12.1	4.2	4	7.2 - 16.0	4.9	4.0	4	0.0 - 8.7	TOC	1	10	n/a
BCAA	23.5	3.1	4	20.0 - 27.0	3.3	2.7	4	0.0 - 5.8	UV254	4	-38	24
TBAA	NA	NA	0	NA	NA	NA	0	NA	TDS _t	84	-6	9
CDBAA	NA	NA	0	NA	NA	NA	0	NA	Comments:			
DCBAA	NA	NA	0	NA	NA	NA	0	NA				
HAA5	141.2	38.2	3	108.2 - 183.0	10.7	4.2	4	4.4 - 13.2				
HAA6	165.9	40.6	3	130.2 - 210.0	14.0	6.5	4	4.4 - 18.2				
HAA9	NA	NA	0	NA	NA	NA	0	NA				

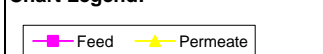
SDS Conditions

WQP	Avg	SD	Count	Min - Max
Res (0)	2.29	3.04	8	0.94 - 9.80
Temp (°C)	20.0	0.0	8	20.0 - 20.0
pH (unit)	8.2	0.0	8	8.1 - 8.2
Time (hr)	83.0	0.0	8	83.0 - 83.0

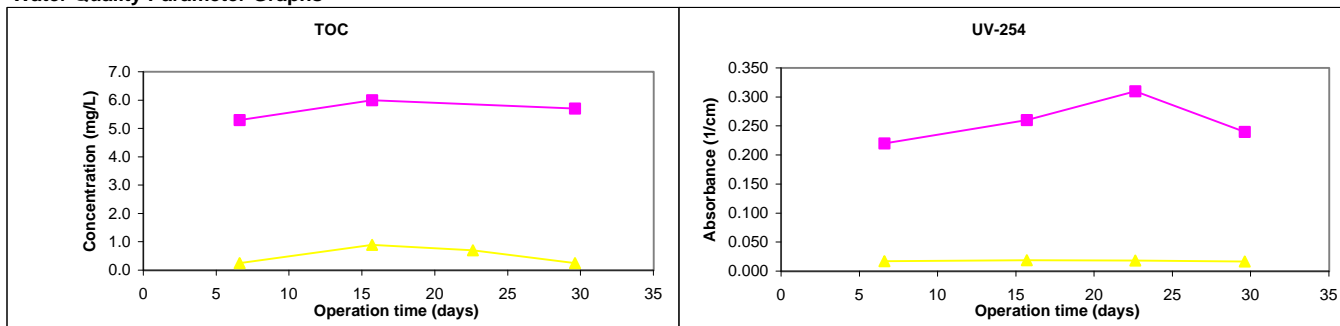
Pretreatment Information

Process	Description	Scale
Hydrochloric acid addition	pH = 6.4	Pilot-scale

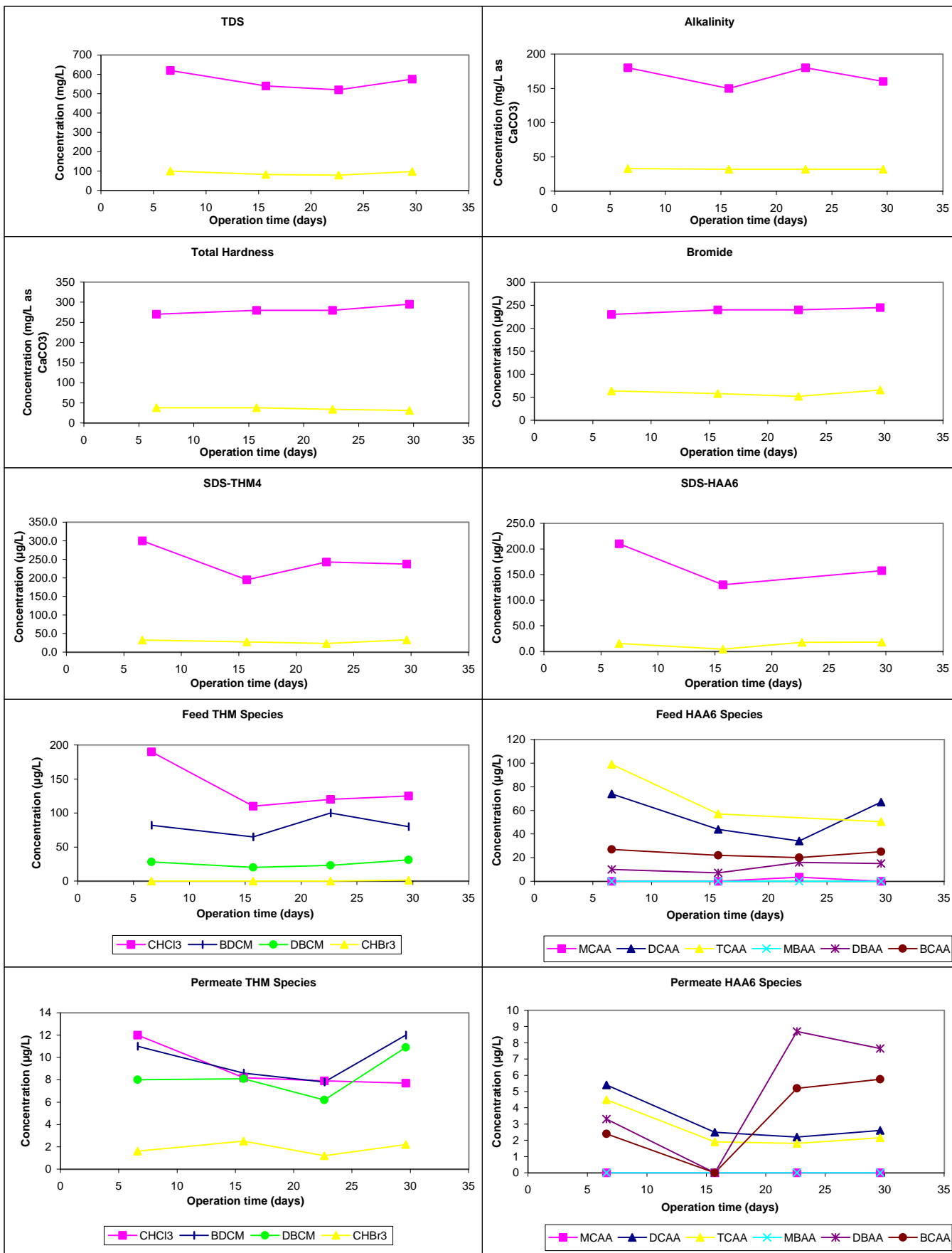
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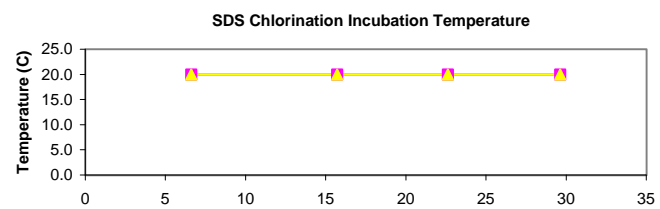
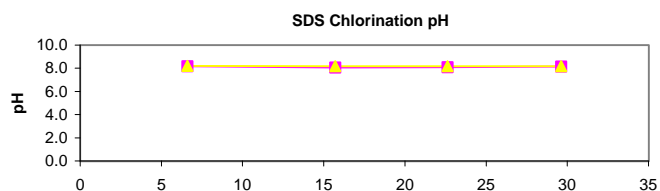
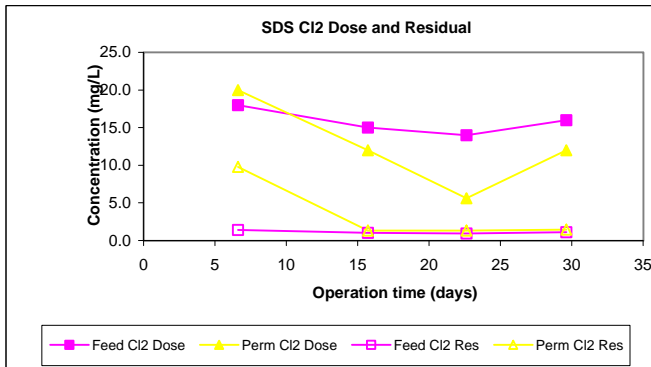
Water Quality Parameter Graphs



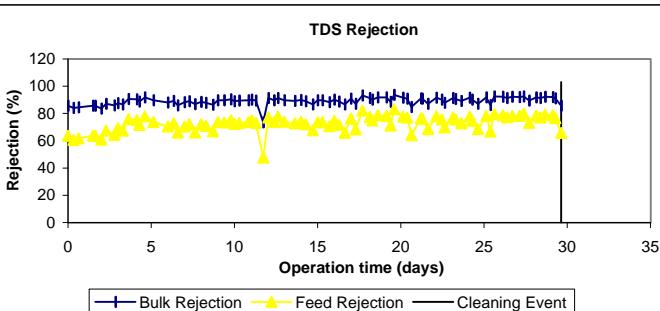
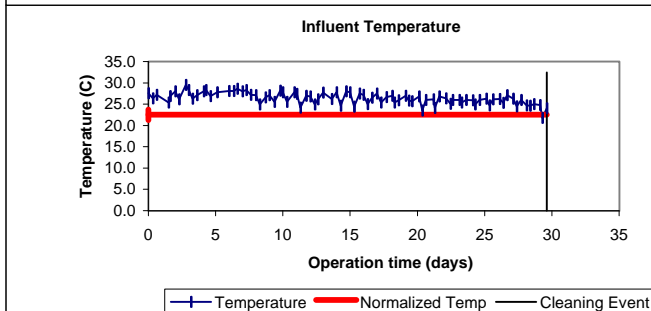
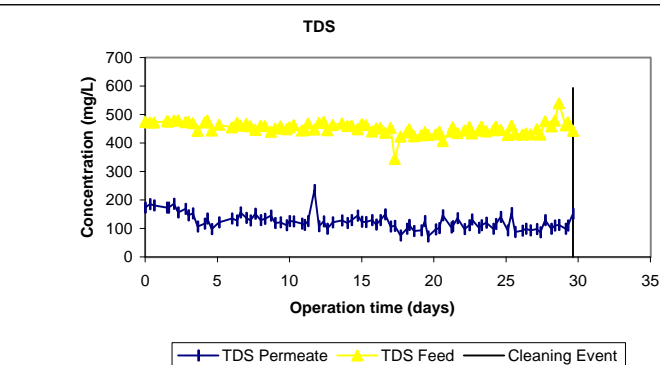
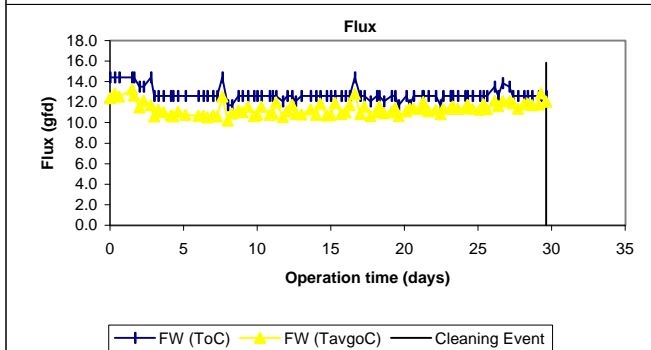
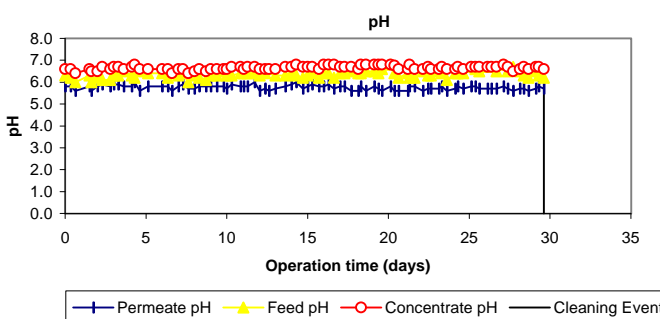
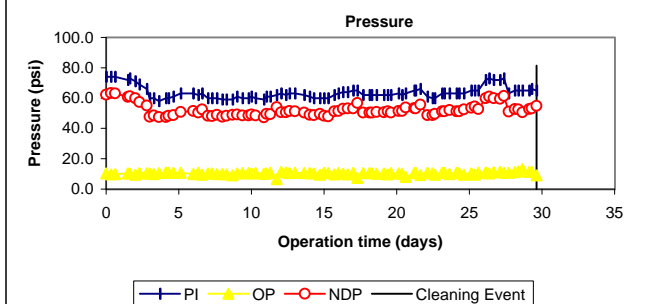
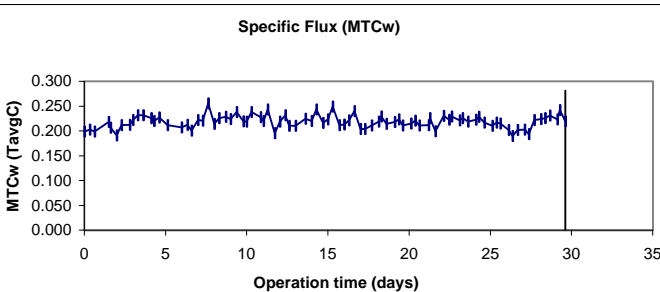
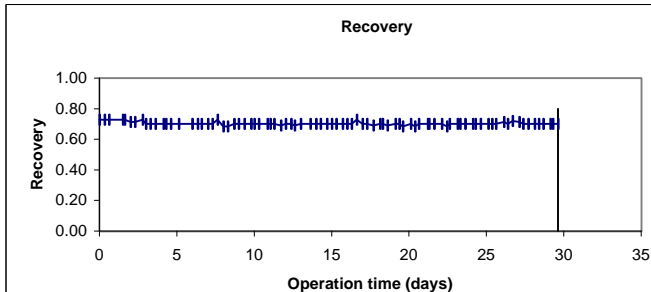
Water Quality Parameter Graphs (Continued)



Water Quality Parameter Graphs (Continued)



Productivity Graphs



ICR Information

ID / ICR#: FL 5360313 / 1093
 ICR Contact: Julie O'Neal, P.E.
 Phone No.: (561) 840-0853
 Period: 1/12/99 - 2/9/99 (28 days)

Membrane Information

Manufacturer: FilmTec Corp.	Mfr. MTC_w: 0.410 (gfd/psi)
Trade Name: FILMTEC	Mfr. Temp: 25.0 °C
Membrane Model: NF70-4040	Max Flow: 16.0 gpm
MWCO: 200 Daltons	Min Flow: 3.0 gpm
Element Size: 4" x 40"	Total Width : 13.2 ft
Element Area: 80.0 ft ²	Feed Sp Thickness: 0.0030 ft
Design Flux: 28.7 gfd	840 Element Area 400.0 ft ²
Mfr. NDP: 70.0 psi	840 Purchase Price: \$700

Design Parameters

Norm Temp: 22.5 °C	Recycle Ratio: 3.95
Temp Norm MTC-w: 0.381 TavGC	Manuf rep Re_{JTDS}: 80%
Design Recovery: 0.75	TDS_F: 440.0 mg/L
Design Flux: 15.0 gfd	

Water Quality Summary

	Mean	SD	Feed Count	Min/Max	Mean	SD	Permeate Count	Min/Max	Mean	SD	Concentrate Count	Min/Max
pH	6.8	0.2	4	6.7 - 7.1	6.1	0.2	4	5.9 - 6.3	7.0	0.2	4	6.8 - 7.1
Temp	26.3	0.5	4	26.0 - 27.0	26.3	0.5	4	26.0 - 27.0	26.3	0.5	4	26.0 - 27.0
Alk	161	85	4	34 - 210	29	3	4	26 - 32	578	50	4	540 - 650
TDS	486	20	4	470 - 510	66	6	4	61 - 73	1325	50	4	1300 - 1400
TotHard	284	8	4	275 - 290	24	3	4	21 - 27	833	59	4	760 - 890
CaHard	228	13	4	210 - 240	20	2	4	17 - 22	670	47	4	630 - 720
Turb	4.06	4.09	4	0.90 - 10.05	0.01	0.02	4	0.00 - 0.04	3.46	2.80	4	0.64 - 6.20
Amm	0.5	0.1	4	0.5 - 0.7	0.3	0.1	4	0.2 - 0.3	1.0	0.1	4	0.9 - 1.2
TOC	7.0	0.6	4	6.6 - 7.9	0.5	0.3	4	0.3 - 0.7	19.3	1.0	4	18.0 - 20.0
UV254	0.265	0.0	4	0.220 - 0.320	0.020	0.0	4	0.013 - 0.034	0.670	0.1	4	0.610 - 0.800
SUVA	3.76	0.41	4	3.17 - 4.05	4.77	2.15	4	1.97 - 7.20	3.48	0.39	4	3.15 - 4.00
Bromide	223	15	4	200 - 230	47	2	4	45 - 49				
TOX	706	52	4	649 - 776	48	10	4	32 - 53				
CHCl3	145.8	50.7	4	83.0 - 200.0	5.5	0.3	4	5.2 - 5.9	Mass Balance			
BDCM	59.3	8.4	4	51.0 - 71.0	5.8	0.5	4	5.3 - 6.4	Closure Errors (%)			
DBCM	19.8	3.0	4	17.0 - 24.0	6.0	0.9	4	4.9 - 6.9	WQP	Count	Avg	SD/RD
CHBr3	0.3	0.6	4	0.0 - 1.1	1.1	0.7	4	0.0 - 1.7	Alk	4	15	52
THM4	225.0	54.9	4	165.1 - 290.0	18.3	1.6	4	16.0 - 19.6	TDS	4	-16	12
MCAA	0.0	0.0	4	0.0 - 0.0	0.0	0.0	4	0.0 - 0.0	TotHard	4	-13	12
DCAA	51.9	16.3	4	35.0 - 73.0	2.8	0.5	4	2.2 - 3.3	CaHard	4	-12	10
TCAA	47.8	12.1	4	37.0 - 63.0	1.9	0.1	4	1.7 - 2.0	Turb	1	47	n/a
MBAA	0.0	0.0	4	0.0 - 0.0	0.0	0.0	4	0.0 - 0.0	Amm	4	-16	9
DBAA	6.0	0.8	4	5.2 - 7.0	2.2	0.7	4	1.6 - 2.9	TOC	2	-28	5
BCAA	18.5	3.0	4	14.0 - 20.0	2.4	0.3	4	2.0 - 2.7	UV254	4	-32	6
TBAA	NA	NA	0	NA	NA	NA	0	NA	Comments:			
CDBAA	NA	NA	0	NA	NA	NA	0	NA				
DCBAA	NA	NA	0	NA	NA	NA	0	NA				
HAA5	105.6	27.6	4	79.6 - 141.2	7.0	0.9	4	6.0 - 8.2				
HAA6	124.1	29.6	4	93.6 - 161.2	9.3	1.2	4	8.0 - 10.9				
HAA9	NA	NA	0	NA	NA	NA	0	NA				

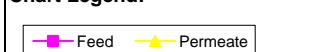
SDS Conditions

WQP	Avg	SD	Count	Min - Max
Res (1)	1.13	0.90	8	0.05 - 3.05
Temp (°C)	20.0	0.0	8	20.0 - 20.0
pH (unit)	8.1	0.1	8	7.9 - 8.2
Time (hr)	83.0	0.0	8	83.0 - 83.0

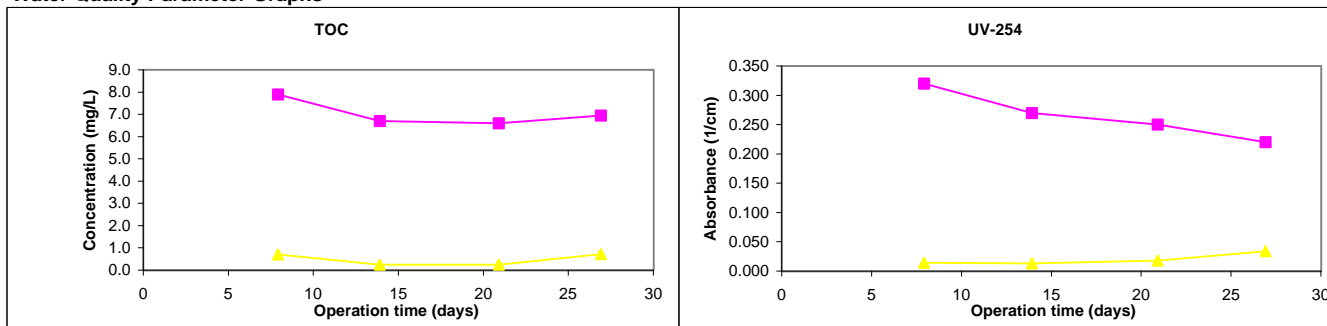
Pretreatment Information

Process	Description	Scale
Hydrochloric acid addition	pH = 6.4	Pilot-scale

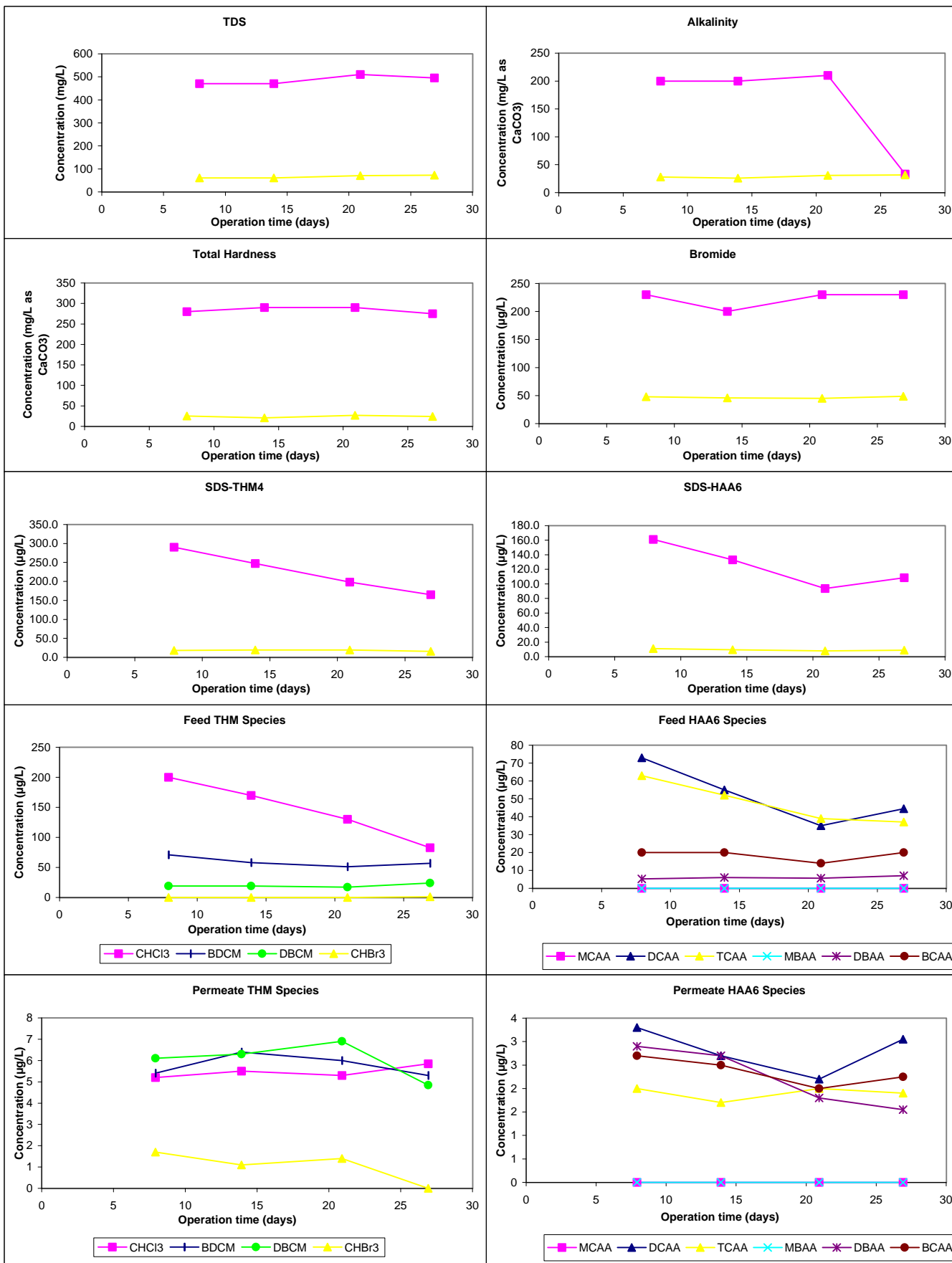
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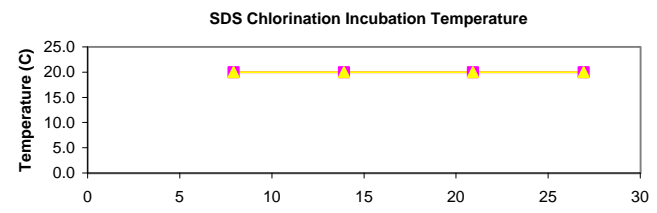
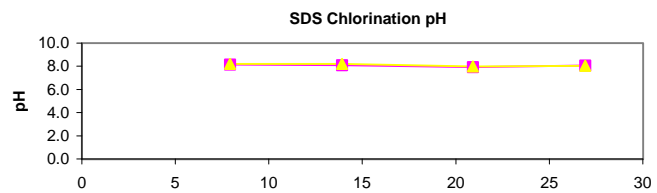
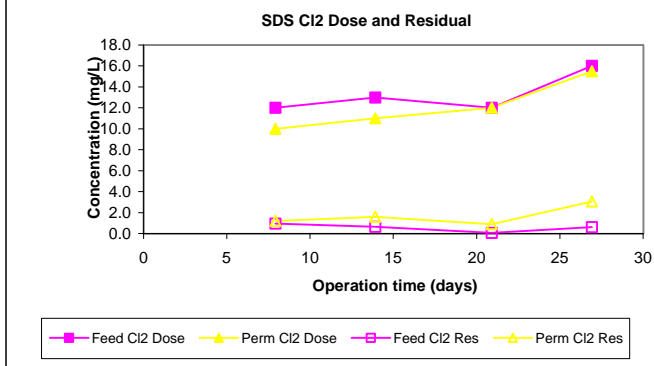
Water Quality Parameter Graphs



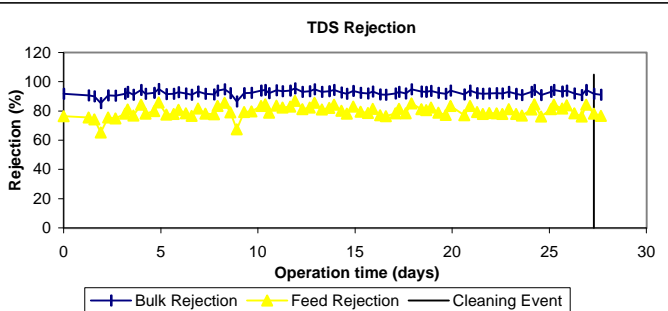
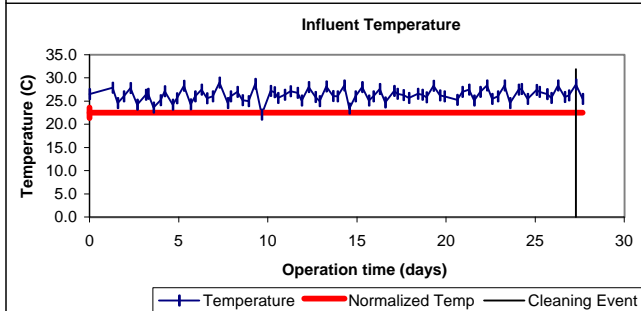
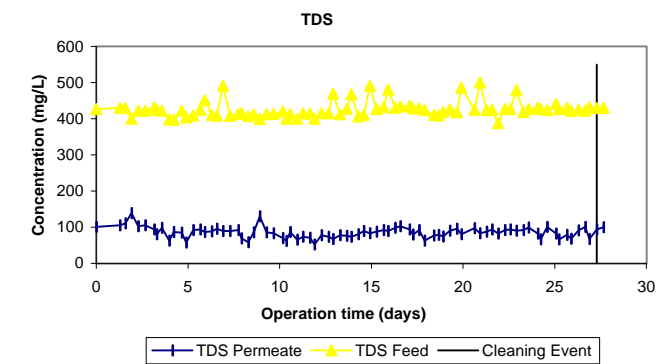
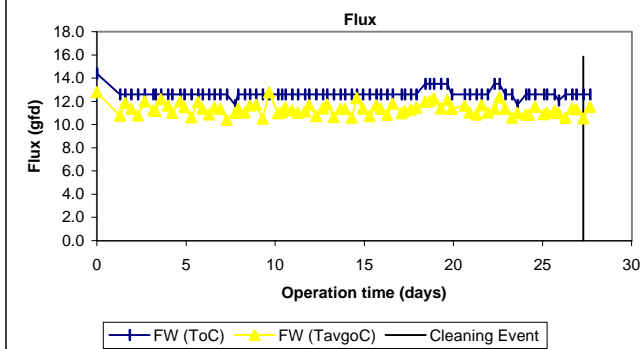
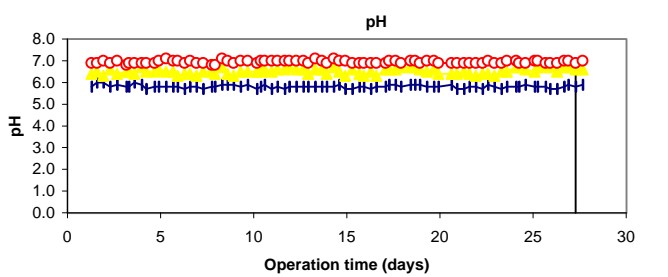
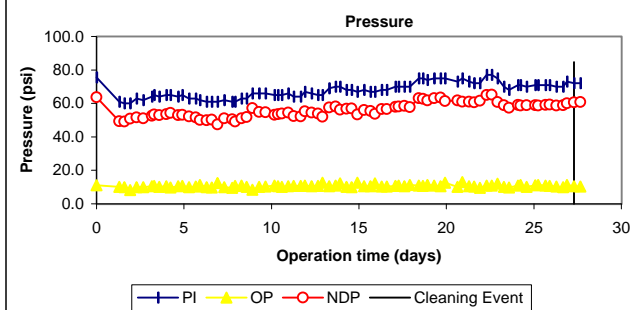
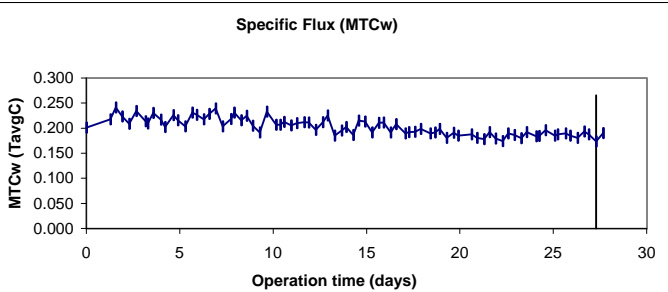
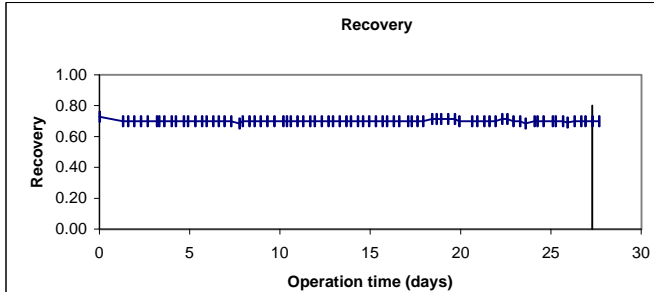
Water Quality Parameter Graphs (Continued)



Water Quality Parameter Graphs (Continued)



Productivity Graphs



ICR Information

ID / ICR#: FL5360313 / 1093
 ICR Contact: Julie O'Neal, P.E.
 Phone No.: (561) 840-0853
 Period: 5/3/98 - 6/11/98 (39 days)

Membrane Information

Manufacturer: Fluid Systems Mfr. MTC_w: 0.270 (gfd/psi)
 Trade Name: Spiral-Wound Reverse Osmosis Element Mfr. Temp: 25.0 °C
 Membrane Model: TFCS 4921S Max Flow: 10.0 gpm
 MWCO: 200 Daltons Min Flow: 4.0 gpm
 Element Size: 4" x 40" Total Width: 12.7 ft
 Element Area: 78.0 ft² Feed Sp Thickness: 0.0027 ft
 Design Flux: 20.5 gfd 840 Element Area: 330.0 ft²
 Mfr. NDP: 75.0 psi 840 Purchase Price: \$790

Design Parameters

Norm Temp: 22.5 °C Recycle Ratio: 4.08
 Temp Norm MTC-w: 0.251 TavGC Manuf rep Rej_{TDS}: 80%
 Design Recovery: 0.75 TDS_F: 440.0 mg/L
 Design Flux: 15.0 gfd

Water Quality Summary

	Mean	SD	Feed Count	Min/Max	Mean	SD	Permeate Count	Min/Max	Mean	SD	Concentrate Count	Min/Max
pH	7.3	0.1	3	7.2 - 7.3	5.0	1.5	3	3.3 - 5.9	NA	NA	0	0.0 - 0.0
Temp	27.3	0.9	4	26.2 - 28.5	27.3	0.9	4	26.2 - 28.5	NA	NA	0	0.0 - 0.0
Alk	253	10	4	240 - 260	24	17	4	0 - 36	300	NA	1	300 - 300
TDS	445	42	4	390 - 490	128	36	4	100 - 180	1700	NA	1	1700 - 1700
TotHard	265	6	4	260 - 270	36	5	4	31 - 42	710	NA	1	710 - 710
CaHard	205	6	4	200 - 210	29	4	4	24 - 34	540	NA	1	540 - 540
Turb	6.93	6.45	4	1.30 - 13.00	0.03	0.05	4	0.00 - 0.10	23.00	NA	1	23.00 - 23.00
Amm	0.5	0.1	4	0.4 - 0.6	0.3	0.1	4	0.2 - 0.4	1.0	NA	1	1.0 - 1.0
TOC	5.6	0.2	4	5.4 - 5.9	0.6	0.3	3	0.3 - 0.7	18.0	NA	1	18.0 - 18.0
UV254	0.228	0.0	4	0.200 - 0.260	0.010	0.0	4	0.005 - 0.016	0.660	NA	1	0.660 - 0.660
SUVA	4.11	0.51	4	3.64 - 4.81	1.70	0.45	4	1.29 - 2.29	3.67	NA	1	3.67 - 3.67
Bromide	343	132	3	200 - 460	81	34	3	56 - 120				
TOX	NA	NA	0	0 - 0	59	35	3	36 - 100				
CHCl3	NA	NA	0	NA	3.4	0.6	3	3.0 - 4.1	Mass Balance Closure Errors (%)			
BDCM	NA	NA	0	NA	4.5	2.8	3	1.9 - 7.4				
DBCM	NA	NA	0	NA	5.9	3.0	3	2.8 - 8.7	WQP	Count	Avg	SD/RD
CHBr3	NA	NA	0	NA	0.5	0.9	3	0.0 - 1.6	Alk	1	-199	n/a
THM4	NA	NA	0	NA	14.3	6.3	3	7.7 - 20.2	TDS	1	18	n/a
MCAA	NA	NA	0	NA	0.0	0.0	3	0.0 - 0.0	TotHard	1	-29	n/a
DCAA	NA	NA	0	NA	0.4	0.6	3	0.0 - 1.1	CaHard	1	-29	n/a
TCAA	NA	NA	0	NA	0.0	0.0	3	0.0 - 0.0	Turb	0	n/a	n/a
MBAA	NA	NA	0	NA	0.0	0.0	3	0.0 - 0.0	Amm	1	-31	n/a
DBAA	NA	NA	0	NA	0.3	0.6	3	0.0 - 1.0	TOC	1	-19	n/a
BCAA	NA	NA	0	NA	0.4	0.7	3	0.0 - 1.2	UV254	1	-35	n/a
TBAA	NA	NA	0	NA	NA	NA	0	NA	TDS _t	65	1	12
CDBAA	NA	NA	0	NA	NA	NA	0	NA	Comments:			
DCBAA	NA	NA	0	NA	NA	NA	0	NA				
HAA5	NA	NA	0	NA	0.7	1.2	3	0.0 - 2.1				
HAA6	NA	NA	0	NA	1.1	1.9	3	0.0 - 3.3				
HAA9	NA	NA	0	NA	NA	NA	0	NA				

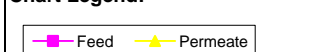
SDS Conditions

WQP	Avg	SD	Count	Min - Max
Res (0)	1.20	0.10	3	1.10 - 1.30
Temp (°C)	20.0	0.0	3	20.0 - 20.0
pH (unit)	8.0	0.1	3	7.9 - 8.0
Time (hr)	83.0	0.0	3	83.0 - 83.0

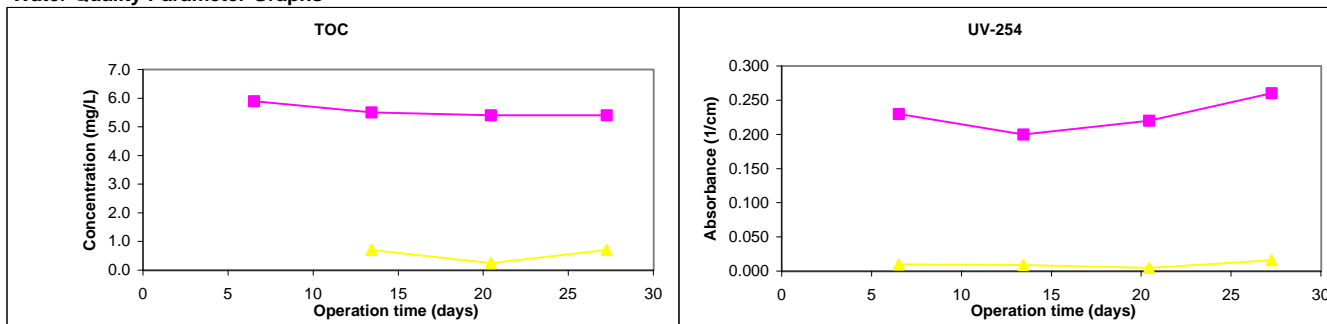
Pretreatment Information

Process	Description	Scale
Hydrochloric acid addition	pH = 6.7	Pilot-scale

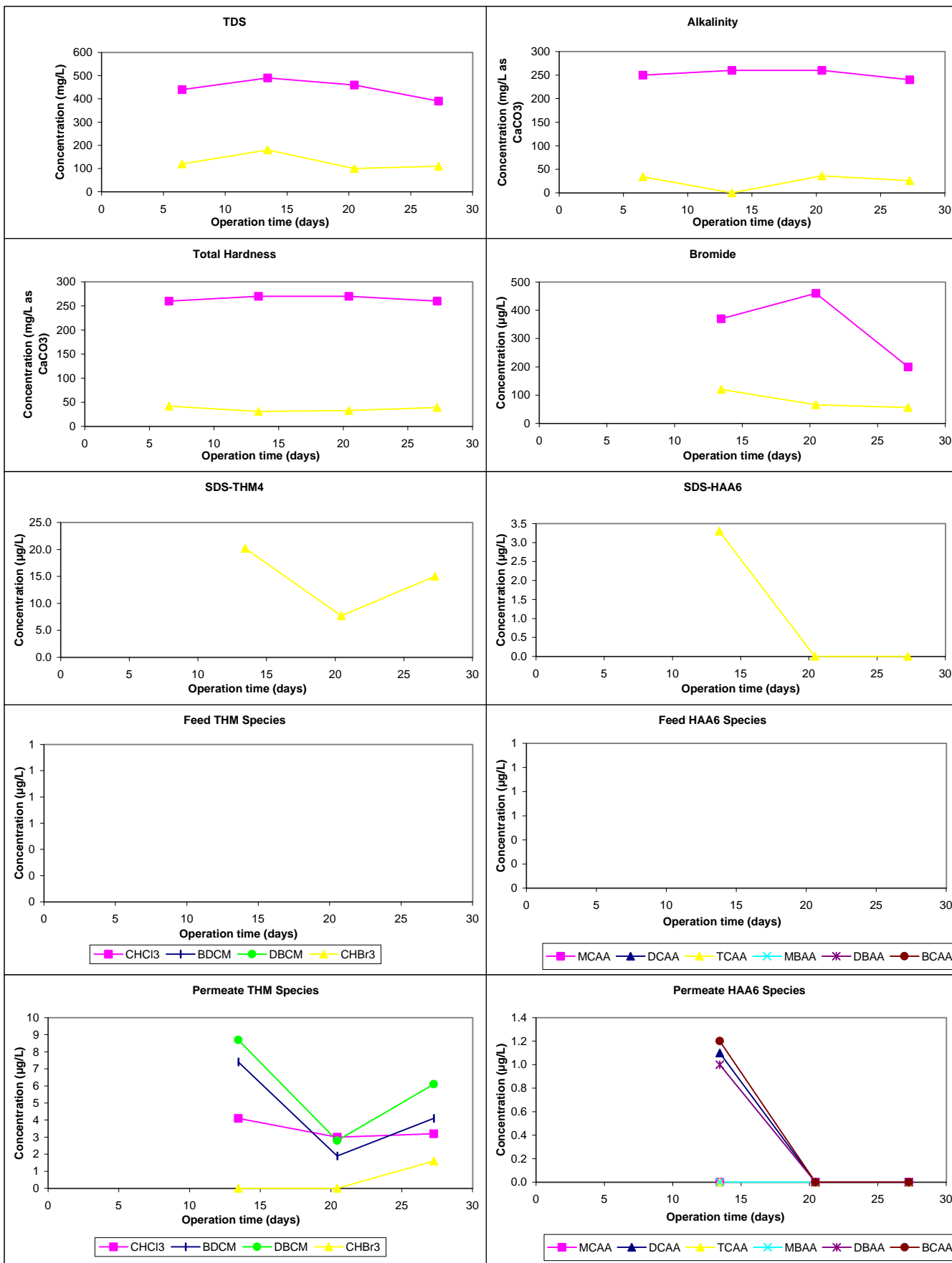
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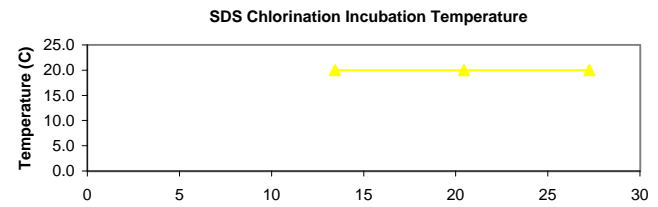
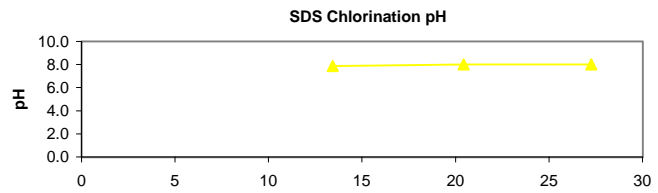
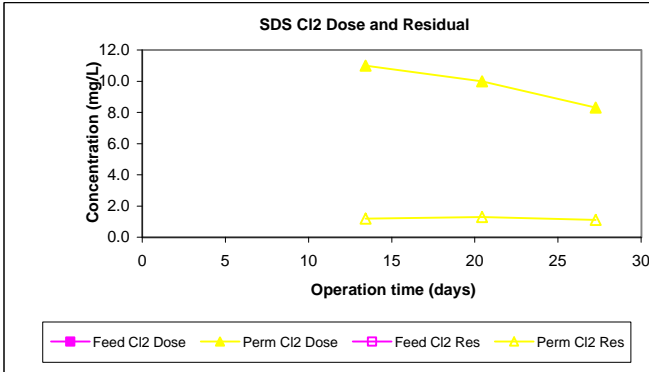
Water Quality Parameter Graphs



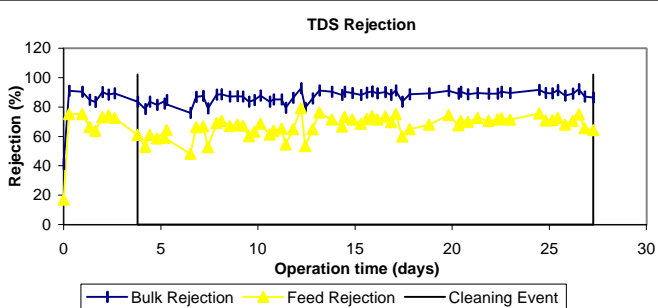
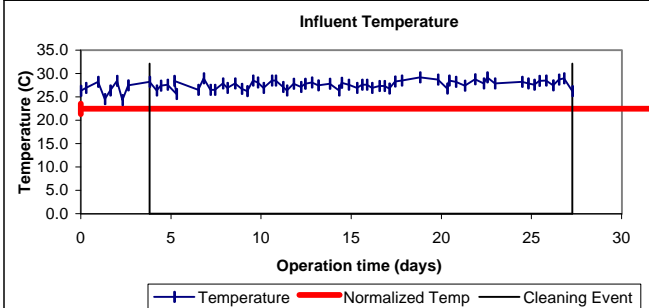
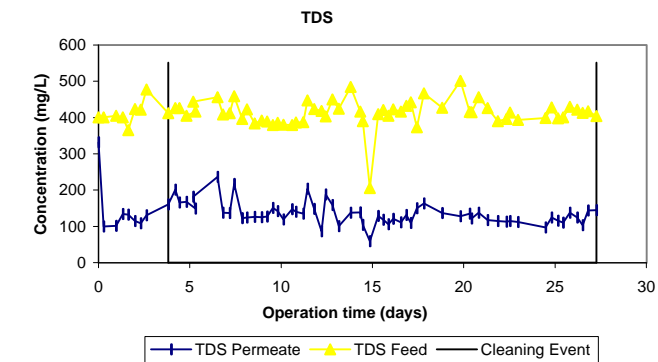
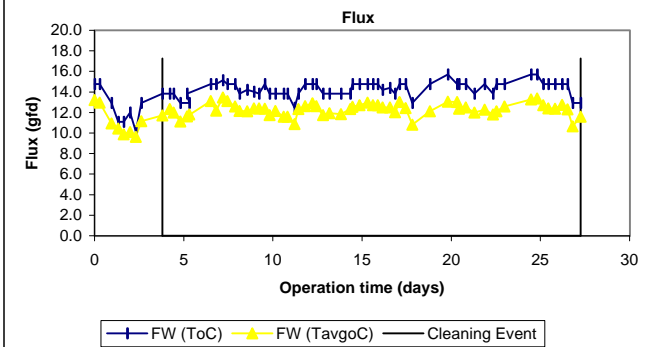
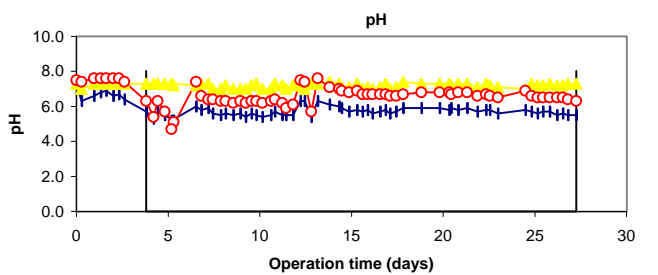
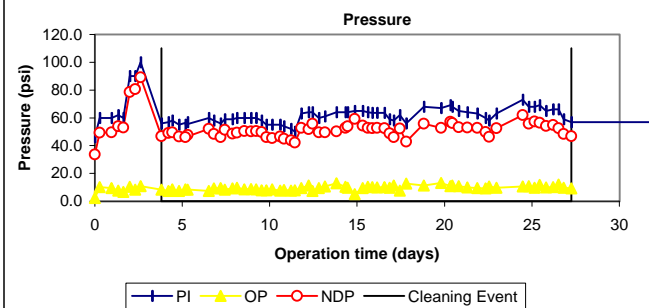
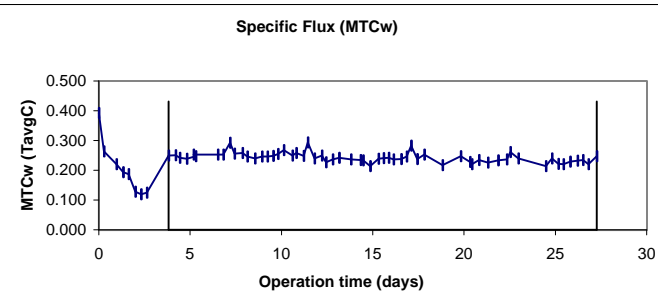
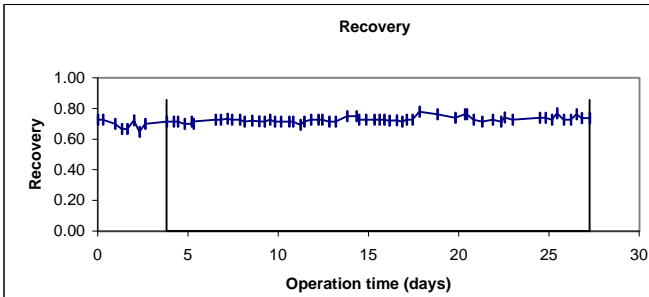
Water Quality Parameter Graphs (Continued)



Water Quality Parameter Graphs (Continued)



Productivity Graphs



ICR Information

ID / ICR#: FL5360313 / 1093
 ICR Contact: Julie O'Neal, P.E.
 Phone No.: (561) 840-0853
 Period: 7/27/98 - 9/2/98 (37 days)

Membrane Information

Manufacturer: Fluid Systems Mfr. MTC_w: 0.270 (gfd/psi)
 Trade Name: Spiral-Wound Reverse Osmosis Element Mfr. Temp: 25.0 °C
 Membrane Model: TFCS 4921S Max Flow: 10.0 gpm
 MWCO: 200 Daltons Min Flow: 4.0 gpm
 Element Size: 4" x 40" Total Width: 12.7 ft
 Element Area: 78.0 ft² Feed Sp Thickness: 0.0027 ft
 Design Flux: 20.5 gfd 840 Element Area: 330.0 ft²
 Mfr. NDP: 75.0 psi 840 Purchase Price: \$790

Design Parameters

Norm Temp: 22.5 °C Recycle Ratio: 4.08
 Temp Norm MTC-w: 0.251 TavGC Manuf rep Rej_{TDS}: 80%
 Design Recovery: 0.75 TDS_F: 440.0 mg/L
 Design Flux: 15.0 gfd

Water Quality Summary

	Mean	SD	Feed Count	Min/Max	Mean	SD	Permeate Count	Min/Max	Mean	SD	Concentrate Count	Min/Max
pH	6.2	0.2	3	5.9 - 6.3	5.9	0.1	3	5.8 - 6.0	NA	NA	0	0.0 - 0.0
Temp	28.2	0.6	4	27.8 - 29.0	28.2	0.6	4	27.8 - 29.0	NA	NA	0	0.0 - 0.0
Alk	139	6	4	130 - 145	36	5	4	32 - 43	NA	NA	0	0 - 0
TDS	579	36	4	530 - 610	107	11	4	97 - 120	NA	NA	0	0 - 0
TotHard	279	10	4	270 - 290	37	4	4	32 - 41	NA	NA	0	0 - 0
CaHard	219	6	4	210 - 225	30	3	4	28 - 34	NA	NA	0	0 - 0
Turb	1.46	1.12	4	0.33 - 3.00	0.03	0.05	4	0.00 - 0.10	NA	NA	0	0.00 - 0.00
Amm	0.4	0.1	4	0.3 - 0.6	0.4	0.1	4	0.2 - 0.5	NA	NA	0	0.0 - 0.0
TOC	6.1	0.3	4	5.7 - 6.4	0.3	0.0	4	0.3 - 0.3	NA	NA	0	0.0 - 0.0
UV254	0.247	0.0	3	0.230 - 0.270	0.011	0.0	3	0.009 - 0.012	NA	NA	0	0.000 - 0.000
SUVA	NA	NA	3	NA	NA	NA	3	NA	NA	NA	0	NA
Bromide	339	84	4	240 - 420	61	37	4	10 - 97				
TOX	NA	NA	0	0 - 0	95	76	3	40 - 182				
CHCl3	NA	NA	0	NA	12.7	11.1	3	6.2 - 25.5	Mass Balance			
BDCM	NA	NA	0	NA	5.0	3.9	3	2.6 - 9.5	Closure Errors (%)			
DBCM	NA	NA	0	NA	4.9	4.4	3	0.0 - 8.6	WQP	Count	Avg	SD/RD
CHBr3	NA	NA	0	NA	1.0	1.7	3	0.0 - 3.0	Alk	0	n/a	n/a
THM4	NA	NA	0	NA	23.6	5.3	3	17.9 - 28.4	TDS	0	n/a	n/a
MCAA	NA	NA	0	NA	0.0	0.0	3	0.0 - 0.0	TotHard	0	n/a	n/a
DCAA	NA	NA	0	NA	5.7	5.2	3	0.0 - 10.1	CaHard	0	n/a	n/a
TCAA	NA	NA	0	NA	2.8	2.5	3	0.0 - 4.6	Turb	0	n/a	n/a
MBAA	NA	NA	0	NA	0.0	0.0	3	0.0 - 0.0	Amm	0	n/a	n/a
DBAA	NA	NA	0	NA	0.5	0.8	3	0.0 - 1.5	TOC	0	n/a	n/a
BCAA	NA	NA	0	NA	3.3	3.0	3	0.0 - 6.0	UV254	0	n/a	n/a
TBAA	NA	NA	0	NA	NA	NA	0	NA	Comments:			
CDBAA	NA	NA	0	NA	NA	NA	0	NA				
DCBAA	NA	NA	0	NA	NA	NA	0	NA	TDS	78	-7	13
HAA5	NA	NA	0	NA	9.0	8.0	3	0.0 - 15.4				
HAA6	NA	NA	0	NA	12.3	10.7	3	0.0 - 19.3				
HAA9	NA	NA	0	NA	NA	NA	0	NA				

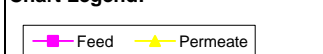
SDS Conditions

WQP	Avg	SD	Count	Min - Max
Res (0)	1.10	0.40	3	0.64 - 1.40
Temp (°C)	20.0	0.0	3	20.0 - 20.0
pH (unit)	7.9	0.0	3	7.9 - 7.9
Time (hr)	83.0	0.0	3	83.0 - 83.0

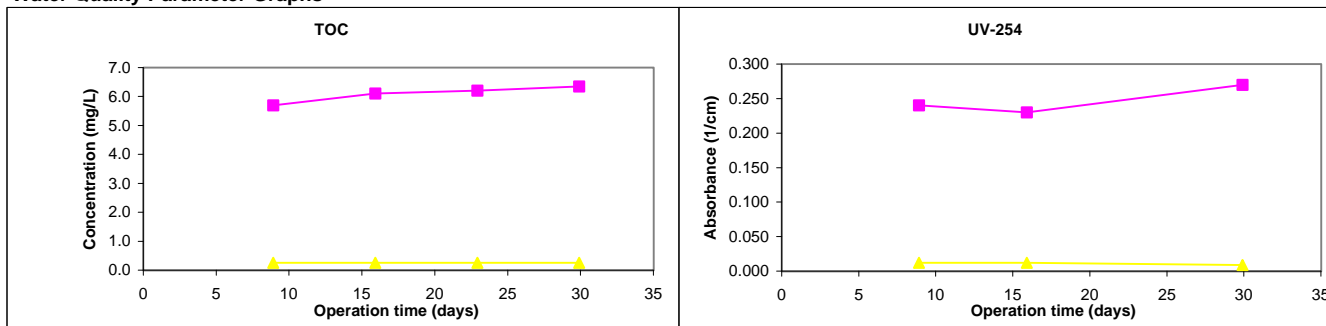
Pretreatment Information

Process	Description	Scale
Hydrochloric acid addition	pH = 6.7	Pilot-scale

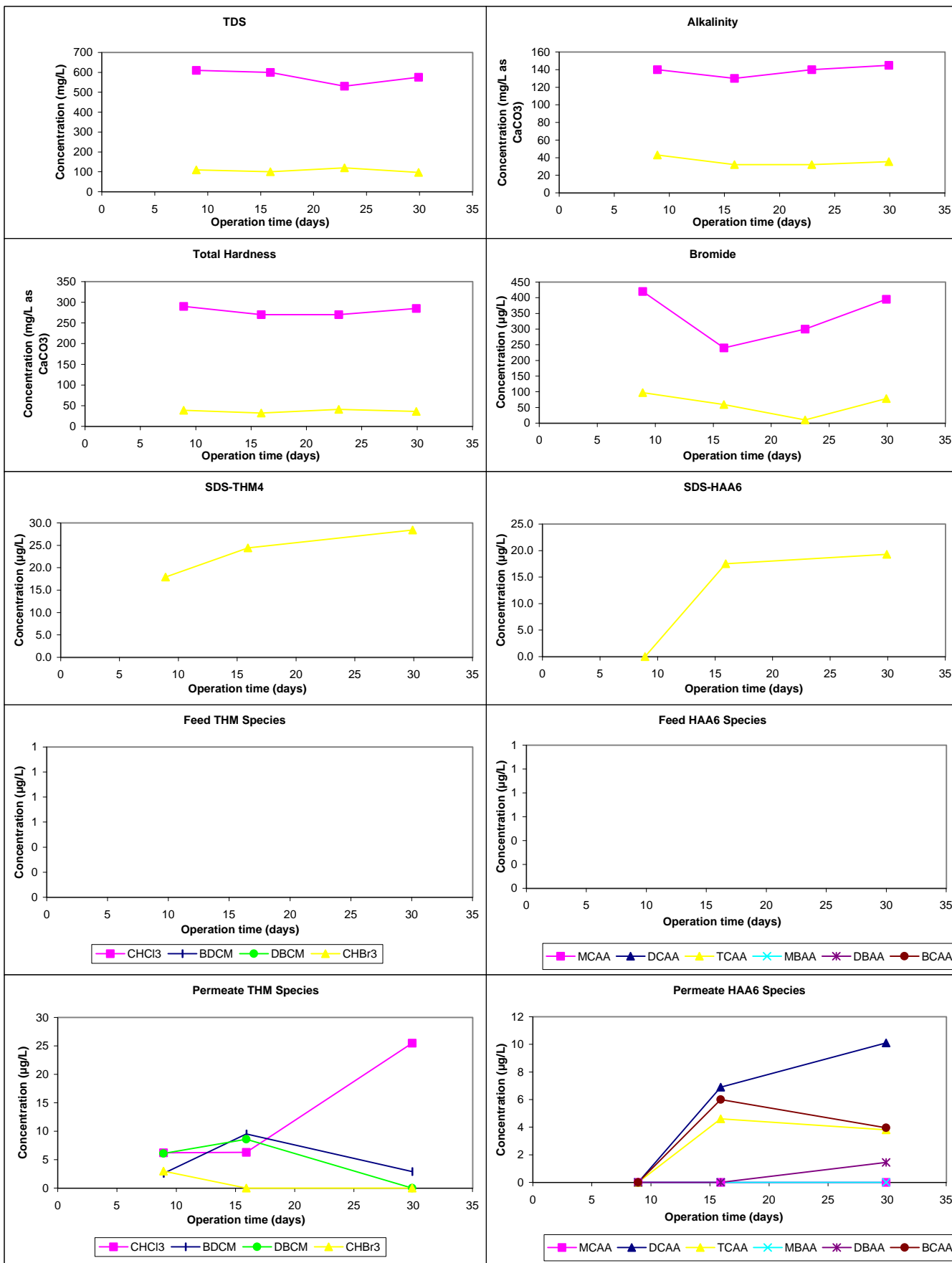
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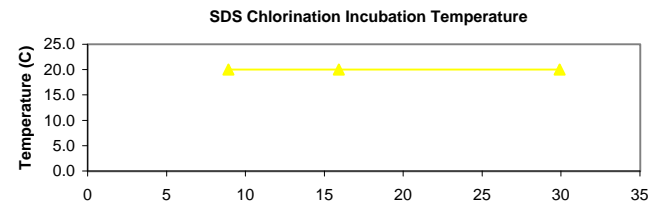
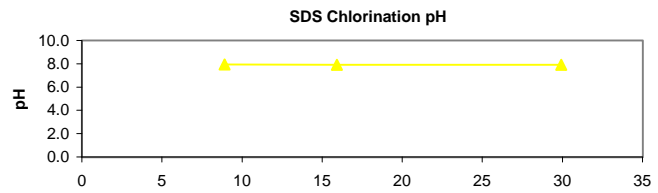
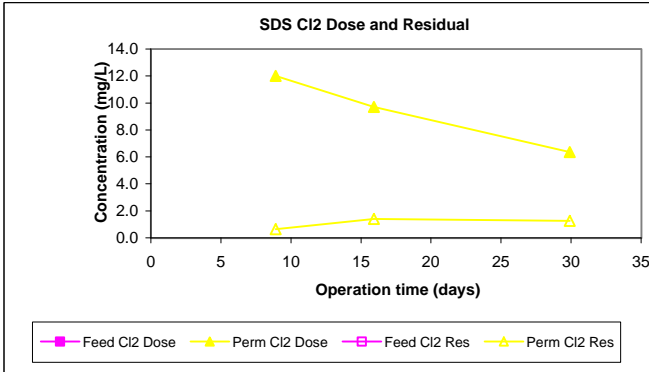
Water Quality Parameter Graphs



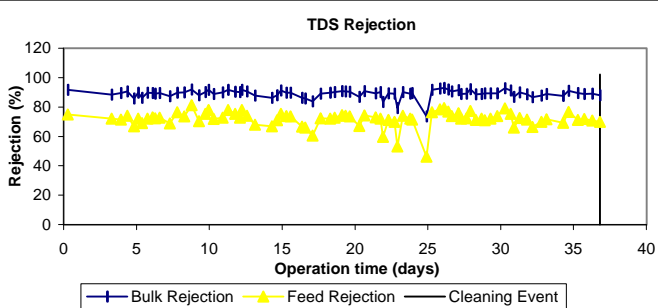
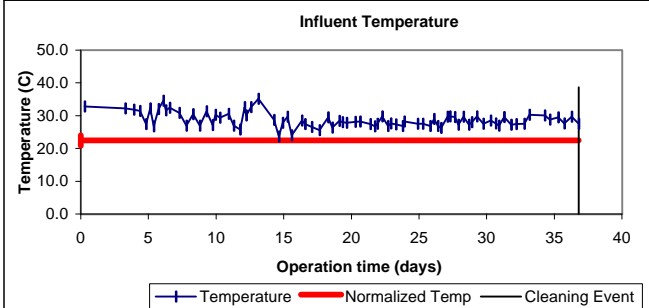
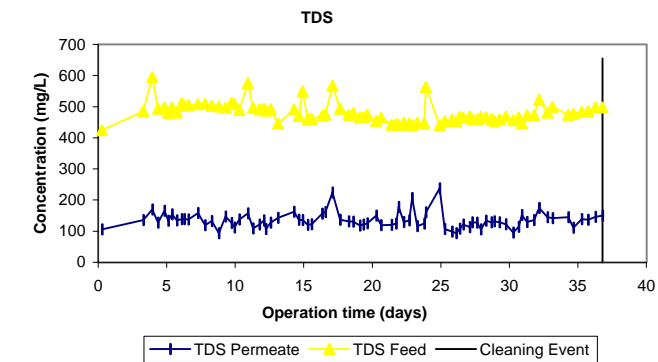
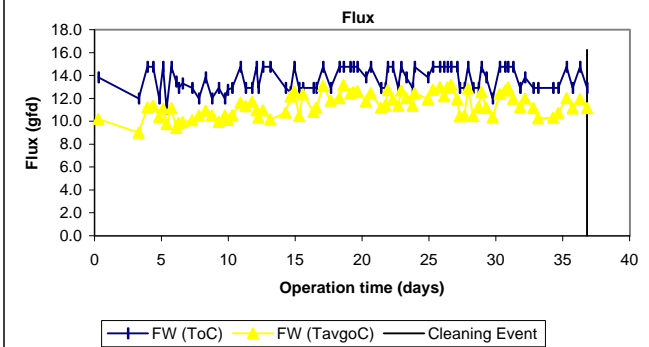
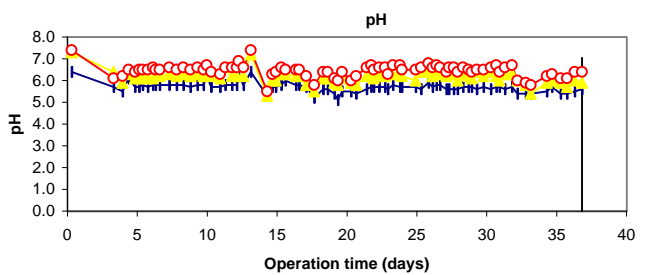
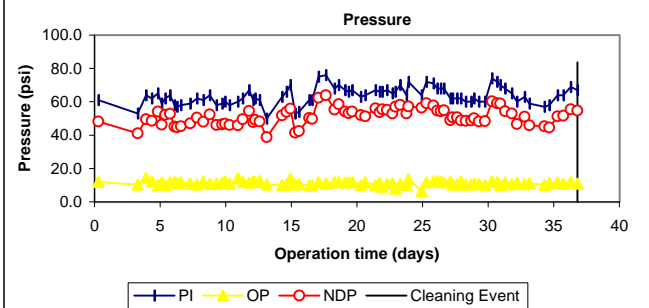
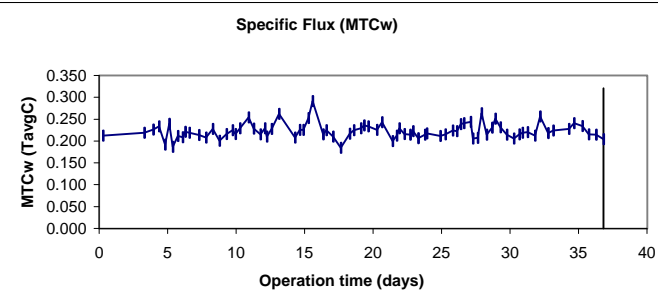
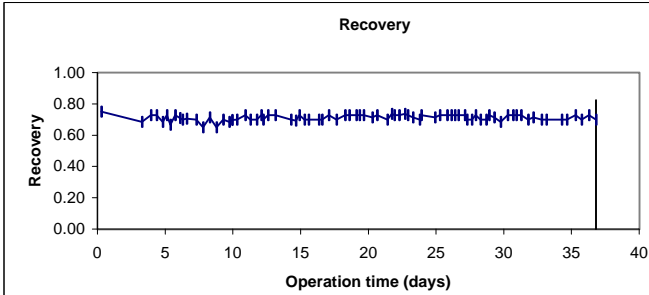
Water Quality Parameter Graphs (Continued)



Water Quality Parameter Graphs (Continued)



Productivity Graphs



ICR Information

ID / ICR#: FL5360313 / 1093
 ICR Contact: Julie O'Neal, P.E.
 Phone No.: (561) 840-0853
 Period: 12/17/98 - 1/12/99 (26 days)

Membrane Information

Manufacturer: Fluid Systems Mfr. MTC_w: 0.270 (gfd/psi)
 Trade Name: Spiral-Wound Reverse Osmosis Element Mfr. Temp: 25.0 °C
 Membrane Model: TFCS 4921S Max Flow: 10.0 gpm
 MWCO: 200 Daltons Min Flow: 4.0 gpm
 Element Size: 4" x 40" Total Width: 12.7 ft
 Element Area: 78.0 ft² Feed Sp Thickness: 0.0027 ft
 Design Flux: 20.5 gfd 840 Element Area: 330.0 ft²
 Mfr. NDP: 75.0 psi 840 Purchase Price: \$790

Design Parameters

Norm Temp: 22.5 °C Recycle Ratio: 4.08
 Temp Norm MTC-w: 0.251 TavGC Manuf rep Rej_{TDS}: 80%
 Design Recovery: 0.75 TDS_F: 440.0 mg/L
 Design Flux: 15.0 gfd

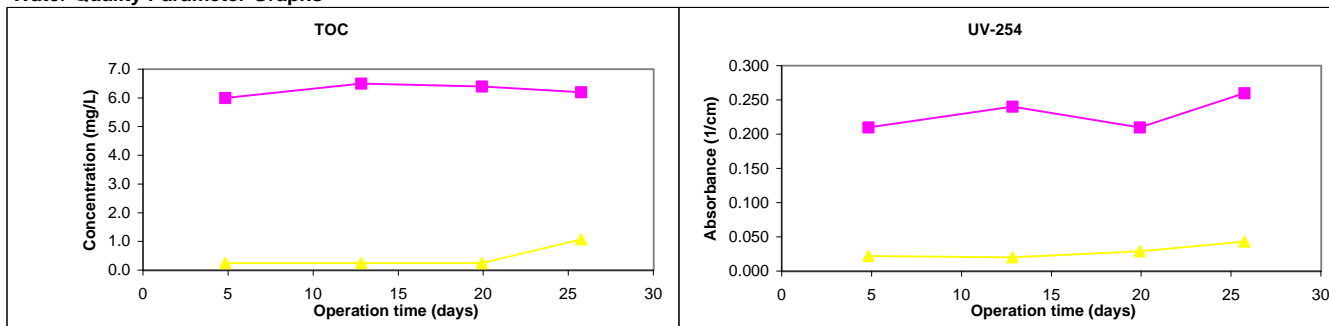
Water Quality Summary

	Mean	SD	Feed Count	Min/Max	Mean	SD	Permeate Count	Min/Max	Mean	SD	Concentrate Count	Min/Max
pH	6.9	0.2	4	6.6 - 7.0	6.4	0.2	4	6.2 - 6.6	7.2	0.2	4	7.0 - 7.3
Temp	26.0	1.4	4	24.0 - 27.0	26.0	1.4	4	24.0 - 27.0	26.0	1.4	4	24.0 - 27.0
Alk	209	12	4	200 - 225	52	3	4	47 - 54	535	54	4	460 - 580
TDS	459	38	4	410 - 500	104	11	4	97 - 120	1225	50	4	1200 - 1300
TotHard	290	0	4	290 - 290	44	3	4	40 - 48	818	59	4	770 - 900
CaHard	226	5	4	220 - 230	34	2	4	32 - 37	653	46	4	620 - 720
Turb	16.40	10.90	4	1.60 - 26.00	0.00	0.00	4	0.00 - 0.00	6.02	9.99	4	0.48 - 21.00
Amm	0.5	0.1	4	0.4 - 0.5	0.2	0.0	4	0.2 - 0.3	0.9	0.2	4	0.8 - 1.1
TOC	6.3	0.2	4	6.0 - 6.5	0.5	0.4	4	0.3 - 1.1	16.8	0.5	4	16.0 - 17.0
UV254	0.230	0.0	4	0.210 - 0.260	0.029	0.0	4	0.020 - 0.043	0.618	0.0	4	0.570 - 0.660
SUVA	3.67	0.39	4	3.28 - 4.19	8.10	3.14	4	4.00 - 11.60	3.68	0.17	4	3.53 - 3.88
Bromide	241	18	4	220 - 260	75	8	4	64 - 82				
TOX	730	194	4	625 - 1020	73	33	4	38 - 105				
CHCl3	136.3	20.6	4	110.0 - 160.0	8.4	5.7	4	3.6 - 16.5	Mass Balance			
BDCM	69.8	7.8	4	61.0 - 80.0	9.7	4.6	4	5.4 - 15.0	Closure Errors (%)			
DBCM	25.6	6.3	4	19.5 - 32.0	11.0	3.8	4	7.1 - 14.5	WQP	Count	Avg	SD/RD
CHBr3	1.1	1.3	4	0.0 - 2.4	2.7	3.0	4	0.0 - 7.0	Alk	4	18	47
THM4	232.7	15.3	4	217.5 - 249.0	31.7	16.5	4	17.5 - 53.0	TDS	4	19	49
MCAA	1.0	1.9	4	0.0 - 3.8	0.0	0.0	4	0.0 - 0.0	TotHard	4	17	52
DCAA	41.5	34.4	4	5.9 - 80.0	1.8	0.4	3	1.3 - 2.1	CaHard	4	17	52
TCAA	38.5	39.2	4	7.0 - 90.0	1.8	0.2	3	1.6 - 2.0	Turb	0	n/a	n/a
MBAA	0.0	0.0	4	0.0 - 0.0	0.0	0.0	4	0.0 - 0.0	Amm	4	12	41
DBAA	6.6	5.8	4	0.0 - 13.0	4.4	5.1	4	0.0 - 9.1	TOC	1	5	n/a
BCAA	17.0	10.4	4	3.0 - 28.0	4.8	4.9	4	0.0 - 11.5	UV254	4	13	55
TBAA	NA	NA	0	NA	NA	NA	0	NA	TDS _t	78	-9	11
CDBAA	NA	NA	0	NA	NA	NA	0	NA	Comments:			
DCBAA	NA	NA	0	NA	NA	NA	0	NA				
HAA5	87.5	73.8	4	12.9 - 179.4	6.4	5.1	3	3.3 - 12.3				
HAA6	104.5	83.3	4	15.9 - 207.4	8.9	7.1	3	3.3 - 16.9				
HAA9	NA	NA	0	NA	NA	NA	0	NA				
SDS Conditions				Pretreatment Information								
WQP	Avg	SD	Count	Min - Max	Process	Description	Scale					
Res (0)	1.05	0.29	8	0.66 - 1.40	Hydrochloric acid addition	pH = 6.7	Pilot-scale					
Temp (°C)	20.0	0.0	8	20.0 - 20.0								
pH (unit)	8.1	0.1	8	8.0 - 8.2								
Time (hr)	83.0	0.0	8	83.0 - 83.0								

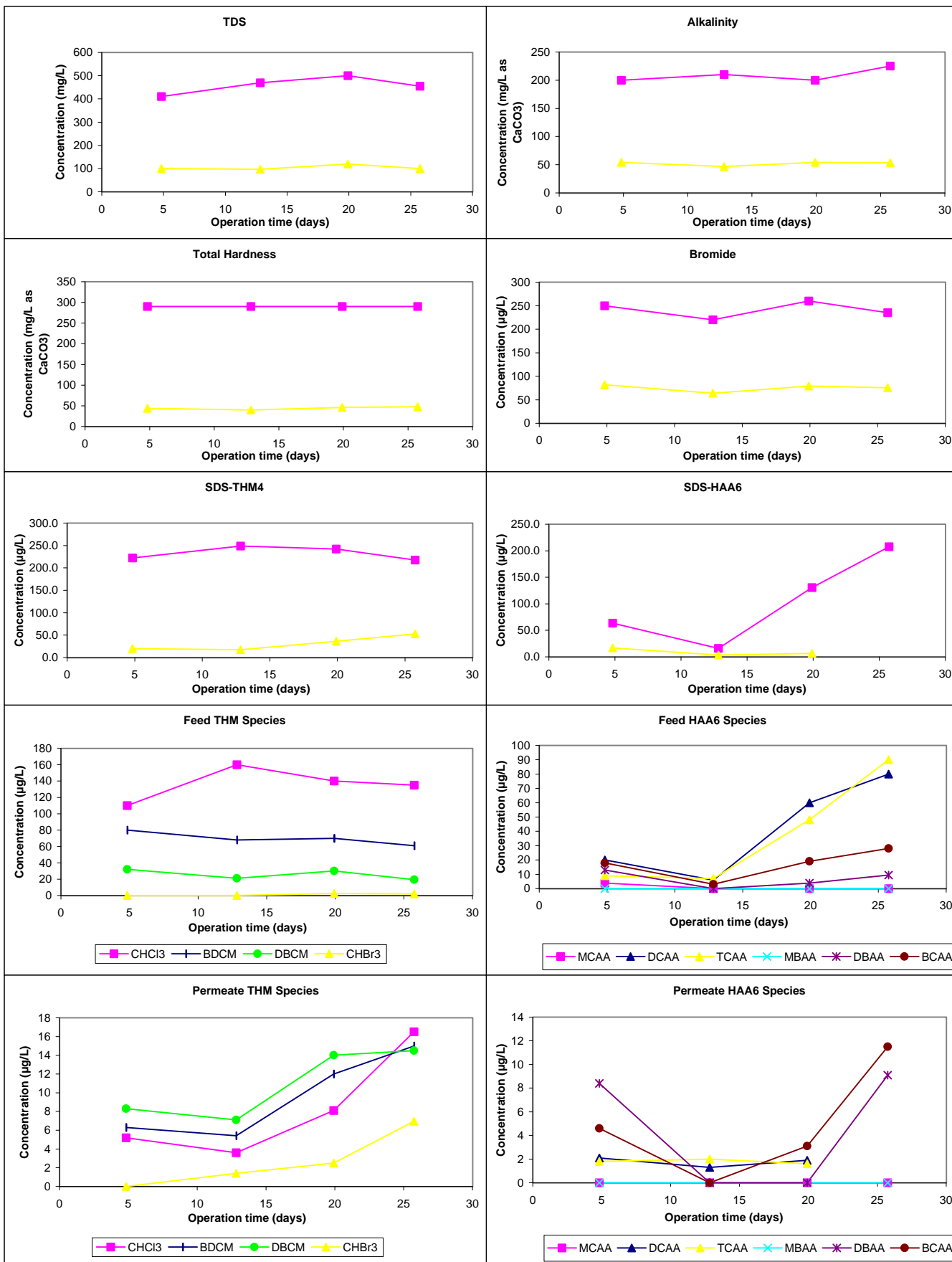
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— Feed — Permeate

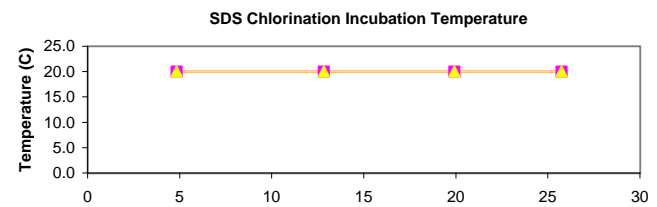
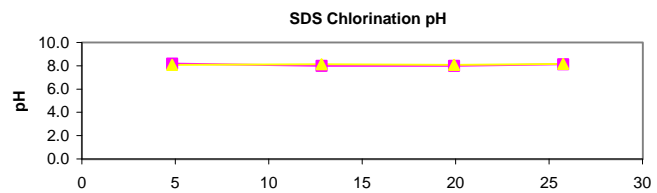
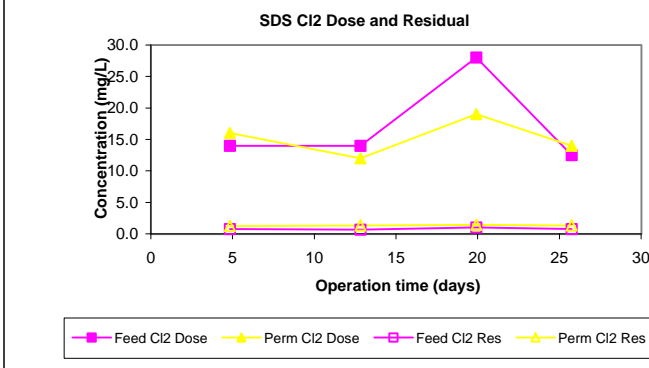
Water Quality Parameter Graphs



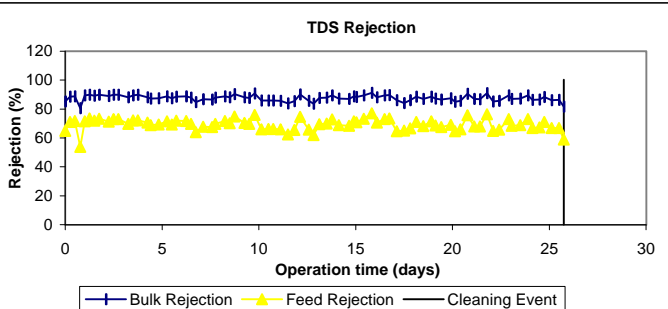
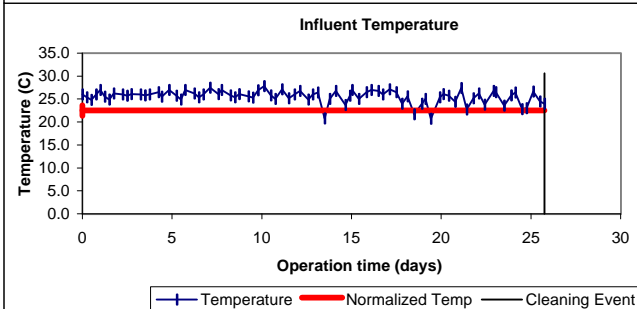
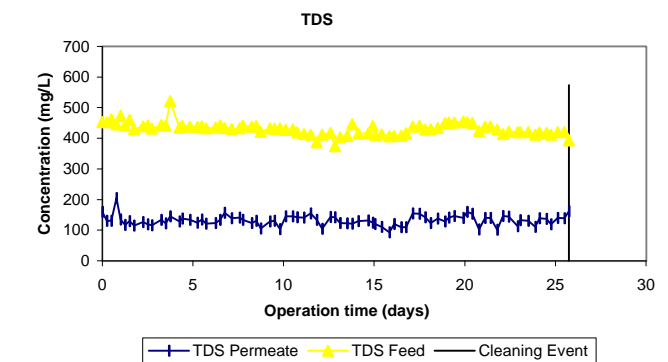
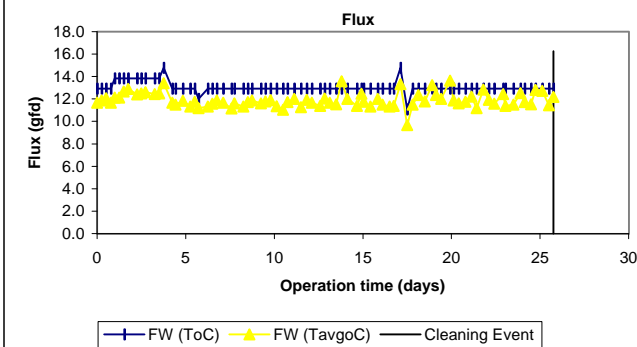
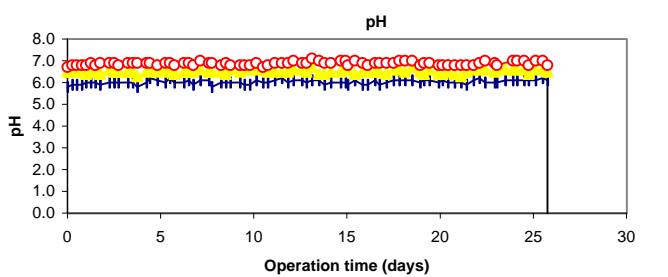
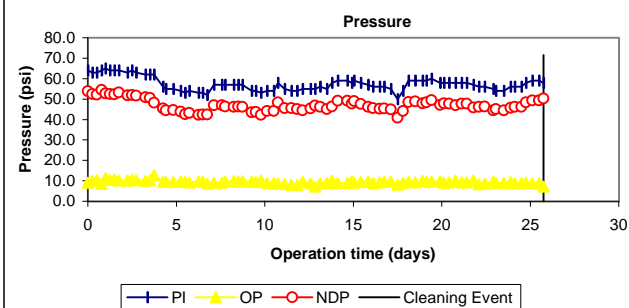
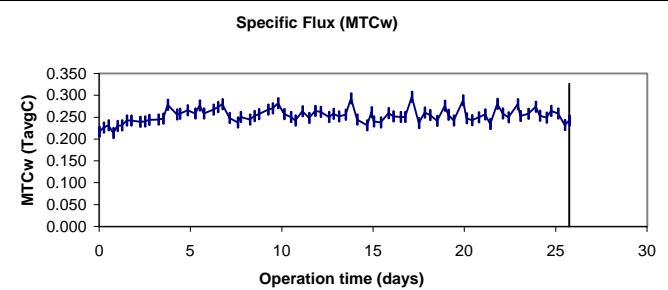
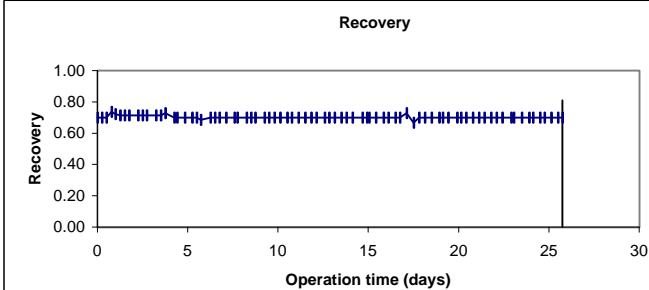
Water Quality Parameter Graphs (Continued)



Water Quality Parameter Graphs (Continued)



Productivity Graphs



ICR Information

ID / ICR#: FL5360313 / 1093
 ICR Contact: Julie O'Neal, P.E.
 Phone No.: (561) 840-0853
 Period: 2/9/99 - 3/8/99 (27 days)

Membrane Information

Manufacturer: Fluid Systems Mfr. MTC_w: 0.270 (gfd/psi)
 Trade Name: Spiral-Wound Reverse Osmosis Element Mfr. Temp: 25.0 °C
 Membrane Model: TFCS 4921S Max Flow: 10.0 gpm
 MWCO: 200 Daltons Min Flow: 4.0 gpm
 Element Size: 4" x 40" Total Width: 12.7 ft
 Element Area: 78.0 ft² Feed Sp Thickness: 0.0027 ft
 Design Flux: 20.5 gfd 840 Element Area: 330.0 ft²
 Mfr. NDP: 75.0 psi 840 Purchase Price: \$790

Design Parameters

Norm Temp: 22.5 °C Recycle Ratio: 4.08
 Temp Norm MTC-w: 0.251 TavGC Manuf rep Rej_{TDS}: 80%
 Design Recovery: 0.75 TDS_F: 440.0 mg/L
 Design Flux: 15.0 gfd

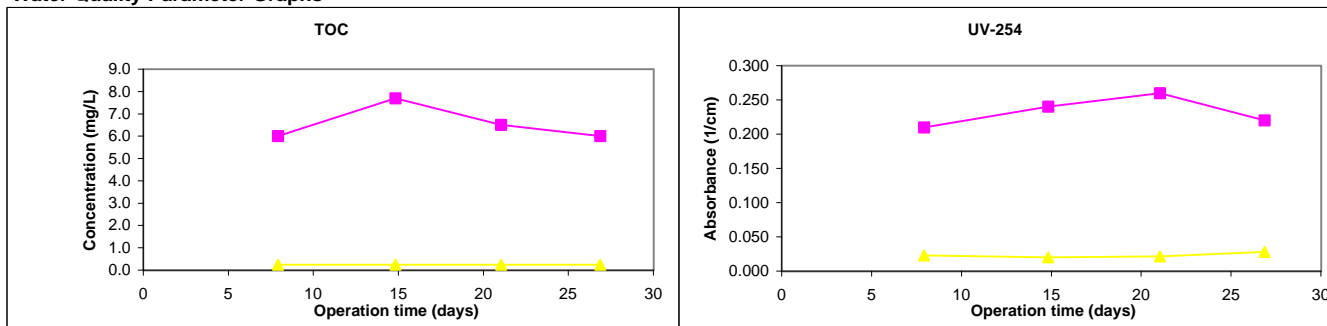
Water Quality Summary

	Feed				Permeate				Concentrate				
	Mean	SD	Count	Min/Max	Mean	SD	Count	Min/Max	Mean	SD	Count	Min/Max	
pH	6.8	0.1	4	6.6 - 6.9	6.5	0.1	4	6.4 - 6.5	7.2	0.1	4	7.0 - 7.3	
Temp	25.3	2.2	4	22.0 - 27.0	25.3	2.2	4	22.0 - 27.0	25.3	2.2	4	22.0 - 27.0	
Alk	195	6	4	190 - 200	78	26	4	58 - 115	480	29	4	450 - 510	
TDS	499	27	4	460 - 520	139	9	4	130 - 150	1200	0	4	1200 - 1200	
TotHard	273	5	4	270 - 280	59	2	4	57 - 62	683	41	4	630 - 720	
CaHard	208	5	4	200 - 210	46	2	4	45 - 48	535	31	4	500 - 570	
Turb	13.08	7.66	4	6.30 - 24.00	0.08	0.16	4	0.00 - 0.31	1.98	1.57	4	0.35 - 3.60	
Amm	0.5	0.1	4	0.4 - 0.6	0.3	0.0	4	0.3 - 0.3	0.9	0.1	4	0.8 - 1.0	
TOC	6.6	0.8	4	6.0 - 7.7	0.3	0.0	4	0.3 - 0.3	16.3	1.3	4	15.0 - 18.0	
UV254	0.233	0.0	4	0.210 - 0.260	0.023	0.0	4	0.020 - 0.028	0.568	0.0	4	0.550 - 0.600	
SUVA	3.57	0.37	4	3.12 - 4.00	9.25	1.39	4	8.00 - 11.20	3.50	0.14	4	3.33 - 3.67	
Bromide	224	5	4	220 - 230	88	2	4	85 - 90					
TOX	555	80	3	469 - 628	61	8	3	52 - 67					
CHCl3	73.3	7.5	3	69.0 - 82.0	4.5	1.2	3	3.2 - 5.6	Mass Balance				
BDCM	48.8	3.3	3	45.5 - 52.0	6.2	1.6	3	4.4 - 7.3	Closure Errors (%)				
DBCM	19.0	1.0	3	18.0 - 20.0	10.3	2.3	3	8.8 - 13.0	WQP	Count	Avg	SD/RD	
CHBr3	0.0	0.0	4	0.0 - 0.0	4.9	2.2	3	2.4 - 6.3	Alk	4	0	5	
THM4	141.2	11.2	3	133.5 - 154.0	26.0	4.5	3	23.1 - 31.2	TDS	4	-14	10	
MCAA	0.0	0.0	4	0.0 - 0.0	0.0	0.0	3	0.0 - 0.0	TotHard	4	-13	6	
DCAA	32.0	18.5	4	10.0 - 55.0	1.5	1.5	3	0.0 - 3.0	CaHard	4	-9	6	
TCAA	30.6	18.2	4	8.2 - 52.0	1.2	2.1	3	0.0 - 3.7	Turb	1	-806	n/a	
MBAA	0.0	0.0	4	0.0 - 0.0	0.0	0.0	3	0.0 - 0.0	Amm	4	-11	10	
DBAA	4.7	1.6	4	2.7 - 6.6	3.3	0.4	3	2.8 - 3.6	TOC	0	n/a	n/a	
BCAA	14.0	7.0	4	4.9 - 22.0	2.5	1.0	3	1.5 - 3.5	UV254	4	-27	15	
TBAA	NA	NA	0	NA	NA	NA	0	NA	TDS _t	80	-12	17	
CDBAA	NA	NA	0	NA	NA	NA	0	NA	Comments:				
DCBAA	NA	NA	0	NA	NA	NA	0	NA					
HAA5	67.3	37.9	4	20.9 - 113.6	6.0	3.7	3	2.8 - 10.1					
HAA6	81.2	44.8	4	25.8 - 135.6	8.5	4.7	3	4.3 - 13.6					
HAA9	NA	NA	0	NA	NA	NA	0	NA					
SDS Conditions					Pretreatment Information								
WQP	Avg	SD	Count	Min - Max	Process	Description						Scale	
Res (0)	0.73	0.06	8	0.65 - 0.85	Hydrochloric acid addition pH = 6.7								Pilot-scale
Temp (°C)	20.0	0.0	8	20.0 - 20.0									
pH (unit)	8.1	0.1	8	7.9 - 8.2									
Time (hr)	83.0	0.0	8	83.0 - 83.0									
Chart Legend:													
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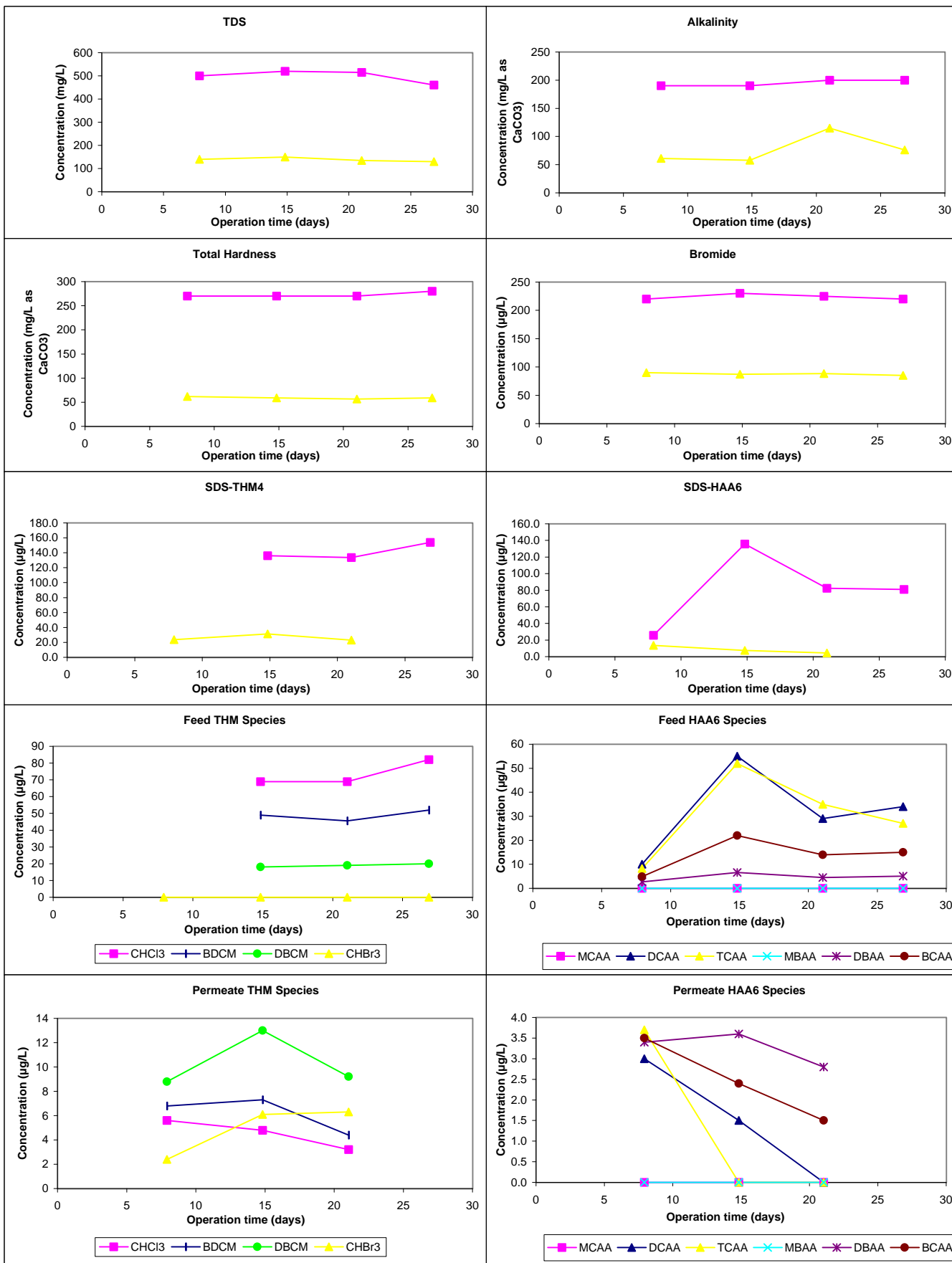
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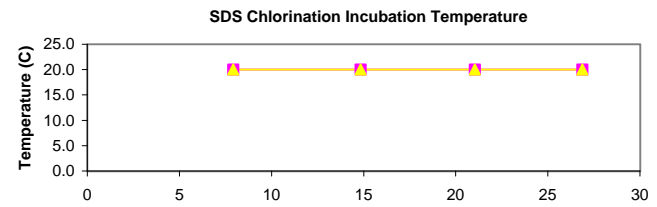
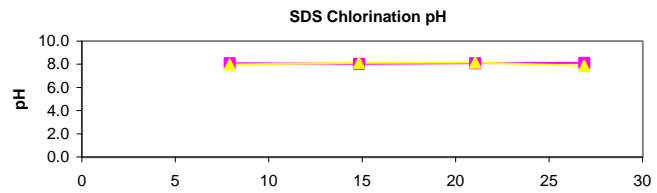
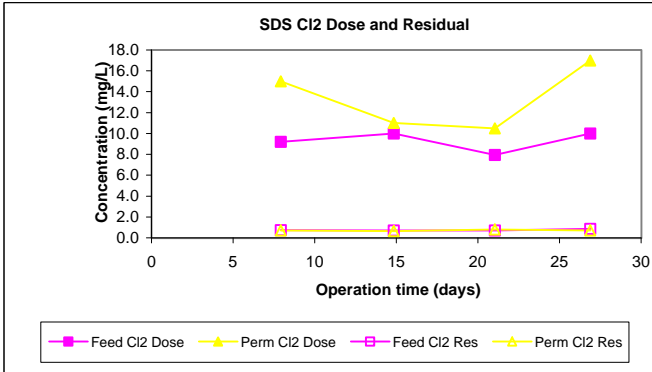
Water Quality Parameter Graphs



Water Quality Parameter Graphs (Continued)



Water Quality Parameter Graphs (Continued)



Productivity Graphs

