APPENDIX H

Water Quality Data from City of Duvall Membrane Pilot Plant

Table I-1. Summary of City of Duvall Membrane Pilot Plant Effluent Quality

	Units	Concentration Average	Concentration Maximum	Federal Drinking Water Standard	Primary/ Secondary P/S
Conventionals					
Chloride	mg/L	18	23	250	S
Nitrate as N	mg/L	6.3	12.5	10	P
Nitrate+Nitrite	mg/L	5.6	12.5	10	P
Nitrite as N	mg/L	0.016	0.016	1.0	P
Sulfate	mg/L	13	17	250	S
Total Dissolved Solids	mg/L	171	236	500	S
Metals					
Aluminum	mg/L	0.046	0.056	0.05/0.2	S
Antimony	mg/L	<0.003	<0.003	0.006	P
Arsenic	mg/L	<0.01	0.014	0.01/0.05	P
Barium	mg/L	0.003	0.007	2.0	P
Beryllium	mg/L	<0.002	<0.002	0.004	P
Cadmium	mg/L	<0.005	<0.005	0.005	P
Chromium	mg/L	<0.01	0.012	0.1	P
Copper	mg/L	0.018	0.061	1.0	S
Fluoride	mg/L	0.43	0.62	2.0	P/S
Iron	mg/L	<0.1	<0.1	0.3	S
Lead	mg/L	<0.0005	<0.0005	0.05	P
Manganese	mg/L	0.070	0.12	0.05	S
Mercury	mg/L	<0.0002	<0.0002	0.002	P
Nickel	mg/L	0.001	0.002	0.1	P
Selenium	mg/L	<0.003	<0.003	0.05	P
Silver	mg/L	<0.0005	<0.0005	0.1	S
Thallium	mg/L	<0.0005	<0.0005	0.002	P
Zinc	mg/L	0.042	0.097	5.0	S
Organic Compounds					
Aroclor 1016	ug/L	<0.08	<0.08	0.5	P
Aroclor 1221	ug/L	<0.16	<0.16	0.5	P
Aroclor 1232	ug/L	<0.08	<0.08	0.5	P
Aroclor 1242	ug/L	<0.16	<0.16	0.5	P
Aroclor 1248	ug/L	<0.08	<0.08	0.5	P
Aroclor 1254	ug/L	<0.16	<0.16	0.5	P
Aroclor 1260	ug/L	<0.08	<0.08	0.5	P
Atrazine	ug/L	<0.8	<0.8	3	P
Benzene	ug/L	<0.4	<0.4	5	P
Benzo(a)pyrene	ug/L	<0.08	<0.08	0.2	P
bis(2-Ethylhexyl)phthalat	ug/L	<0.8	1.0	6	P
Bromodichloromethane	ug/L	1.4	2.3	80	P
Bromoform	ug/L	<1	<1	80	P
Carbon Tetrachloride	ug/L	<1	<1	5	P
Chlordane (technical)	ug/L	<0.08	<0.08	2	P
Chlorobenzene	ug/L	<1	<1	100	P
Chloroform	ug/L	4.5	6.6	80	P
Cyanide	ug/L	<50	<50	200	P
D, 2,4-	ug/L	<0.08	<0.08	70	P
Dalapon	ug/L	<0.08	<0.08	200	P
Dibromo-3-chloropropan	ug/L	<0.01	<0.01	0.2	P
Dibromochloromethane	ug/L	<1	<1	80	P
Dibromoethane, 1,2- (ED	ug/L	<0.01	<0.01	0.05	P

Dichlorobenzene, 1,2-	ug/L	<0.4	<0.4	600	P
Dichlorobenzene, 1,4-	ug/L	<0.4	0.080	75	P
Dichloroethane, 1,1-	ug/L	<0.4	<0.4	7	P
Dichloroethane, 1,2-	ug/L	<1	<1	5	P
Dichloroethene, 1,1-	ug/L	<0.4	<0.4	7	P
Dichloroethene, cis-1,2-	ug/L	<0.4	<0.4	70	P
Dichloroethene, trans-1,2	ug/L	<0.4	<0.4	100	P
Dichloropropane, 1,2-	ug/L	<0.4	<0.4	5	P
Dinoseb	ug/L	<0.08	<0.08	7	P
Endrin	ug/L	<0.02	0.032	2	P
Ethylbenzene	ug/L	<0.4	<0.4	700	P
gamma-BHC (Lindane)	ug/L	<0.008	<0.008	0.2	P
Heptachlor	ug/L	<0.008	<0.008	0.4	P
Heptachlor epoxide	ug/L	<0.008	<0.008	0.2	P
Hexachlorobenzene	ug/L	<0.8	<0.8	1	P
Hexachlorocyclopentadie	ug/L	<0.4	<0.4	50	P
Methoxychlor	ug/L	<0.08	<0.08	40	P
Methylene chloride	ug/L	<1	<1	5	P
Pentachlorophenol	ug/L	<0.08	0.87	1	P
Silvex (2,4,5-TP)	ug/L	<0.08	<0.08	50	P
Styrene	ug/L	<0.4	0.091	100	P
Tetrachloroethane, 1,1,1,	ug/L	<1	<1	200	P
Tetrachloroethene	ug/L	<0.8	<0.8	5	P
Toluene	ug/L	<0.4	0.23	1000	P
Toxaphene	ug/L	<0.8	<0.8	3	P
Trichlorobenzene, 1,2,4-	ug/L	<0.8	<0.8	70	P
Trichloroethane, 1,1,1-	ug/L	<1	<1	200	P
Trichloroethane, 1,1,2-	ug/L	<1	<1	5	P
Trichloroethene	ug/L	<0.4	<0.4	5	P
Vinyl chloride	ug/L	<1	<1	2	P
Xylene, m,p-	ug/L	<2	<2	10000	P
Xylene, o-	ug/L	<0.4	<0.4	10000	P

Kubota MBR Pilot Plant Effluent Test Results

4-Month Summary

DATE	pH	Dissolved O2	Temperature	CBOD, mg/L	TSS, mg/L	Ammonia, mg/L	Nitrate, mg/L	TKN, mg/L	CaCO3, mg/L	Fecal, mg/L	Copper, mg/L	Mercury, mg/L	Silver, mg/L	Zinc, mg/L
	MIN.	MIN.	AVG.	AVG.	AVG.	AVG.	AVG.	AVG.	AVG.	GEM	AVG.	AVG.	AVG.	AVG.
	6.05	2.43	13.51	1.39	0.40	0.56	9.3	2.74	51	0	4	0.000	0.000	21
	MAX	AVG.	MAX			MAX	MAX	MAX	MAX	GM7	MAX	MAX	MAX	MAX
	7.45	5.86	18.00			3.49	29.0	20.00	94	0	13	0.000	0.001	35

Kubota MBR Pilot Plant Effluent Test Results

January 2002

DATE	pH	Dissolved O2	Temperature	CBOD, mg/L	TSS, mg/L	Ammonia, mg/L	Nitrate, mg/L	TKN, mg/L	CaCO3, mg/L	Fecal, mg/L	Copper, mg/L	Mercury, mg/L	Silver, mg/L	Zinc, mg/L
01/01/02	Plant Check													
01/02/02	6.82	5.15	15	<1	0		0.2	2.00		0				
01/03/02	7.00	2.43	14	2		0.99				0				
01/04/02	7.02	3.78	14											
01/05/02	Plant Check													
01/06/02	Plant Check													
01/07/02	6.95	4.10	18		0.5	0.17	0.2	1.00	78.		4.	0.0000	0.000	29.
01/08/02	6.73	3.72	16							0				
01/09/02	6.93	2.90	15	INC.	0.4		0.2	0.61						
01/10/02	6.98	6.48	14	<1		0.09								
01/11/02	6.63	5.50	15							0				
01/12/02	Plant Check													
01/13/02	Plant Check													
01/14/02	6.97	6.50	14				3.9	0.25	70.		7.	0.0000	0.000	34.
01/15/02	6.94	4.99	12											
01/16/02	6.88	6.69	13											
01/17/02	6.80	6.78	13	<1	2	0.04				0				
01/18/02	6.72	6.90	12	<1	0	0.63	18.0	2.50		0				
01/19/02	Plant Check													
01/20/02	Plant Check													
01/21/02	Plant Check													
01/22/02	6.78	6.86	12		0.4		13.0	0.98	28.		8.	0.0000	0.000	22.
01/23/02	6.87	8.00	12	<1	0.8	0.26	9.80	1.30						
01/24/02	6.77	7.26	12	<1		0.32								
01/25/02	6.75	7.00	12											
01/26/02	Plant Check													
01/27/02	Plant Check													
01/28/02	6.67	8.41	12	*1	0.3	0.90	24.0	1.50	8.	0	9.	0.0000	0.000	28.
01/29/02	6.67	10.05	10											
01/30/02	6.67	6.46	11	<1	0.6	0.15	18.0	1.00		0				
01/31/02	7.23	6.74	11	<1										
	MIN.	MIN.	AVG.	AVG.	AVG.	AVG.	AVG.	AVG.	AVG.	GEM	AVG.	AVG.	AVG.	AVG.
	6.63	**2.43**	**13.19**	**<1**	**0.56**	**0.39**	**9.7**	**1.24**	**46.**	**0**	**7.**	**0.000**	**0.000**	**28.**
	MAX	AVG.	MAX			MAX	MAX	MAX	MAX	GM7	MAX	MAX	MAX	MAX
	7.23	**6.03**	**18.00**			**0.99**	**24.0**	**2.50**	**78.**	**0**	**9.**	**0.000**	**0.000**	**34.**

Kubota MBR Pilot Plant Effluent Test Results

February 2002

DATE	pH	Dissolved O2	Temperature	CBOD, mg/L	TSS, mg/L	Ammonia, mg/L	Nitrate, mg/L	TKN, mg/L	CaCO3, mg/L	Fecal, mg/L	Copper, mg/L	Mercury, mg/L	Silver, mg/L	Zinc, mg/L
02/01/02	7.15	8.14	13											
02/02/02	Plant Check													
02/03/02	Plant Check													
02/04/02	6.93	7.00	12		0.3	0.10	3.3	2.70	75.	0	1.	0.0000	0.000	35.
02/05/02	6.89	5.48	10											
02/06/02	6.72	6.73	12	<1		0.18				0				
02/07/02	6.58	5.52	11	<1	0		14.0	1.60						
02/08/02	7.27	7.85	13											
02/09/02	Plant Check													
02/10/02	Plant Check													
02/11/02	6.23	5.65	10		0		2.1	20.00	12.		13.	0.0000	0.000	30.
02/12/02	6.14	6.23	10											
02/13/02	6.27	6.59	9	<1	0.7	0.85	29.0	2.30						
02/14/02	6.18	6.56	11	<1		0.34				0				
02/15/02	6.07	8.00	10							0				
02/16/02	Plant Check													
02/17/02	Plant Check													
02/18/02	Plant Check													
02/19/02	6.05	7.27	12		0.3					0				
02/20/02	6.21	6.35	13	4										
02/21/02	6.81	6.11	13	<1		2.70								
02/22/02	6.76	5.01	14			0.66				0				
02/23/02	Plant Check													
02/24/02	Plant Check													
02/25/02	6.91	5.29	12		0									
02/26/02	6.83	4.79	12	<1						0				
02/27/02	6.79	4.56	11	<1	0	2.90				0				
02/28/02	6.68	5.12	12			0.75								
	MIN. **6.05**	MIN. **4.56**	AVG. **11.58**	AVG. **<1**	AVG. **0.19**	AVG. **1.06**	AVG. **12.1**	AVG. **6.65**	AVG. **44.**	GEM **0**	AVG. **7.**	AVG. **0.000**	AVG. **0.000**	AVG. **33.**
	MAX **7.27**	AVG. **6.22**	MAX **14.00**			MAX **2.90**	MAX **29.0**	MAX **20.00**	MAX **75.**	GM7 **0**	MAX **13.**	MAX **0.000**	MAX **0.000**	MAX **35.**

Kubota MBR Pilot Plant Effluent Test Results

CITY OF DUVALL, MEMBRANE PILOT PLANT EFFLUENT DATA

Source: City of Duvall

November 2001

DATE	pH	Dissolved O2	Temperature	CBOD, mg/L	TSS, mg/L	Ammonia, mg/L	Nitrate, mg/L	TKN, mg/L	CaCO3, mg/L	Fecal, mg/L	Copper, mg/L	Mercury, mg/L	Silver, mg/L	Zinc, mg/L
11/01/01														
11/02/01														
11/03/01														
11/04/01														
11/05/01														
11/06/01	6.53	4.29	16.8											
11/07/01	6.64	4.52	16.6		0									
11/08/01	6.76	4.19	16.2	3										
11/09/01														
11/10/01														
11/11/01														
11/12/01	6.98	4.43	16.5		0.1					0				
11/13/01														
11/14/01	7.45	4.60	15.5	4	0.6					0				
11/15/01	6.60	4.41	17.2	4										
11/16/01	6.70	5.08	16.3											
11/17/01														
11/18/01														
11/19/01	6.69	6.20	16.6		0.2					0				
11/20/01	6.80	7.62	16			0.005	6.7	0.65	62.0		0.005	0.0002	0.001	0.012
11/21/01	6.45	5.12	15.6	2	0.6	0.082	8.5	2.00		0				
11/22/01	6.77	7.37	14.6	1										
11/23/01														
11/24/01														
11/25/01														
11/26/01	6.77	7.37	14.6		0.8	0.082	6.8	1.10	52.0	0	0.012	0.0002	0.001	0.015
11/27/01	6.76	7.98	14.2											
11/28/01	6.80	8.02	14.3	1	0.8	0.005	9.7	0.98		0				
11/29/01	6.85	8.44	14.5	1										
11/30/01	6.77	8.28	13.6											
	MIN. 6.45	MIN. 4.19	AVG. 15.57	AVG. 2.29	AVG. 0.44	AVG. 0.04	AVG. 7.9	AVG. 1.18	AVG. 57.0	GEM 0	AVG. 0.009	AVG. 0.000	AVG. 0.001	AVG. 0.014
	MAX 7.45	AVG. 6.12	MAX 17.20			MAX 0.08	MAX 9.7	MAX 2.00	MAX 62.0	GM7 0	MAX 0.012	MAX 0.000	MAX 0.001	MAX 0.015

Kubota MBR Pilot Plant Effluent Test Results

December 2001

DATE	pH	Dissolved O2	Temperature	CBOD, mg/L	TSS, mg/L	Ammonia, mg/L	Nitrate, mg/L	TKN, mg/L	CaCO3, mg/L	Fecal, mg/L	Copper, mg/L	Mercury, mg/L	Silver, mg/L	Zinc, mg/L
12/01/01	Plant Check													
12/02/01	Plant Check													
12/03/01	6.86	5.29	12.8		0.7		6.8	1.6	44.		0.	0.0000	0.000	20.
12/04/01	6.82	5.51	12.7							0				
12/05/01	6.73	5.13	13.8	1	0.5	0.061	9.5	3.7						
12/06/01	6.81	4.80	13.7	*5		0.12				0				
12/07/01	6.58	4.96	14.0											
12/08/01	Plant Check													
12/09/01	Plant Check													
12/10/01	6.65	6.12	16.7		0.2		4.7	1.1	64.		6.	0.0000	0.000	27.
12/11/01	6.48	4.73	14.9							0				
12/12/01	6.99	5.81	14.7	1										
12/13/01	6.69	5.33	15	1		0.050	5.0	1.6		0				
12/14/01	6.66	5.63	14		0.2	0.050								
12/15/01	Plant Check													
12/16/01	Plant Check													
12/17/01	6.80	7.70	12.1		0.7	0.049	13.0	1.4	34.	0	4.	0.0000	0.000	20.
12/18/01	7.00	6.39	13.4	2										
12/19/01	6.90	4.61	13.3	2	0.2		12.0	1.3		0				
12/20/01	6.85	3.87	13.2			0.032								
12/21/01	7.05	3.15	12.8											
12/22/01	Plant Check													
12/23/01	Plant Check													
12/24/01	7.13	4.65	13		0.1	0.012								
12/25/01	Plant Check													
12/26/01	7.23	4.53	12.8				7.1	1.3	56.		4.	0.0000	0.000	16.
12/27/01	6.79	3.47	13.2	3	1	3.490				0				
12/28/01	7.21	5.28	14.4	*5						0				
12/29/01	Plant Check													
12/30/01	Plant Check													
12/31/01	6.85	4.21			0	2.830	0.2	3.2	94.		0.	0.0000	0.000	27.
	MIN.	MIN.	AVG.	AVG.	AVG.	AVG.	AVG.	AVG.	AVG.	GEM	AVG.	AVG.	AVG.	AVG.
	6.48	**3.15**	**13.71**	**1.67**	**0.40**	**0.74**	**7.3**	**1.90**	**58.4**	**0**	**3.**	**0.000**	**0.000**	**22.**
	MAX	AVG.	MAX			MAX	MAX	MAX	MAX	GM7	MAX	MAX	MAX	MAX
	7.23	**5.06**	**16.70**			**3.49**	**13.0**	**3.70**	**94.0**	**0**	**6.**	**0.000**	**0.000**	**27.**