

APPENDIX B: SOURCE DATA FOR CHAPTER IV

6/28/2001 SRT=18 d
 SYS 2 @ 5⁰ C.

Location	COD	SS	VSS	VSS/SS	NO ₃ -N	PO ₄ -P	PO ₄ -P	Flow Rate	Ac	NH ₄ -N	PHB	PHV	PHA	PHA	PHA	PHA	Glycogen	Glycogen	Glycogen	Glycogen
	mg/L	mg/L	mg/L		mg/L	mg/L	mg/d	L/day	mg/L	mg/L	mg/L	mg/L	mg/L	mg/d	C-mmol/L	C-mmol/d	mg/L	mg/d	C-mmol/L	C-mmol/d
Synt. Feed	NM				0	0		30.6	464	24.6										
PO4-P Feed					0	2404		1.5	0											
Comb. Inf.	NM				0	114.5		32.1	442.3	23.4										
Anaerobic 1	NM	3640	2625	0.721	0	182.2	-2513		127.5	23.8	199	12	211	-4623	10	-216	156.0	1248	5.78	46
Anaerobic 2	NM	3563	2645	0.742	0	205	-1623		96	7	238	28	266	-3916	12	-186	138.0	1282	5.11	47
Anoxic 1	NM	6144	4283	0.697	0	159.1	-2873		0	7.1	252	7	259	-4674	12	-211	322.0	1336	11.93	49
Anoxic 2	NM	6152	4265	0.693	0	173.5	-1581	39.1	0	12.4	249	17	266	-769	12	-40	316.0	659	11.70	24
Aerobic 1	NM	6592	4321	0.655	0.6	57.9	8173		0	7.3	155	13	168	6929	8	323	352.0	-2545	13.04	-94
Aerobic 2	NM	6696	4300	0.642	1.5	4.4	3782		0	3.8	104	15	119	3464	6	161	369.0	-1202	13.67	-45
Aerobic 3	NM	6748	4277	0.634	2.4	0	311	0	0	1.1	90	7	97	1555	5	74	373.0	-283	13.81	-10
Effluent	NM	44	27	0.614	2.2	0			0	1.2										
RAS	NM	11452	7301	0.638	1.4	0		38.6	0	0.9	112	13	125		6		696		25.78	

7/2/2001 SRT=18d
SYS 2 @ 5° C

Location	COD	SS	VSS	VSS/SS	NO ₃ -N	PO ₄ -P	PO ₄ -P	Flow Rate	Ac	NH ₄ -N	PHB	PHV	PHA	PHA	PHA	PHA	Glycogen	Glycogen	Glycogen	Glycogen
	mg/L	mg/L	mg/L		mg/L	mg/L	mg/d	L/day	mg/L	mg/L	mg/L	mg/L	mg/L	mg/d	C-mmol/L	C-mmol/d	mg/L	mg/d	C-mmol/L	C-mmol/d
Synt. Feed	480				0	0		30	489	34.3										
PO ₄ -P Feed					0	3243		1.58	0											
Comb. Inf.	456				0	162.5		31.58	464.5	32.6										
Anaerobic 1	159	4172	2896	0.694	0	234	-2609		105.9	28.9	208	41	249	-6287	11.7	-300	160.0	818	5.93	30
Anaerobic 2	123	4120	2922	0.709	0	258.2	-1718		75.6	29.9	266	21	287	-2697	13.4	-121	148.0	852	5.48	32
Anoxic 1	34	7098	4780	0.673	0	205.7	-2227		0	25.7	232	36	268	-3761	12.6	-183	319.0	1328	11.81	49
Anoxic 2	30	7162	4907	0.685	0	225.1	-2101	39.4	0	27.1	269	20	289	-2274	13.5	-100	309.0	1083	11.44	40
Aerobic 1	32	7532	4926	0.654	1.9	132.5	6378		0	21.8	164	13	177	7715	8.3	360	346.0	-2549	12.81	-94
Aerobic 2	28	7704	4870	0.632	2.7	76	3892		0	17.2	107	12	119	3995	5.6	186	361.0	-1033	13.37	-38
Aerobic 3	28	7812	4793	0.614	3	37.2	2673	0	0	13.9	87	2	89	2066	4.1	99	369.0	-551	13.67	-20
Effluent	32	28	19	0.679	3	33.9			0	13.6										
RAS	26	13014	8200	0.630	2.4	46.1		37.3	0	17	129	2	131		6.1		680		25.19	

7/5/2001 SRT=18
d
SYS2 @ 5° C

Location	COD	SS	VSS	VSS/SS	NO ₃ -N	PO ₄ -P	PO ₄ -P	Flow Rate L/day	Ac	NH ₄ -N	PHB	PHV	PHA	PHA	PHA	PHA	Glycogen	Glycogen	Glycogen	Glycogen
	mg/L	mg/L	mg/L		mg/L	mg/L	mg/d		mg/L	mg/L	mg/L	mg/L	mg/L	mg/d	C-mmol/L	C-mmol/d	mg/L	mg/d	C-mmol/L	C-mmol/d
Synt. Feed	480				0	0		29	446	35.6										
PO4-P Feed					0	3580		1.52	0											
Comb. Inf.	456				0	179.8		30.52	423.8	33.8										
Anaerobic 1	159	4389	2914	0.664	0	272.8	-3123		112.6	28.1	186	38	224	-5134	10.6	-241	143.0	1536	5.30	57
Anaerobic 2	123	4337	2940	0.678	0	291.7	-1325		84.7	29	231	28	259	-2454	12.1	-112	137.0	421	5.07	16
Anoxic 1	34	7216	4697	0.651	0	245.5	-2887		0	24.3	222	22	244	-4435	11.4	-206	298.0	1893	11.04	70
Anoxic 2	30	7209	4748	0.659	0	265.6	-2175	39.6	0	25.6	215	52	267	-2489	12.6	-127	292.0	649	10.81	24
Aerobic 1	32	7496	4792	0.639	1.6	162.7	7061		0	19.8	147	4	151	7960	7.0	382	348.0	-3843	12.89	-142
Aerobic 2	28	7688	4769	0.620	2.3	110.3	3596		0	15.6	94	6	100	3500	4.7	162	369.0	-1441	13.67	-53
Aerobic 3	28	7869	4782	0.608	2.8	68.4	2875	0	0	13.1	70	3	73	1853	3.4	87	378.0	-618	14.00	-23
Effluent	32	52	34	0.654	3	67.4			0	12										
RAS	26	13482	8151	0.605	2.4	84.7		38.1	0	15.9	90	10	100		4.7		644		23.85	

7/9/2001

SYS 2 @ 5° C

SRT=18 d

Location	COD	SS	VSS	VSS/SS	NO ₃ -N	PO ₄ -P	PO ₄ -P	Flow Rate	Ac	NH ₄ -N	PHB	PHV	PHA	PHA	PHA	PHA	Glycogen	Glycogen	Glycogen	Glycogen
	mg/L	mg/L	mg/L		mg/L	mg/L	mg/d	L/day	mg/L	mg/L	mg/L	mg/L	mg/L	mg/d	C-mmol/L	C-mmol/d	mg/L	mg/d	C-mmol/L	C-mmol/d
Synt. Feed	NM				0	0		28.8	469	33										
PO4-P Feed					0	3394		1.54	0											
Comb. Inf.	NM				0	172.3		30.34	445.2	31.3										
Anaerobic 1	NM	4446	2844	0.640	0	267.9	-3217		126.9	NM	167	17	184	-4383	9	-205	182.0	878	6.74	33
Anaerobic 2	NM	4469	2819	0.631	0	284	-1132		101.5	NM	185	17	202	-1266	9	-59	179.0	211	6.63	8
Anoxic 1	NM	7328	4549	0.621	0	241.7	-2568		0	NM	172	24	196	-3312	9	-158	351.0	700	13.00	26
Anoxic 2	NM	7294	4487	0.615	0	260	-1999	40	0	NM	194	20	214	-1966	10	-90	342.0	983	12.67	36
Aerobic 1	NM	7582	4522	0.596	2	168	6370		0	NM	114	9	123	6301	6	296	360.0	-1246	13.33	-46
Aerobic 2	NM	7711	4468	0.579	2.5	124.3	3026		0	NM	79	5	84	2700	4	127	377.0	-1177	13.96	-44
Aerobic 3	NM	7800	4506	0.578	2.8	91.8	2250	0	0	NM	64	5	69	1039	3	48	385.0	-554	14.26	-21
Effluent	NM	33	16	0.485	2.9	88.9			0	7										
RAS	NM	14107	8563	0.607	2.2	99.2		38.9	0	NM	94	6	100		5		680		25.19	

7/12/2001

SYS 2 @ 5° C

SRT=18 d

Location	COD	SS	VSS	VSS/SS	NO ₃ -N	PO ₄ -P	PO ₄ -P	Flow Rates L/day	Ac	NH ₄ -N	PHB	PHV	PHA	PHA	PHA	PHA	Glycogen	Glycogen	Glycogen	Glycogen
	mg/L	mg/L	mg/L		mg/L	mg/L	mg/d		mg/L	mg/L	mg/L	mg/L	mg/L	mg/d	C-mmol/L	C-mmol/d	mg/L	mg/d	C-mmol/L	C-mmol/d
Synt. Feed	510				0	0		28.5	486	24.6										
PO4-P Feed					0	3134		1.56	0											
Comb. Inf.	484				0	162.6		30.06	461	23.4										
Anaerobic 1	186	4683	2924	0.624	0	236.8	-2809		151	23.8	206	12	218	-4945	10.2	-231	175.0	408	6.48	15
Anaerobic 2	160	4596	2897	0.630	0	255.9	-1342		119	7	229	22	251	-2319	11.8	-110	168.0	492	6.22	18
Anoxic 1	36	7639	4568	0.598	0	208	-2005		0	7.1	218	23	241	-3938	11.3	-185	321.0	755	11.89	28
Anoxic 2	28	7568	4582	0.605	0	222.4	-1573	40.2	0	12.4	246	12	258	-1857	12.0	-82	316.0	546	11.70	20
Aerobic 1	30	7845	4507	0.575	2	135.1	6029		0	7.3	158	14	172	5939	8.0	276	331.0	-1036	12.26	-38
Aerobic 2	32	7992	4412	0.552	2.5	95.4	2742		0	3.8	117	2	119	3660	5.5	173	339.0	-552	12.56	-20
Aerobic 3	30	8087	4436	0.549	2.9	69.9	1761	0	0	1.1	83	6	89	2072	4.2	95	349.0	-691	12.93	-26
Effluent	30	61	34	0.557	2.9	67.6			0	1.2										
RAS	34	14397	8169	0.567	2.1	70.3		39	0	0.9	111	11	122		5.7		616		22.81	

7/16/2001

SYS 2 @ 20⁰

C

SRT=10 d

Location	COD	SS	VSS	VSS/SS	NO ₃ -N	PO ₄ -P	PO ₄ -P	Flow Rates L/day	Ac	NH ₄ -N	PHB	PHV	PHA	PHA	PHA	PHA	Glycogen	Glycogen	Glycogen	Glycogen
	mg/L	mg/L	mg/L		mg/L	mg/L	mg/d		mg/L	mg/L	mg/L	mg/L	mg/L	mg/d	C-mmol/L	C-mmol/d	mg/L	mg/d	C-mmol/L	C-mmol/d
Synt. Feed	481				0	0		35.3	432	36.1										
PO4-P Feed					0	566		2.38	0											
Comb. Inf.	451				0	35.8		37.68	404.7	33.8										
Anaerobic 1	119	2894	2077	0.718	0	129	-4422		75		158	15	173	-6519	8.1	-304	112.0	3861	4.15	143
Anaerobic 2	40	2846	2065	0.726	0	161	-2659		0		190	27	217	-3656	10.2	-174	88.0	1994	3.26	74
Anoxic 1	34	4518	3242	0.718	0	105	173		0		149	17	166	479	7.8	24	293.0	-227	10.85	-8
Anoxic 2	26	4479	3230	0.721	0	109	-505	45.4	0		151	22	173	-884	8.1	-43	290.0	379	10.74	14
Aerobic 1	28	4599	3298	0.717	5.3	22	7037		0	4.9	72	8	80	7522	3.7	354	335.0	-3640	12.41	-135
Aerobic 2	26	4686	3301	0.704	7.4	5.4	1343		0	1.7	50	5	55	2022	2.6	95	361.0	-2103	13.37	-78
Aerobic 3	24	4737	3290	0.695	7.8	1.6	307	0	0	0.6	46	-1	45	809	2.1	39	369.0	-647	13.67	-24
Effluent	26	42	28	0.667	7.3	1.9			0	1										
RAS	28	7590	5299	0.698	7	1.3		43.2	0	0.6	72	7	79		3.7		682		25.26	

8/6/2001
 SYS 2 @ 20 °C
 SRT=10d

Location	COD	SS	VSS	VSS/SS	NO ₃ -N	PO ₄ -P	PO ₄ -P	Flow Rates L/day	Ac	NH ₄ -N	PHB	PHV	PHA	PHA	PHA	PHA	Glycogen	Glycogen	Glycogen	Glycogen
	mg/L	mg/L	mg/L		mg/L	mg/L	mg/d		mg/L	mg/L	mg/L	mg/L	mg/L	mg/d	C-mmol/L	C-mmol/d	mg/L	mg/d	C-mmol/L	C-mmol/d
Synt. Feed	479				0	0		34	454	40.2										
PO ₄ -P Feed					0	608		2.3	0											
Comb. Inf.	449				0	38.5		36.3	425.2	37.7										
Anaerobic 1	129	2954	2108	0.714	0	148	-5370		82		149	33	182	-6737	8.6	-319	119.0	3597	4.41	133
Anaerobic 2	46	2916	2100	0.720	0	181	-2633		0		196	29	225	-3431	10.6	-158	104.0	1197	3.85	44
Anoxic 1	36	4600	3266	0.710	0	113	351		0		151	24	175	-5	8.2	-1	304.0	-70	11.26	-3
Anoxic 2	28	4577	3300	0.721	0	115.9	-363	43.5	0		154	25	179	-501	8.4	-24	301.0	376	11.15	14
Aerobic 1	30	4799	3346	0.697	4.7	26	7345		0	6.6	72	12	84	7762	3.9	365	348.0	-3840	12.89	-142
Aerobic 2	24	4846	3398	0.701	6.5	7	1552		0	3.5	49	10	59	2043	2.8	96	364.0	-1307	13.48	-48
Aerobic 3	30	4859	3321	0.683	6.8	2	409	0	0	2	42	8	50	735	2.4	35	367.0	-245	13.59	-9
Effluent	30	23	16	0.696	6.8	1.8			0	1.8										
RAS	28	7711	5376	0.697	6.4	1.2		45.4	0	1.1	75	12	87		4.1		654		24.22	

8/21/2001
 SYS 2 @ 20 °C
 SRT=10d

Location	COD	SS	VSS	VSS/SS	NO ₃ -N	PO ₄ -P	PO ₄ -P	Flow Rates L/day	Ac	NH ₄ -N	PHB	PHV	PHA	PHA	PHA	PHA	Glycogen	Glycogen	Glycogen	Glycogen
	mg/L	mg/L	mg/L		mg/L	mg/L	mg/d		mg/L	mg/L	mg/L	mg/L	mg/L	mg/d	C-mmol/L	C-mmol/d	mg/L	mg/d	C-mmol/L	C-mmol/d
Synt. Feed	489				0	0		33.4	442	40.9										
PO ₄ -P Feed					0	636		2.3	0											
Comb. Inf.	457.5				0	41.0		35.7	413.5	38.3										
Anaerobic 1	136	2857	2100	0.735	0	137	-4643		84		152	27	179	-6615	8.4	-312	129.0	3270	4.78	121
Anaerobic 2	48	2836	2087	0.736	0	164	-2179		0		187	37	224	-3632	10.5	-172	106.0	1856	3.93	69
Anoxic 1	34	4479	3210	0.717	0	105	270		0		140	29	169	180	8.0	6	308.0	-190	11.41	-7
Anoxic 2	26	4401	3196	0.726	0	110	-623	45	0		153	21	174	-623	8.2	-25	304.0	498	11.26	18
Aerobic 1	28	4529	3128	0.691	4.9	23	6925		0	7	68	14	82	7323	3.9	343	354.0	-3980	13.11	-147
Aerobic 2	26	4617	3245	0.703	6.8	7	1274		0	3.8	47	12	59	1831	2.8	86	379.0	-1990	14.04	-74
Aerobic 3	24	4699	3219	0.685	6.7	3.8	255	0	0	2.2	39	8	47	955	2.2	46	385.0	-478	14.26	-18
Effluent	26	49	32	0.653	6.8	4.2			0	2.1										
RAS	28	7410	5235	0.706	6.3	2.7		43.9	0	1.5	72	0	72		3.3		675		25.00	

8/27/2001
 SYS 2 @ 20 °C
 SRT=10d

Location	COD	SS	VSS	VSS/SS	NO ₃ -N	PO ₄ -P	PO ₄ -P	Flow Rate	Ac	NH ₄ -N	PHB	PHV	PHA	PHA	PHA	PHA	Glycogen	Glycogen	Glycogen	Glycogen
	mg/L	mg/L	mg/L		mg/L	mg/L	mg/d	L/day	mg/L	mg/L	mg/L	mg/L	mg/L	mg/d	C-mmol/L	C-mmol/d	mg/L	mg/d	C-mmol/L	C-mmol/d
Synt. Feed	489				0	0		33.4	466	40.9										
PO4-P Feed					0	619		2.3	0											
Comb. Inf.	457.5				0	39.9		35.7	436.0	38.3										
Anaerobic 1	136	3014	2165	0.718	0	145	-5058		89		147	22	169	-6573	7.9	-310	111.0	4182	4.11	155
Anaerobic 2	48	2983	2177	0.730	0	179	-2744		0		181	23	204	-2825	9.6	-132	92.0	1533	3.41	57
Anoxic 1	34	4569	3266	0.715	0	112	403		0		133	19	152	312	7.1	14	294.0	14	10.89	0
Anoxic 2	26	4580	3224	0.704	0	116	-506	45	0		144	13	157	-632	7.3	-27	292.0	253	10.81	9
Aerobic 1	28	4696	3249	0.692	5.1	26	7326		0	7	62	9	71	7000	3.3	327	352.0	-4884	13.04	-181
Aerobic 2	26	4799	3268	0.681	6.6	9.4	1351		0	3.8	42	13	55	1302	2.6	59	370.0	-1465	13.70	-54
Aerobic 3	24	4862	3290	0.677	6.9	2.6	554	0	0	2.2	36	15	51	326	2.4	15	371.0	-81	13.74	-3
Effluent	26	30	20	0.667	6.6	3.1			0	2.1										
RAS	28	7602	5279	0.694	6.4	2.5		45.7	0	1.5	61	6	67		3.1		651		24.11	

7/16/2001

SYS 2 @ 5⁰
C.

SRT=18 d

Location	COD	SS	VSS	VSS/SS	NO ₃ -N	PO ₄ -P	PO ₄ -P	Flow Rate	Ac	NH ₄ -N	PHB	PHV	PHA	PHA	PHA	PHA	Glycogen	Glycogen	Glycogen	Glycogen
	mg/L	mg/L	mg/L		mg/L	mg/L	mg/d	L/day	mg/L	mg/L	mg/L	mg/L	mg/L	mg/d	C-mmol/L	C-mmol/d	mg/L	mg/d	C-mmol/L	C-mmol/d
Synt. Feed	472				0	0		28.8	445	29.1										
PO4-P Feed					0	2422		1.58	0											
Comb. Inf.	447				0	126.0		30.38	421.9	27.6										
Anaerobic 1	174	4884	2891	0.592	0	226.8	-3343		131	NM	180	9	189	-3772	8.8	-175	161.0	1058	5.96	39
Anaerobic 2	142	4953	2952	0.596	0	247.5	-1444		94	NM	202	21	223	-2373	10.4	-113	147.0	977	5.44	36
Anoxic 1	49	8169	4611	0.564	0	199.6	-2641		0	NM	196	18	214	-3078	10.0	-142	320.0	1052	11.85	39
Anoxic 2	34	8022	4630	0.577	0	219.7	-2178	39.4	0	NM	219	20	239	-2710	11.2	-127	312.0	867	11.56	32
Aerobic 1	36	8453	4722	0.559	1.3	125.2	6519		0	NM	158	4	162	5311	7.5	251	346.0	-2345	12.81	-87
Aerobic 2	44	8617	4645	0.539	1.8	69.6	3835		0	6.6	100	7	107	3794	5.0	176	359.0	-897	13.30	-33
Aerobic 3	32	8769	4578	0.522	2	38.6	2138	0	0	3.7	65	10	75	2207	3.5	102	364.0	-345	13.48	-13
Effluent	36	26	17	0.654	1.9	38.4			0	3.2										
RAS	30	16348	8942	0.547	1.6	44.6		38.6	0	NM	97	21	118		5.6		660		24.44	

**SYS 2 @ 5⁰
C
SRT=18 d**

Location	COD	SS	VSS	VSS/SS	NO ₃ -N	PO ₄ -P	PO ₄ -P	Flow Rate	Ac	NH ₄ -N	PHB	PHV	PHA	PHA	PHA	PHA	Glycogen	Glycogen	Glycogen	Glycogen
	mg/L	mg/L	mg/L		mg/L	mg/L	mg/d	L/day	mg/L	mg/L	mg/L	mg/L	mg/L	mg/d	C-mmol/L	C-mmol/d	mg/L	mg/d	C-mmol/L	C-mmol/d
Synt. Feed	511				0	0		28.8	449	35.4										
PO4-P Feed					0	2498		1.6	0											
Comb. Inf.	484				0	131.5		30.4	425	33.6										
Anaerobic 1	189	4579	2689	0.587	0	221	-3169		122	24.8	177	18	195	-4463	9.1	-211	146.0	1383	5.41	51
Anaerobic 2	152	4492	2679	0.596	0	242.1	-1477		100	26	205	19	224	-2030	10.5	-95	136.0	700	5.04	26
Anoxic 1	42	7522	4346	0.578	0	191.5	-2289		0	15.2	201	11	212	-2709	9.9	-124	300.0	454	11.11	17
Anoxic 2	32	7409	4300	0.580	0	209.7	-1984	39.6	0	16.3	223	9	232	-2180	10.8	-101	293.0	763	10.85	28
Aerobic 1	30	7589	4246	0.559	1.1	121	6156		0	11.6	149	5	154	5413	7.2	253	320.0	-1874	11.85	-69
Aerobic 2	28	7643	4364	0.571	1.7	71	3470		0	9.7	104	7	111	2984	5.2	138	338.0	-1249	12.52	-46
Aerobic 3	36	7666	4235	0.552	1.8	39.5	2186	0	0	8.9	83	6	89	1527	4.2	71	349.0	-763	12.93	-28
Effluent	32	78	40	0.513	2.1	40.2			0	8.8										
RAS	30	14033	7783	0.555	1.6	42		39	0	8.7	110	11	121		5.7		606		22.44	

8/23/2001

SYS 2 @ 5⁰
C

SRT=18 d

Location	COD	SS	VSS	VSS/SS	NO ₃ -N	PO ₄ -P	PO ₄ -P	Flow Rate	Ac	NH ₄ -N	PHB	PHV	PHA	PHA	PHA	PHA	Glycogen	Glycogen	Glycogen	Glycogen
	mg/L	mg/L	mg/L		mg/L	mg/L	mg/d	L/day	mg/L	mg/L	mg/L	mg/L	mg/L	mg/d	C-mmol/L	C-mmol/d	mg/L	mg/d	C-mmol/L	C-mmol/d
Synt. Feed	520				0	0		29.4	477	NM										
PO4-P Feed					0	2448		1.56	0											
Comb. Inf.	493				0	123.3		30.96	452.6	NM										
Anaerobic 1	196	4793	2450	0.511	0	214	-3282		150	NM	177	12	189	-3990	8.8	-188	157.0	1158	5.81	43
Anaerobic 2	168	4628	2392	0.517	0	233.6	-1383		112	NM	211	18	229	-2822	10.7	-133	148.0	635	5.48	24
Anoxic 1	NM	8532	4307	0.505	0	186	-2232		0	NM	203	16	219	-3747	10.2	-175	312.0	1667	11.56	62
Anoxic 2	NM	8469	4422	0.522	0	202	-1759	39.6	0	NM	229	7	236	-1869	11.0	-83	309.0	330	11.44	12
Aerobic 1	NM	8727	4418	0.506	1.2	117	5981		0	NM	140	15	155	5699	7.3	263	334.0	-1759	12.37	-65
Aerobic 2	NM	8976	4468	0.498	1.9	73	3096		0	NM	90	10	100	3870	4.7	181	341.0	-493	12.63	-18
Aerobic 3	NM	9022	4439	0.492	2.3	41	2252	0	0	NM	65	6	71	2040	3.3	96	354.0	-915	13.11	-34
Effluent	36	28	13	0.464	2.2	42.9			0	NM										
RAS	NM	17969	9056	0.504	1.8	44.1		39.4	0	NM	99	7	106		5.0		648		24.00	

9/10/2001
 SYS 2 @ 5^o C
 SRT=18 d

Location	COD	SS	VSS	VSS/SS	NO ₃ -N	PO ₄ -P	PO ₄ -P	Flow Rate	Ac	NH ₄ -N	PHB	PHV	PHA	PHA	PHA	PHA	Glycogen	Glycogen	Glycogen
	mg/L	mg/L	mg/L		mg/L	mg/L	mg/d	L/day	mg/L	mg/L	mg/L	mg/L	mg/L	mg/d	C-mmol/L	C-mmol/d	mg/L	mg/d	C-mmol/L
Synt. Feed	NM				0	0		29.1	466	NM									
PO4-P Feed					0	1320		1.56	0										
Comb. Inf.	NM				0	83.8		30.66	442	NM									
Anaerobic 1	NM	4888	2603	0.533	0	127.9	-2788		158	NM	142	7	149	-4168	7.0	-195	137.0	1760	5.07
Anaerobic 2	NM	4906	2599	0.530	0	149.7	-1540		121	NM	177	7	184	-2473	8.6	-115	124.0	919	4.59
Anoxic 1	NM	8940	4627	0.518	0	79.7	-851		0	NM	125	15	140	-1479	6.6	-74	292.0	338	10.81
Anoxic 2	NM	8911	4745	0.532	0	92	-1837	40	0	NM	152	7	159	-2838	7.4	-128	286.0	896	10.59
Aerobic 1	NM	9157	4779	0.522	0.8	47.9	4823		0	NM	95	8	103	6124	4.8	284	305.0	-2078	11.30
Aerobic 2	NM	9290	4753	0.512	1.1	23.2	2701		0	NM	76	8	84	2078	3.9	97	313.0	-875	11.59
Aerobic 3	NM	9292	4721	0.508	1.3	6.7	1804	38.7	0	NM	63	6	69	1640	3.2	77	316.0	-328	11.70
Effluent	NM	52	28	0.538	1.3	6.6			0	NM									
RAS	NM	16590	8307	0.501	0.9	5.4		40	0	NM	92	2	94		4.4		574		21.26

9/17/2001

SYS 2 @ 5⁰
C

SRT=18 d

Location	COD	SS	VSS	VSS/SS	NO ₃ -N	PO ₄ -P	PO ₄ -P	Flow Rate	Ac	NH ₄ -N	PHB	PHV	PHA	PHA	PHA	PHA	Glycogen	Glycogen	Glycogen	Glycogen
	mg/L	mg/L	mg/L		mg/L	mg/L	mg/d	L/day	mg/L	mg/L	mg/L	mg/L	mg/L	mg/d	C-mmol/L	C-mmol/d	mg/L	mg/d	C-mmol/L	C-mmol/d
Synt. Feed	NM				0	0		29	439	NM										
PO4-P Feed					0	2378		1.56	0											
Comb. Inf.	NM				0	121.4		30.56	417	NM										
Anaerobic 1	NM	4679	2548	0.545	0	192	-3830		139	NM	125	13	138	-3761	6.5	-177	138.0	951	5.11	35
Anaerobic 2	NM	4632	2501	0.540	0	213	-1440		107	NM	172	24	196	-3976	9.2	-188	120.0	1234	4.44	46
Anoxic 1	NM	8492	4446	0.524	0	140	-1498		0	NM	127	8	135	-1309	6.3	-59	279.0	777	10.33	29
Anoxic 2	NM	8513	4499	0.528	0	148	-1168	38	0	NM	139	11	150	-2189	7.0	-103	274.0	730	10.15	27
Aerobic 1	NM	8648	4536	0.525	0.8	109	4210		0	NM	85	7	92	6262	4.3	293	300.0	-2807	11.11	-104
Aerobic 2	NM	8712	4517	0.518	1.1	79	3239		0	NM	64	7	71	2267	3.3	105	314.0	-1511	11.63	-56
Aerobic 3	NM	8786	4500	0.512	1.3	58	2267	38.4	0	NM	53	4	57	1511	2.7	71	316.0	-216	11.70	-8
Effluent	NM	72	37	0.514	1.3	59			0	NM										
RAS	NM	17494	9014	0.515	0.9	54		39	0	NM	70	1	71		3.3		542		20.07	

9/22/2001
 SYS 2 @ 5°
 C.
 SRT=18 d

Location	COD	SS	VSS	VSS/SS	NO ₃ -N	PO ₄ -P	PO ₄ -P	Flow Rate	Ac	NH ₄ -N	PHB	PHV	PHA	PHA	PHA	PHA	Glycogen	Glycogen	Glycogen	Glycogen
	mg/L	mg/L	mg/L		mg/L	mg/L	mg/d	L/day	mg/L	mg/L	mg/L	mg/L	mg/L	mg/d	C-mmol/L	C-mmol/d	mg/L	mg/d	C-mmol/L	C-mmol/d
Synt. Feed	NM				0	0		29	475	NM										
PO4-P Feed					0	2361		1.56	0											
Comb. Inf.	NM				0	120.5		30.56	451	NM										
Anaerobic 1	NM	4479	2500	0.558	0	190.8	-3984		159	NM	142	7	149	-4273	7.0	-198	141.0	1506	5.22	56
Anaerobic 2	NM	4398	2512	0.571	0	206.9	-1138		136	NM	166	16	182	-2332	8.5	-111	136.0	353	5.04	13
Anoxic 1	NM	8103	4402	0.543	0	138	-1741		0	NM	138	10	148	-4041	6.9	-188	292.0	346	10.81	13
Anoxic 2	NM	8066	4498	0.558	0	145	-1042	40.1	0	NM	141	15	156	-1191	7.3	-58	286.0	893	10.59	33
Aerobic 1	NM	8197	4370	0.533	0.9	103	4568		0	NM	93	11	104	5656	4.9	265	302.0	-1740	11.19	-64
Aerobic 2	NM	8286	4346	0.524	1.3	76	2937		0	NM	72	5	77	2937	3.6	139	308.0	-653	11.41	-24
Aerobic 3	NM	8341	4358	0.522	1.6	56	2175	38.8	0	NM	50	2	52	2719	2.4	128	322.0	-1523	11.93	-56
Effluent	NM	59	31	0.525	1.7	56			0	NM										
RAS	NM	17390	9200	0.529	1.2	51		39.4	0	NM	74	5	79		3.7		551		20.41	

10/8/2001
 SYS 2 @ 5⁰
 C
 SRT=17.9d

Location	COD	SS	VSS	VSS/SS	NO ₃ -N	PO ₄ -P	PO ₄ -P	Flow Rate	Ac	NH ₄ -N	PHB	PHV	PHA	PHA	PHA	PHA	Glycogen	Glycogen	Glycogen	Glycogen
	mg/L	mg/L	mg/L		mg/L	mg/L	mg/d	L/day	mg/L	mg/L	mg/L	mg/L	mg/L	mg/d	C-mmol/L	C-mmol/d	mg/L	mg/d	C-mmol/L	C-mmol/d
Synt. Feed	536				0	0		29.4	489	NM										
PO4-P Feed					0	3476		1.56	0											
Comb. Inf.	509				0	175.1		30.96	464	NM										
Anaerobic 1	236	4627	2522	0.545	0	279	-4029		190	NM	208	28	236	-5394	11.1	-256	155.0	1754	5.74	65
Anaerobic 2	200	4639	2516	0.542	0	301	-1577		156	NM	266	21	287	-3655	13.4	-168	144.0	788	5.33	29
Anoxic 1	89	8368	4388	0.524	0	248	-2575		49	NM	232	36	268	-4112	12.6	-199	318.0	864	11.78	32
Anoxic 2	44	8296	4434	0.534	0	259	-1218	40.7	0	NM	269	14	283	-1661	13.2	-69	316.0	222	11.70	8
Aerobic 1	34	8459	4436	0.524	1	166	6516		0	NM	164	17	181	7146	8.5	332	346.0	-2102	12.81	-78
Aerobic 2	36	8577	4423	0.516	1.6	114	3643		0	NM	107	13	120	4274	5.6	200	361.0	-1051	13.37	-39
Aerobic 3	38	8650	4392	0.508	1.7	84	2102	0	0	NM	87	4	91	2032	4.2	97	369.0	-560	13.67	-21
Effluent	34	38	20	0.526	1.5	82			0	NM										
RAS	36	16456	8285	0.503	1.5	85		39.1	0	NM	119	9	128		6.0		659		24.41	

10/12/2001

SYS 2 @ 5°

C

SRT=16.4d

Location	COD	SS	VSS	VSS/SS	NO ₃ -N	PO ₄ -P	PO ₄ -P	Flow Rate	Ac	NH ₄ -N	PHB	PHV	PHA	PHA	PHA	PHA	Glycogen	Glycogen	Glycogen	Glycogen
	mg/L	mg/L	mg/L		mg/L	mg/L	mg/d	L/day	mg/L	mg/L	mg/L	mg/L	mg/L	mg/d	C-mmol/L	C-mmol/d	mg/L	mg/d	C-mmol/L	C-mmol/d
Synt. Feed	520				0	0		29.1	474	NM										
PO4-P Feed					0	3450		1.56	0											
Comb. Inf.	494				0	175.5		30.66	450	NM										
Anaerobic 1	222	4333	2429	0.561	0	281	-4043		183	NM	215	16	231	-5138	10.8	-239	148.0	2388	5.48	88
Anaerobic 2	179	4246	2396	0.564	0	302	-1494		150	NM	269	16	285	-3843	13.3	-179	143.0	356	5.30	13
Anoxic 1	80	8024	4118	0.513	0	244	-2357		45	NM	243	19	262	-3512	12.3	-165	322.0	978	11.93	36
Anoxic 2	40	7987	4145	0.519	0	261	-1878	40.5	0	NM	252	27	279	-1878	13.1	-90	319.0	331	11.81	12
Aerobic 1	32	8186	4199	0.513	1	164	6786		0	NM	169	10	179	6996	8.4	330	359.0	-2798	13.30	-104
Aerobic 2	36	8297	4218	0.508	1.5	115	3428		0	NM	116	7	123	3918	5.7	183	368.0	-630	13.63	-23
Aerobic 3	32	8317	4192	0.504	1.8	82	2309	0	0	NM	89	5	94	2029	4.4	95	375.0	-490	13.89	-18
Effluent	32	40	22	0.550	1.6	81			0	NM										
RAS	30	15102	7879	0.522	1.4	79		39.3	0	NM	122	9	131		6.1		671		24.85	

10/15/2001
 SYS 2 @ 5^o C.
 SRT=15.1 d

Location	COD	SS	VSS	VSS/SS	NO ₃ -N	PO ₄ -P	PO ₄ -P	Flow Rate	Ac	NH ₄ -N	PHB	PHV	PHA	PHA	PHA	PHA	Glycogen	Glycogen	Glycogen	Glycogen
	mg/L	mg/L	mg/L		mg/L	mg/L	mg/d	L/day	mg/L	mg/L	mg/L	mg/L	mg/L	mg/d	C-mmol/L	C-mmol/d	mg/L	mg/d	C-mmol/L	C-mmol/d
Synt. Feed	NM				0	0		29.1	479	NM										
PO4-P Feed					0	2377		1.56	0											
Comb. Inf.	NM				0	120.9		30.66	455	NM										
Anaerobic 1	NM	3979	2217	0.557	0	204	-3111		187	NM	136	9	145	-3317	6.8	-155	141.0	795	5.22	29
Anaerobic 2	NM	4026	2238	0.556	0	224	-1419		153	NM	169	8	177	-2271	8.3	-105	133.0	568	4.93	21
Anoxic 1	NM	7741	4022	0.520	0	176	-1962		45	NM	149	13	162	-2009	7.6	-95	272.0	445	10.07	16
Anoxic 2	NM	7654	3991	0.521	0	190	-1538	40.3	0	NM	160	13	173	-1208	8.1	-56	268.0	439	9.93	16
Aerobic 1	NM	7842	4092	0.522	1.2	110	5565		0	NM	92	10	102	4939	4.8	230	287.0	-1322	10.63	-49
Aerobic 2	NM	7913	4129	0.522	1.7	67	2991		0	NM	58	8	66	2504	3.1	117	297.0	-696	11.00	-26
Aerobic 3	NM	7949	4185	0.526	1.9	39	1948	0	0	NM	40	3	43	1600	2.0	76	303.0	-417	11.22	-15
Effluent	NM	53	29	0.547	1.8	39			0	NM										
RAS	NM	13652	7910	0.579	1.3	38		38.9	0	NM	75	8	83		3.9		537		19.89	

10/22/2001

SYS 2 @ 5°C

SRT=13.3 d

Location	COD	SS	VSS	VSS/SS	NO ₃ -N	PO ₄ -P	PO ₄ -P	Flow Rate	Ac	NH ₄ -N	PHB	PHV	PHA	PHA	PHA	PHA	Glycogen	Glycogen	Glycogen	Glycogen
	mg/L	mg/L	mg/L		mg/L	mg/L	mg/d	L/day	mg/L	mg/L	mg/L	mg/L	mg/L	mg/d	C-mmol/L	C-mmol/d	mg/L	mg/d	C-mmol/L	C-mmol/d
Synt. Feed	526				0	0		29.1	485	NM										
PO4-P Feed					0	1472		1.56	0											
Comb. Inf.	499				0	74.9		30.66	460	NM										
Anaerobic 1	233	3744	2082	0.556	0	179	-3796		190	NM	131	4	135	-3615	6.3	-168	152.0	820	5.63	30
Anaerobic 2	197	3673	2109	0.574	0	197	-1277		157	NM	140	12	152	-1206	7.1	-58	150.0	142	5.56	5
Anoxic 1	85	7429	3880	0.522	0	152	-1747		47	NM	127	19	146	-2920	6.9	-140	290.0	452	10.74	17
Anoxic 2	41	7468	3902	0.522	0	164	-1318	40.3	0	NM	142	6	148	-220	6.9	-5	288.0	220	10.67	8
Aerobic 1	36	7544	3995	0.530	0.9	100	4452		0	NM	80	6	86	4313	4.0	201	301.0	-904	11.15	-33
Aerobic 2	32	7612	3972	0.522	1.1	57	2991		0	NM	53	7	60	1809	2.8	84	310.0	-626	11.48	-23
Aerobic 3	34	7697	4017	0.522	1.3	25	2226	0	0	NM	35	4	39	1461	1.8	69	310.0	0	11.48	0
Effluent	36	50	28	0.560	1.3	24			0	NM										
RAS	32	13144	7285	0.554	1.1	25		38.9	0	NM	54	6	60		2.8		557		20.63	

**10/28/2001
SYS 2 @ 5⁰ C
SRT=12 d**

Location	COD mg/L	SS mg/L	VSS mg/L	VSS/SS	NO₃-N mg/L	PO₄-P mg/L	PO₄-P mg/d	Flow Rate L/day	Ac mg/L	NH₄-N mg/L
Synt. Feed	482				0	0		29.1	444	NM
PO4-P Feed					0	1492		1.62	0	
Comb. Inf.	457				0	78.7		30.72	421	NM
Anaerobic 1	212	3887	2148	0.553	0	182	-3660		176	NM
Anaerobic 2	196	3642	2038	0.560	0	197	-1068		165	NM
Anoxic 1	98	7048	3847	0.546	0	159	-1783		57	NM
Anoxic 2	47	7102	3856	0.543	0	170	-1209	40.5	7	NM
Aerobic 1	30	7286	3799	0.521	0.8	112	4026		0	NM
Aerobic 2	34	7345	3818	0.520	1	74	2638		0	NM
Aerobic 3	32	7417	3724	0.502	1.3	41	2291	0	0	NM
Effluent	34	52	31	0.596	1.2	39			0	NM
RAS	34	12466	6986	0.560	0.9	43		38.7	0	NM

NM: not measured.

Internal storage data are not available.

10/30/2001

SYS 2 @ 5°C

SRT=11.2 d

Location	COD	SS	VSS	VSS/SS	NO ₃ -N	PO ₄ -P	PO ₄ -P	Flow Rate	Ac	NH ₄ -N	PHB	PHV	PHA	PHA	PHA	PHA	Glycogen	Glycogen	Glycogen	Glycogen
	mg/L	mg/L	mg/L		mg/L	mg/L	mg/d	L/day	mg/L	mg/L	mg/L	mg/L	mg/L	mg/d	C-mmol/L	C-mmol/d	mg/L	mg/d	C-mmol/L	C-mmol/d
Synt. Feed	480				0	0		29	448	NM										
PO ₄ -P Feed					0	1508		1.6	0											
Comb. Inf.	455				0	78.8		30.6	425	NM										
Anaerobic 1	206	3649	2013	0.552	0	179	-3389		180	NM	112	12	124	-3025	5.8	-143	144.0	980	5.33	36
Anaerobic 2	198	3718	2047	0.551	0	194	-1067		167	NM	130	8	138	-995	6.4	-45	139.0	356	5.15	13
Anoxic 1	102	7193	3719	0.517	0	158	-1535		69	NM	119	12	131	-2310	6.1	-109	279.0	498	10.33	18
Anoxic 2	50	6846	3680	0.538	0	171	-1431	40.5	18	NM	136	7	143	-1321	6.7	-60	277.0	220	10.26	8
Aerobic 1	38	6972	3652	0.524	1	119	3619		0	NM	89	5	94	3410	4.4	159	294.0	-1183	10.89	-44
Aerobic 2	36	7056	3637	0.515	1.2	83	2506		0	NM	72	7	79	1044	3.7	48	300.0	-418	11.11	-15
Aerobic 3	36	7023	3791	0.540	1.3	48	2436	0	0	NM	43	3	46	2297	2.2	108	308.0	-557	11.41	-21
Effluent	38	41	23	0.561	1.3	48			0	NM										
RAS	36	12048	7113	0.590	1.1	53		39	0	NM	54	5	59		2.8		547		20.26	

11/5/2001
 SYS 2 @ 5°C
 SRT=9.1d

Location	COD	SS	VSS	VSS/SS	NO ₃ -N	PO ₄ -P	PO ₄ -P	Flow Rate	Ac	NH ₄ -N	PHB	PHV	PHA	PHA	PHA	PHA	Glycogen	Glycogen	Glycogen	Glycogen
	mg/L	mg/L	mg/L		mg/L	mg/L	mg/d	L/day	mg/L	mg/L	mg/L	mg/L	mg/L	mg/d	C-mmol/L	C-mmol/d	mg/L	mg/d	C-mmol/L	C-mmol/d
Synt. Feed	476				0	0		29	436	NM										
PO4-P Feed					0	1560		1.6	0											
Comb. Inf.	451				0	81.6		30.6	413	NM										
Anaerobic 1	214	3470	2289	0.660	0	147	-1392		183	NM	89	11	100	-1554	4.7	-74	118.0	1680	4.37	62
Anaerobic 2	200	3441	2237	0.650	0	160	-927		168	NM	106	9	115	-1070	5.4	-49	109.0	642	4.04	24
Anoxic 1	114	5200	3294	0.633	0	142	-2223		75	NM	114	5	119	-2964	5.6	-137	250.0	-46	9.26	-2
Anoxic 2	54	5218	3255	0.624	0	162	-2214	40.7	26	NM	127	10	137	-1993	6.4	-95	248.0	221	9.19	8
Aerobic 1	40	5638	3488	0.619	0.7	105	3990		0	NM	75	7	82	3850	3.8	180	261.0	-910	9.67	-34
Aerobic 2	34	5900	3617	0.613	0.9	78	1890		0	NM	47	5	52	2100	2.4	98	267.0	-420	9.89	-16
Aerobic 3	32	6003	3649	0.608	1	56	1540	0	0	NM	31	3	34	1260	1.6	59	274.0	-490	10.15	-18
Effluent	36	39	22	0.564	1.1	57			0	NM										
RAS	34	10933	6558	0.600	0.6	53		39.4	0	NM	48	3	51		2.4		504		18.67	

11/8/2001
 SYS 2 @ 5°C
 SRT=7.1 d

Location	COD	SS	VSS	VSS/SS	NO ₃ -N	PO ₄ -P	PO ₄ -P	Flow Rate	Ac	NH ₄ -N	PHB	PHV	PHA	PHA	PHA	PHA	Glycogen	Glycogen	Glycogen	Glycogen
	mg/L	mg/L	mg/L		mg/L	mg/L	mg/d	L/day	mg/L	mg/L	mg/L	mg/L	mg/L	mg/d	C-mmol/L	C-mmol/d	mg/L	mg/d	C-mmol/L	C-mmol/d
Synt. Feed	472				0	0		29	424	NM										
PO ₄ -P Feed					0	1456		1.6	0											
Comb. Inf.	447				0	76.1		30.6	402	NM										
Anaerobic 1	218	2916	1929	0.662	0	138	-1371		175	NM	80	6	86	-1064	4.0	-50	160.0	451	5.93	17
Anaerobic 2	203	2882	1953	0.678	0	150	-850		162	NM	96	5	101	-1062	4.7	-49	157.0	212	5.81	8
Anoxic 1	119	4992	3294	0.660	0	133	-2083		79	NM	92	12	104	-1559	4.9	-75	295.0	842	10.93	31
Anoxic 2	79	4986	3249	0.652	0	151	-1987	40.2	34	NM	116	9	125	-2318	5.8	-107	293.0	221	10.85	8
Aerobic 1	44	5124	3300	0.644	0.2	99	3650		0	NM	85	9	94	2176	4.4	101	298.0	-351	11.04	-13
Aerobic 2	38	5280	3324	0.630	0.3	74	1755		0	NM	73	7	80	983	3.7	46	311.0	-913	11.52	-34
Aerobic 3	34	5315	3298	0.621	0.3	51.1	1608	0	0	NM	62	4	66	983	3.1	46	320.0	-632	11.85	-23
Effluent	34	57	36	0.632	0.3	52.4			0	NM										
RAS	40	9452	5947	0.629	0.2	50		39.6	0	NM	65	5	70		3.3		563		20.85	

11/15/2001
 SYS 2 @ 5°C
 SRT=5.1 d

Location	COD	SS	VSS	VSS/SS	NO ₃ -N	PO ₄ -P	PO ₄ -P	Flow Rates	Ac	NH ₄ -N	PHB	PHV	PHA	PHA	PHA	PHA	Glycogen	Glycogen	Glycogen	Glycogen
	mg/L	mg/L	mg/L		mg/L	mg/L	mg/d	L/day	mg/L	mg/L	mg/L	mg/L	mg/L	mg/d	C-mmol/L	C-mmol/d	mg/L	mg/d	C-mmol/L	C-mmol/d
Synt. Feed	409				0	0		29.1	369	NM										
PO4-P Feed					0	1420		1.6	0											
Comb. Inf.	388				0	74.0		30.7	350	NM										
Anaerobic 1	210	1892	1243	0.657	0	110.1	-889		179	NM	58	2	60	-870	2.8	-40	174.0	-806	6.44	-30
Anaerobic 2	196	1910	1271	0.665	0	122	-847		167	NM	60	7	67	-498	3.1	-24	164.0	712	6.07	26
Anoxic 1	116	3147	2073	0.659	0	105	-775		87	NM	68	5	73	-856	3.4	-40	289.0	187	10.70	7
Anoxic 2	103	3130	2017	0.644	0	115.5	-1157	40.5	70	NM	76	8	84	-1212	3.9	-58	286.0	331	10.59	12
Aerobic 1	46	3158	1927	0.610	0	94	1499		0	NM	68	4	72	836	3.4	40	288.0	-139	10.67	-5
Aerobic 2	38	3199	1940	0.606	0.2	70	1673		0	NM	50	5	55	1185	2.5	58	291.0	-209	10.78	-8
Aerobic 3	34	3239	1936	0.598	0.2	56.5	941	0	0	NM	37	1	38	1185	1.7	56	293.0	-139	10.85	-5
Effluent	34	47	29	0.617	0.1	57			0	NM										
RAS	32	5716	3463	0.606	0.1	54.1		39	0	NM	59	3	62		2.9		522		19.33	

11/19/2001
 SYS 2 @ 5°C
 SRT=3.5 d

Location	COD	SS	VSS	VSS/SS	NO ₃ -N	PO ₄ -P	PO ₄ -P	Flow Rate	Ac	NH ₄ -N	PHB	PHV	PHA	PHA	PHA	PHA	Glycogen	Glycogen	Glycogen	Glycogen
	mg/L	mg/L	mg/L		mg/L	mg/L	mg/d	L/day	mg/L	mg/L	mg/L	mg/L	mg/L	mg/d	C-mmol/L	C-mmol/d	mg/L	mg/d	C-mmol/L	C-mmol/d
Synt. Feed	385				0	0		29.2	331	NM										
PO4-P Feed					0	1443		1.6	0											
Comb. Inf.	365				0	75.0		30.8	314	NM										
Anaerobic 1	234	1035	798	0.771	0	103.1	-695		222	NM	33	2	35	-303	1.6	-14	188.0	-1466	6.96	-54
Anaerobic 2	228	1064	824	0.774	0	107	-279		221	NM	37	4	41	-430	1.9	-20	184.0	286	6.81	11
Anoxic 1	154	1712	1249	0.730	0	99.8	-431		132	NM	45	3	48	-422	2.2	-19	298.0	-242	11.04	-9
Anoxic 2	150	1700	1260	0.741	0	107.3	-834	40.8	121	NM	52	2	54	-667	2.5	-31	294.0	445	10.89	16
Aerobic 1	50	1722	1198	0.696	0	99	584		0	NM	42	6	48	422	2.3	19	294.0	0	10.89	0
Aerobic 2	32	1731	1200	0.693	0.1	88	774		0	NM	34	3	37	774	1.7	37	302.0	-563	11.19	-21
Aerobic 3	34	1749	1210	0.692	0.3	77.2	760	0	0	NM	26	2	28	634	1.3	30	304.0	-141	11.26	-5
Effluent	34	48	35	0.729	0.4	76.3			0	NM										
RAS	30	2486	1706	0.686	0.2	75.9		39.6	0	NM	45	5	50		2.3		498		18.44	

12/17/2001
 SYS 2 @ 10°C
 SRT=12 d

Location	COD	SS	VSS	VSS/SS	NO ₃ -N	PO ₄ -P	PO ₄ -P	Flow Rates	Ac	NH ₄ -N	PHB	PHV	PHA	PHA	PHA	PHA	Glycogen	Glycogen	Glycogen	Glycogen
	mg/L	mg/L	mg/L		mg/L	mg/L	mg/d	L/day	mg/L	mg/L	mg/L	mg/L	mg/L	mg/d	C-mmol/L	C-mmol/d	mg/L	mg/d	C-mmol/L	C-mmol/d
Synt. Feed	519				0	0		32	482	39.3										
PO4-P Feed					0	1261		1.9												
Comb. Inf.	490				0	70.7		33.9	455	37.1										
Anaerobic 1	218	3622	2219	0.613	0	139	-2158		171	28.7	161	10	171	-3111	8.0	-144	141.0	1501	5.22	56
Anaerobic 2	159	3577	2234	0.625	0	166	-1982		120	30.0	201	21	222	-3743	10.4	-177	129.0	881	4.78	33
Anoxic 1	48	6742	4246	0.630	0	131	-2412		0	15.4	214	21	235	-4532	11.0	-211	304.0	1466	11.26	54
Anoxic 2	34	6755	4302	0.637	0	143	-1363	39.5	0	16.1	219	20	239	-454	11.2	-21	300.0	454	11.11	17
Aerobic 1	28	7087	4316	0.609	2	66	5706		0	4.7	148	16	164	5558	7.7	260	336.0	-2668	12.44	-99
Aerobic 2	24	7143	4305	0.603	4.3	29	2742		0	1.5	110	8	118	3409	5.5	161	352.0	-1186	13.04	-44
Aerobic 3	26	7164	4299	0.600	5.8	8.8	1497	0	0	0.5	83	6	89	2149	4.2	100	355.0	-222	13.15	-8
Effluent	28	41	26	0.634	6	10			0	0.7										
RAS	26	13176	7672	0.582	5.2	7.1		40.2	0	0.3	128	18	146		6.9		660		24.44	

12/20/2001
 SYS 2 @ 10°C
 SRT=12 d

Location	COD	SS	VSS	VSS/SS	NO ₃ -N	PO ₄ -P	PO ₄ -P	Flow Rate	Ac	NH ₄ -N	PHB	PHV	PHA	PHA	PHA	PHA	Glycogen	Glycogen	Glycogen	Glycogen
	mg/L	mg/L	mg/L		mg/L	mg/L	mg/d	L/day	mg/L	mg/L	mg/L	mg/L	mg/L	mg/d	C-mmol/L	C-mmol/d	mg/L	mg/d	C-mmol/L	C-mmol/d
Synt. Feed	520				0	0		32	478	40.0										
PO4-P Feed					0	1563		2.1												
Comb. Inf.	488				0	96.3		34.1	449	37.5										
Anaerobic 1	222	3592	2197	0.612	0	180	-3572		169	29.5	177	16	193	-5069	9.0	-237	133.0	2111	4.93	78
Anaerobic 2	154	3540	2152	0.608	0	199	-1404		120	30.8	200	28	228	-2587	10.7	-123	122.0	813	4.52	30
Anoxic 1	48	6579	4022	0.611	0	153	-1945		0	16.0	197	24	221	-3163	10.4	-148	304.0	1190	11.26	44
Anoxic 2	34	6543	4060	0.621	0	162	-1025	39.8	0	17.2	210	21	231	-1139	10.8	-52	300.0	456	11.11	17
Aerobic 1	28	6837	4107	0.601	2	66	7114		0	6.2	131	11	142	6595	6.6	309	345.0	-3335	12.78	-124
Aerobic 2	32	6952	4087	0.588	3.5	40	1927		0	3.5	99	12	111	2297	5.2	107	358.0	-963	13.26	-36
Aerobic 3	36	7032	4055	0.577	5.5	25	1112	0	0	2.7	83	7	90	1556	4.2	74	363.0	-371	13.44	-14
Effluent	32	56	31	0.554	5.8	24.5			0	2.9										
RAS	30	12776	7469	0.585	5.2	19.4		40	0	1.9	117	12	129		6.0		670		24.81	

12/24/2001
SYS 2 @ 10°C

SRT=12 d

Location	COD	SS	VSS	VSS/SS	NO ₃ -N	PO ₄ -P	PO ₄ -P	Flow Rate	Ac	NH ₄ -N	PHB	PHV	PHA	PHA	PHA	PHA	Glycogen	Glycogen	Glycogen	Glycogen
	mg/L	mg/L	mg/L		mg/L	mg/L	mg/d	L/day	mg/L	mg/L	mg/L	mg/L	mg/L	mg/d	C-mmol/L	C-mmol/d	mg/L	mg/d	C-mmol/L	C-mmol/d
Synt. Feed	498				0	0		32	449	NM										
PO4-P Feed					0	1549		2												
Comb. Inf.	469				0	91.1		34	423	NM										
Anaerobic 1	196	3451	2111	0.612	0	173	-3406		147	NM	184	12	196	-5458	9.2	-255	127.0	2412	4.7	89
Anaerobic 2	147	3405	2135	0.627	0	196	-1677		102	NM	205	18	223	-1968	10.4	-93	113.0	1021	4.2	38
Anoxic 1	54	6422	3923	0.611	0	144	-1479		0	NM	200	21	221	-3509	10.4	-165	302.0	799	11.2	30
Anoxic 2	36	6400	4022	0.628	0	157	-1500	38.9	0	NM	212	15	227	-692	10.6	-30	300.0	231	11.1	9
Aerobic 1	40	6579	4046	0.615	2.4	66	6962		0	NM	125	14	139	6732	6.5	313	349.0	-3749	12.9	-139
Aerobic 2	32	6697	4005	0.598	4.6	36	2295		0	NM	96	10	106	2525	5.0	118	369.0	-1530	13.7	-57
Aerobic 3	34	6743	3956	0.587	5.9	22	1071	0	0	NM	83	4	87	1454	4.1	69	366.0	230	13.6	8
Effluent	34	61	36	0.590	6	21			0	NM										
RAS	32	12592	7341	0.583	5.3	20		42.5	0	NM	122	13	135		6.3		645		23.9	

NM: not measured.

12/29/2001
SYS 1 @ 10°C

SRT=8.4 d

Location	COD	SS	VSS	VSS/SS	NO ₃ -N	PO ₄ -P	PO ₄ -P	Flow Rates	Ac	NH ₄ -N	PHB	PHV	PHA	PHA	PHA	PHA	Glycogen	Glycogen	Glycogen	Glycogen
	mg/L	mg/L	mg/L		mg/L	mg/L	mg/d	L/day	mg/L	mg/L	mg/L	mg/L	mg/L	mg/d	C-mmol/L	C-mmol/d	mg/L	mg/d	C-mmol/L	C-mmol/d
Synt. Feed	NM				0	0		31.6	471	33										
PO4-P Feed					0	1207		2.1												
Comb. Inf.	NM				0	75.2		33.7	442	30.9										
Anaerobic 1	NM	3029	1879	0.620	0	147	-2459		162	22.7	146	15	161	-3866	7.5	-181	147.0	1606	5.44	59
Anaerobic 2	NM	2996	1870	0.624	0	179	-2358		112	NM	195	14	209	-3538	9.8	-164	126.0	1548	4.67	57
Anoxic 1	NM	5722	3515	0.614	0	142	-2157		0	NM	169	28	197	-2290	9.3	-112	311.0	936	11.52	35
Anoxic 2	NM	5769	3577	0.620	0	146	-458	40	0	15.8	181	19	200	-343	9.4	-12	311.0	0	11.52	0
Aerobic 1	NM	5870	3549	0.605	2.2	92	4018		0	10.4	124	15	139	4538	6.5	212	339.0	-2083	12.56	-77
Aerobic 2	NM	5942	3561	0.599	4.1	54	2827		0	NM	86	11	97	3125	4.6	146	358.0	-1414	13.26	-52
Aerobic 3	NM	5969	3520	0.590	4.9	24	2232	0	0	4.2	60	8	68	2158	3.2	101	367.0	-670	13.59	-25
Effluent	NM	50	26	0.520	4.7	24.5			0	NM										
RAS	NM	11463	6984	0.609	4.4	22		40.7	0	NM	102	17	119		5.6		669		24.78	

NM: not measured.

12/31/2001
 SYS 2 @ 10°C
 SRT=5.2 d

Location	COD	SS	VSS	VSS/SS	NO ₃ -N	PO ₄ -P	PO ₄ -P	Flow Rates	Ac	NH ₄ -N	PHB	PHV	PHA	PHA	PHA	PHA	Glycogen	Glycogen	Glycogen	Glycogen
	mg/L	mg/L	mg/L		mg/L	mg/L	mg/d	L/day	mg/L	mg/L	mg/L	mg/L	mg/L	mg/d	C-mmol/L	C-mmol/d	mg/L	mg/d	C-mmol/L	C-mmol/d
Synt. Feed	NM				0	0		31	480	37										
PO4-P Feed					0	1266		2.3												
Comb. Inf.					0	87.4		33.3	447	NM										
Anaerobic 1	NM	2765	1794	0.649	0	164	-1916		180	29	109	16	125	-2262	5.9	-107	159.0	685	5.89	25
Anaerobic 2	NM	2721	1752	0.644	0	190	-1895		152	NM	140	12	152	-1968	7.1	-91	148.0	802	5.48	30
Anoxic 1	NM	4862	3059	0.629	0	165	-2348		50	NM	152	9	161	-3383	7.5	-157	315.0	1099	11.67	41
Anoxic 2	NM	4890	3071	0.628	0	180	-1695	39.6	0	23	159	14	173	-1356	8.1	-65	310.0	565	11.48	21
Aerobic 1	NM	4991	3058	0.613	1.7	126	3964		0	16.2	106	13	119	3964	5.6	185	332.0	-1615	12.30	-60
Aerobic 2	NM	5077	3083	0.607	2.9	90	2642		0	11.4	76	8	84	2569	3.9	121	346.0	-1028	12.81	-38
Aerobic 3	NM	5102	3045	0.597	3.3	63	1982	0	0	10.1	48	4	52	2349	2.4	110	348.0	-147	12.89	-5
Effluent	NM	39	24	0.615	3.5	64			0	9.8										
RAS	NM	9656	5192	0.538	3.1	61		40.1	0	NM	84	9	93		4.4		646		23.93	

NM: not measured.

1/5/2001
 SYS 2 @ 10°C
 SRT=2.9 d

Location	COD	SS	VSS	VSS/SS	NO ₃ -N	PO ₄ -P	PO ₄ -P	Flow Rates	Ac	PHB	PHV	PHA	PHA	PHA	PHA	Glycogen	Glycogen	Glycogen	Glycogen
	mg/L	mg/L	mg/L		mg/L	mg/L	mg/d	L/day	mg/L	mg/L	mg/L	mg/L	mg/d	C-mmol/L	C-mmol/d	mg/L	mg/d	C-mmol/L	C-mmol/d
Synt. Feed	498				0	0		31.7	469										
PO4-P Feed					0	409		2.55											
Comb. Inf.	461				0	30.5		34.25	434										
Anaerobic 1	254	1372	1054	0.768	0	70	-709		207	51	8	59	-635	2.8	-31		349	6.20	13
Anaerobic 2	238	1344	1038	0.772	0	80.2	-753		199	60	6	66	-517	3.1	-24	167	251	6.07	9
Anoxic 1	146	2544	1889	0.743	0	70	-1248		112	81	5	86	-234	4.0	-8	164	-227	12.00	-8
Anoxic 2	134	2537	1894	0.747	0	86.3	-1857	39.6	92	87	7	94	-912	4.4	-43	324	342	11.89	13
Aerobic 1	48	2649	1923	0.726	1.5	50.9	2632		0	69	7	76	1338	3.6	62	321	-223	12.00	-8
Aerobic 2	36	2730	1960	0.718	2.6	34.9	1190		0	55	9	64	892	3.0	41	324	-74	12.04	-3
Aerobic 3	38	2804	1932	0.689	3.1	22.1	952	0	0	44	18	62	149	2.9	5	325	74	12.00	3
Effluent	36	30	18	0.600	3.3	22.2			0							324			
RAS	36	4542	3039	0.669	2.7	20.1		40.1	0	96	21	117		5.5				22.70	

1/7/2002
SYS 2 @ 10°C

SRT=1.8d

Location	COD	SS	VSS	VSS/SS	NO ₃ -N	PO ₄ -P	PO ₄ -P	Flow Rates	Ac	NH ₄ -N	PHB	PHV	PHA	PHA	PHA	PHA	Glycogen	Glycogen	Glycogen	Glycogen
	mg/L	mg/L	mg/L		mg/L	mg/L	mg/d	L/day	mg/L	mg/L	mg/L	mg/L	mg/L	mg/d	C-mmol/L	C-mmol/d	mg/L	mg/d	C-mmol/L	C-mmol/d
Synt. Feed	465				0	0		31.7	429	35										
PO ₄ -P Feed					0	406		2.55												
Comb. Inf.	430				0	30.2		34.25	397	NM										
Anaerobic 1	248	985	798	0.810	0	56	-566		211	27	35	5	40	-439	1.9	-21	170	276	6.30	10
Anaerobic 2	234	1006	814	0.809	0	64	-591		205	NM	42	4	46	-443	2.2	-20	168	148	6.22	5
Anoxic 1	156	1600	1233	0.771	0	55	-378		116	NM	52	6	58	598	2.7	30	328	-789	12.15	-29
Anoxic 2	148	1649	1278	0.775	0	64	-1026	39.6	102	22	59	5	64	-627	3.0	-29	324	456	12.00	17
Aerobic 1	46	1820	1349	0.741	1.1	48	1190		0	18.9	48	4	52	855	2.4	40	325	-74	12.04	-3
Aerobic 2	42	1899	1368	0.720	2.5	37	818		0	16	43	7	50	149	2.4	6	327	-149	12.11	-6
Aerobic 3	38	1981	1418	0.716	2.7	30	520	0	0	15	42	7	49	74	2.3	3	323	297	11.96	11
Effluent	40	44	31	0.705	2.6	30			0	15										
RAS	36	3324	2269	0.683	2.4	29		40.1	0	NM	73	22	95		4.5		603		22.33	

UFUK GOKSIN ERDAL

VITA

Ufuk G. Erdal was born in Istanbul, Turkey. He received his Bachelor of Science degree in Environmental Engineering from the College of Civil Engineering of Istanbul Technical University in 1988. He worked as an environmental engineer at a civil and environmental engineering company, STFA, between 1988 and 1989. Starting in 1989, he was hired as project engineer at State Pulp and Paper Works Industries. In 1993, while he was working as a chief engineer, he won an overseas graduate program scholarship. To pursue graduate studies in environmental engineering, he attended the Ohio State University, and got his Master of Science Degree in the Summer semester of 1996. He was then accepted to the Ph.D. program in the Civil and Environmental Engineering Department at Virginia Tech. He successfully completed his studies in the Spring semester of 2002.